Aero Modeller

June 1972

INCORPORATING
MODEL AIRCRAFT
HOBBY MAGAZINE

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

INSIDE!

FULL SIZE PLANS OF TOP COUPE D'HIVER MODEL

DART
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inc. Tax

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.049 cu. in.
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at your model shop !

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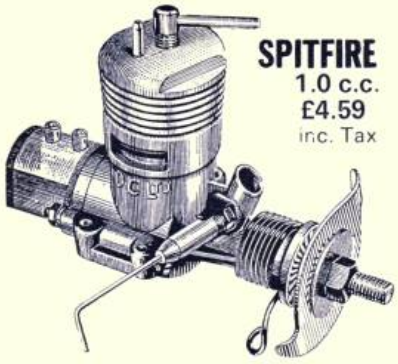
THE GREATEST RANGE OF SPORTS FLYERS' ENGINES



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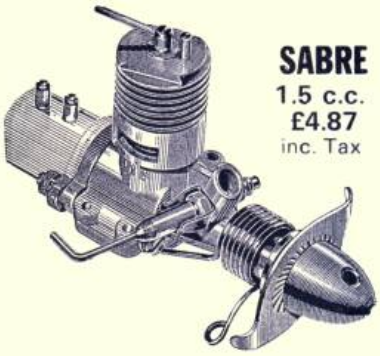

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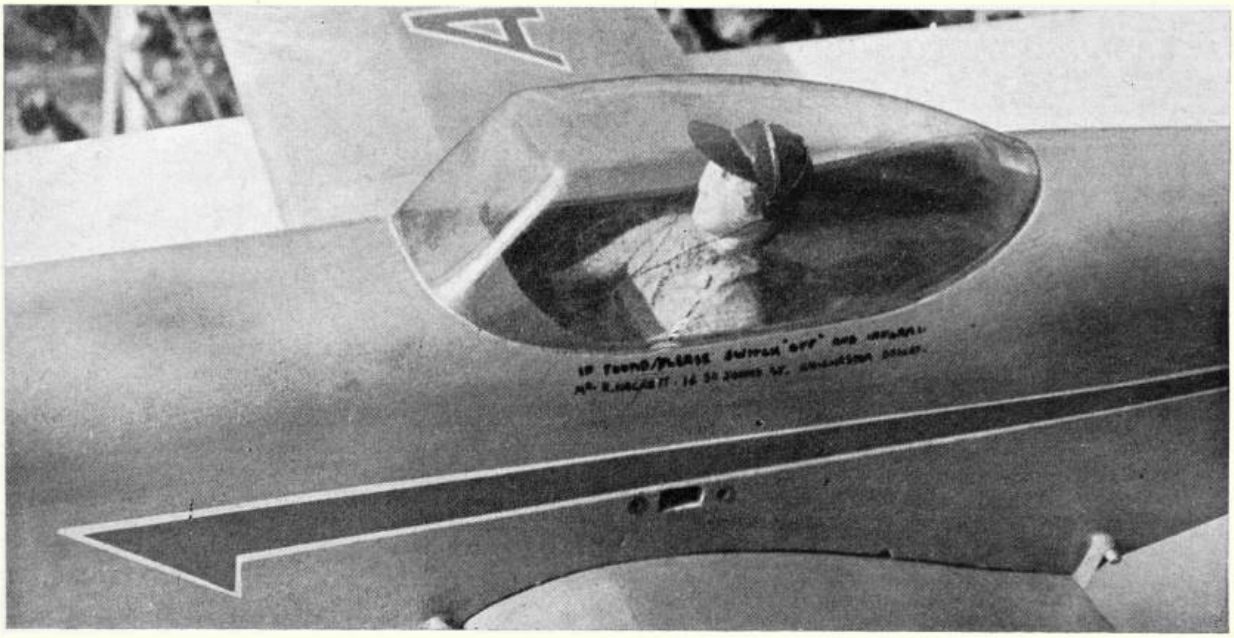

Model (and pilot) by Roy Hackett, of the Chichester Club.

Notice the 'pilot' in this R/C model? He does seem to have a bit of individuality and character, doesn't he? Not just one of the run-of-the-mill plastic types. He's carved from balsa! But you need to be a bit of an artist to produce lifelike results starting from a piece of scrap balsa block. If you haven't got that particular ability (and that means most of us), then the moulded plastic pilot is the best answer for added cockpit realism. All you can go wrong on then is the paint job!

Where balsa does a 'real' job for everyone is on the airframe – the 'engineering' side on which everything depends. Balsa is to the aeromodeller what light alloys are to the full-size aircraft constructor – the 'standard' material choice. And the same engineering principles apply – the material needs to be *selected* for the job it has to do. That's why *Solarbo Balsa* is the automatic choice for aeromodellers who know their materials. The balsa that is specially selected and graded *for* aeromodelling use – every piece! Proven by tens of thousands of aeromodellers the world over –and by their flying results.

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RACING DIESEL OR GLOW
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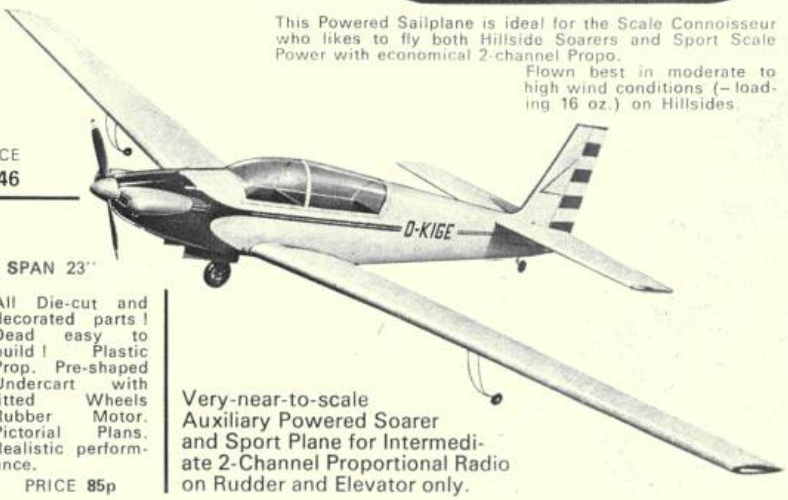
This Powered Sailplane is ideal for the Scale Connoisseur who likes to fly both Hillside Soarers and Sport Scale Power with economical 2-channel Propo.
Flown best in moderate to high wind conditions (– loading 16 oz.) on Hillsides.



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

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PRICE **85p**

IMPALA

FOR RADIO

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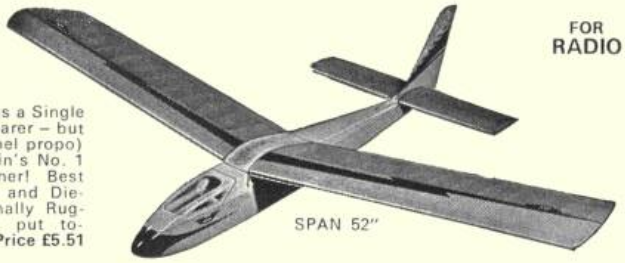

SPAN 52"

A TRIO OF BEST SELLING CONTROL-LINERS!

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For 3 to 5 cc motors. Combined flap and elevator. A superb stunt flyer. Lightweight, robust and highly manoeuvrable. Ideal for 'Glo-star'. **Price £2.45**

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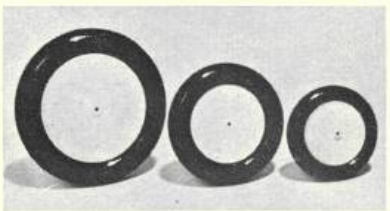

3½" TOMTIT wheels now have reinforced centres – for all models up to 7 lb. weight!

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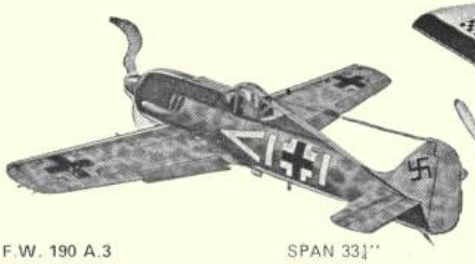

F.W. 190 A.3 SPAN 33¼"

COMBATEER SPAN 38"

BOMB-BAT SPAN 25"

SEND S.A.E. FOR LATEST VERON BROCHURE

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June 1972 Volume XXXVII No. 437

CONTENTS

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COMMENT

Split by specialisation into two completely different meetings, the 1972 British Nationals take place at Hullavington and Strubby at the end of this month. And though this sectorian distinction of 'controlled' flight at one place on full public view and free-flight elsewhere in sheltered privacy may appear to be the biggest change in the character of the 'Nats'; in reality the most remarkable feature is that the 1972 events are being held at all!

In recent weeks the officers of the S.M.A.E. have been involved in a series of crises which might well have spelled an end to the annual Jamboree. As members will be advised when a survival appeal is launched; the vital insurance policies which are a requisite for use of a Service airfield could only be re-negotiated at a considerable increase of premium, way beyond the present means permitted at current membership fees. But the Insurance *has* been re-negotiated and the S.M.A.E. programme of contests *can* proceed.

Then the R.A.F. itself was obliged to cancel permission to use Hullavington. Happily, this situation too was re-negotiated with an undertaking to restrict use to the airfield only – hence the large out-of-bounds area on our map (page 343). There have been other, less drastic situations, all capably dealt with by a small dedicated group of S.M.A.E. officials. This is what the Society is all about. It serves to protect the interests of *all* modellers, for the promotion and well-being of their chosen hobby. Here's hoping that May 27/28/29th will be blessed with calm, cloudless skies to reward the organisers for a job well done.

on the cover

Worm's-eye view of Wal Cordwell's Gloster Gladiator which served him so well during 1971, including fifth place at the National Championships Scale event. Weathered appearance and good detail work give the right atmosphere to this large machine which always turns in a good flight performance.

next month

Long-awaited feature on the **Russian record breakers**, plus drawings of the third line **control handle** *will* appear! More on flapped wings Ray Hegy's tiny biplane **'El Chuparosa'** detailed in Aircraft Described. Pegasus Model's **Warlord** kit reviewed. Special beginner's feature with plans for **ultra simple glider** plus all the regular features. On sale June 16th.

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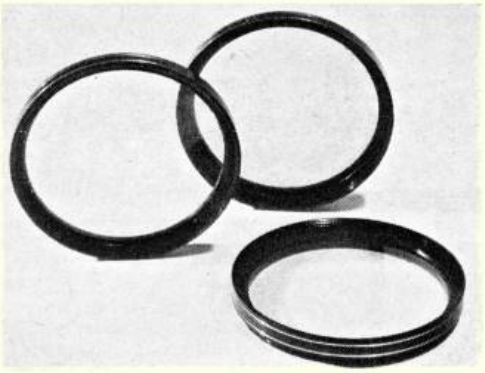

THIS IS THE FIRST of a series of special offers that we are making available to readers. In every case they will be useful items made up for us alone: they may, as with these filters be accepted as universally useful, or, they may be experimental items that we consider of particular merit. . . .
These filters have been selected specially for us by a manufacturer of world renown and are packeted under our Fountain badge. The selection offered provides the most useful and widest coverage for a variety of uses . . . Suggestions for extensions to this range will be welcomed.

SKYLIGHT This is of universal use for colour people – it cuts back excessive blue and reduces haze . . . sometimes called a UV or ultra violet filter. Can be left on lens permanently when it acts as clear cover.

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CLOSE-UP+2 A most valuable lens to enable you to come closer for a picture of your favourite cactus in flower; your plastic model; brings up to 15 in. in range.

PRICES 49 mm. size **£1.60** each inc. postage. 52 mm. size **£1.75** each.

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If you still have your instruction booklet this will give you size. Filters are screw-in type which fit inside the lens threaded ring. If you do not know size measure across *diameter* of lens opening metal to metal inside. This will give you size required. The two sizes offered cover many of the leading makes such as:
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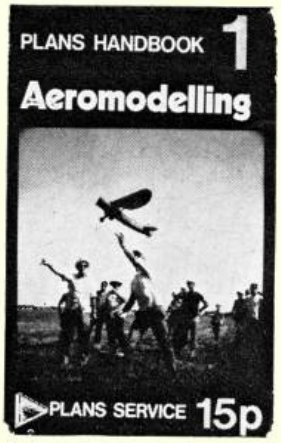
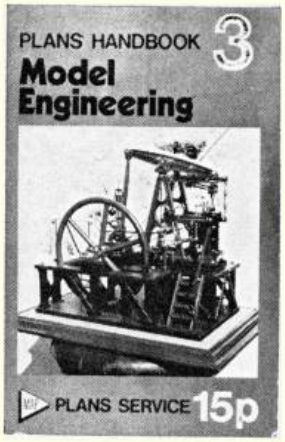


128 pages featuring hundreds of working model aircraft, illustrated almost entirely by photographic reproductions of the actual models, plus span, brief description and graded for ease of construction; also selected engine list with tabulated data; index to illustrated plans, X list of vintage unorthodox novel plans, many other classifications, useful articles, order forms. Also good selection of trade advertisements.

96 pages of plans of scale and semi-scale ships, tugs, lifeboats, submarines, paddle steamers, period ships, racing yachts, hovercraft, cabin cruisers, mostly illustrated, fully described, and classed for ease of building. Working model cars and usual vehicles are included and the very range of scale car drawings, racing cars, ancient and modern. Index of drawings; useful articles on building; waterline plans; trade advertisements.



96 pages of working model drawings for steam locomotives, traction engines, steam engines, petrol engines, workshop equipment from LBSC, Westbury, Evans, Maskalyne, Bradley, Hughes. Plus useful model engineering information, screw-cutting tables, standard threads, letter and number drills, wire and sheet metal gauges, miscellaneous information.

96 pages include a truly *full* range of R/C model plans. There are 128 R/C aircraft, all illustrated, including S/C Sports Models and Trainers, Galloping Ghost Models, Competition Aerobatic Models, Multi-Sport and Trainers, Pylon Racers, S/C and M/C Scale Gliders and Soarers. 87 model boats suitable for radio control, plus do-it-yourself R/C systems.

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One of the most successful British produced light aircraft ever, the Britten Norman Islander makes a magnificent addition to the Airfix range. This finely detailed kit is supplied with optional interiors—executive or air taxi—and two sets of markings.
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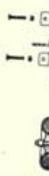
Graupner



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8 x 6 ... 64p 9½ x 5 ... 72p
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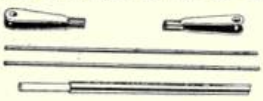

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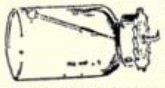

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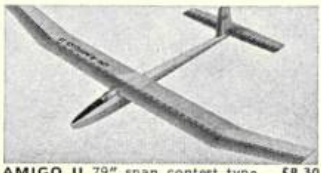
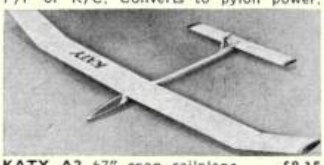


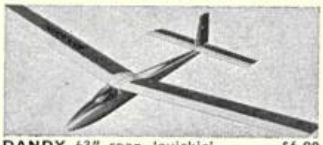
AMIGO II 79" span contest type £8.30
Also takes 049 pylon power egg.

FILOU 50" span sailplane £4.85
F/F or R/C. Converts to pylon power.



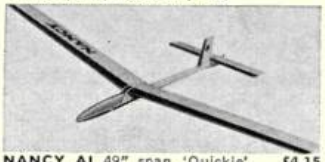
KATY A2 67" span sailplane £8.15
Preshaped balsa and plastic parts.

CIRRUS giant 118" span £18.75
Moulded ABS plastic fuselage, precut wood parts, all hardware, etc. Superb!
also **CUMULUS** 2800 110" span £41.60
Injection moulded parts. Ideal for R/C.



DANDY 63" span 'quickie' £6.90
also **BEGINNER** 39" span £2.70

FOKA 102" span scale model £14.80
Kit features finished one-piece moulded fuselage in high-impact plastic, other pre-formed parts, hardware, etc.



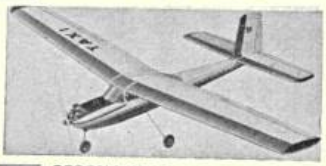
NANCY AI 49" span 'Quickie' £4.15
also **UHU Mark III** 43" span £2.80
FOUGA SYLPHE (Jetex) £1.78

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-bild' plan and separate R/C INSTALLATION PLAN. Wingspan 59". Engines .15 to .35. Ideal for 2- to 8-channel R/C.

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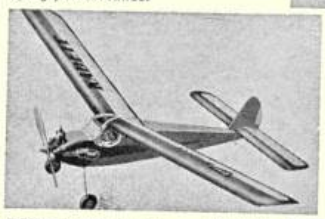
A truly SUPERB prefabricated kit with injection moulded plastic fuselage, foam wings and tail. Span 61" for 5-6 c.c. motors. This kit is an outstanding example of modern design and use of mixed materials – plastic, foam-plastic and wood – with all parts fully shaped. The most advanced production of its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

CONSUL £9.95
41" span super kit with finished moulded foam plastic fuselage, wings, tail, diecut wood parts, formed undercarriage, wheels, etc. Ideal for rudder-only R/C – or equally suitable for free-flight. One of the first 'all plastic' kit models – and one of the best! Quick and easy assembly and super flying performance.

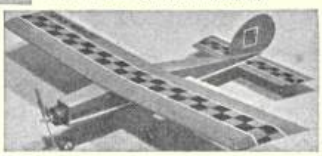


KADETT £5.40
High wing F/F sports model, in the traditional style. Kit is complete down to hardware, wheels, adhesives, decals, etc. A popular favourite for 'Sunday flying'.

Also

TOPSY 32" span £3.45
Very stable high wing cabin monoplane for free-flight, or radio control, Ideal for .049 motors.

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.



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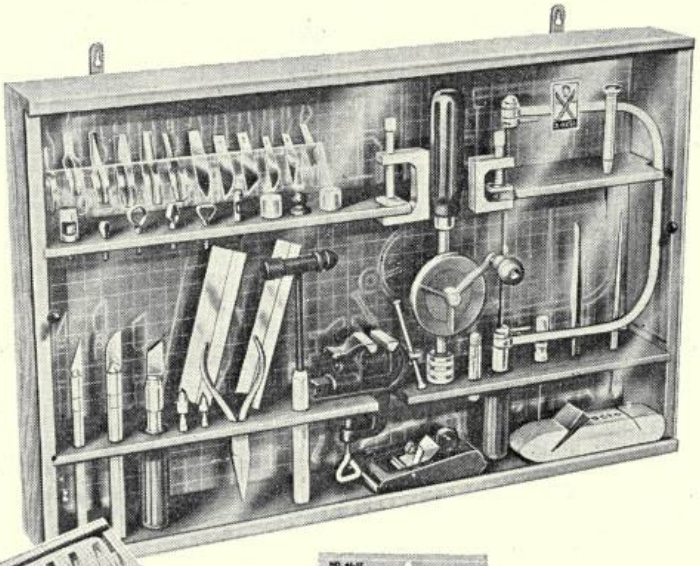
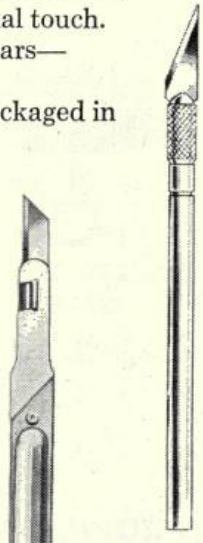


No. 88
X-acto Hobby Den Tool Cabinet. Sturdy woodfitted cabinet with sliding see-thru cover shows off full assortment of X-acto hobby tools, knives, and blades against a blueprint silhouette background of each tool for easy replacement.



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X-acto Knife. Light aluminium handle, with blade.

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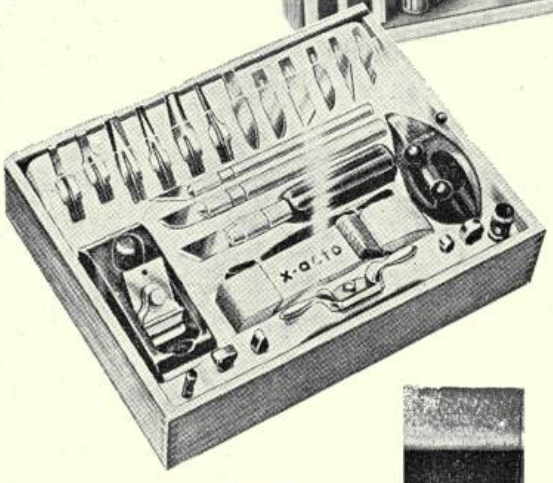
X-acto Knife. Patented lock handle; reversible blade.



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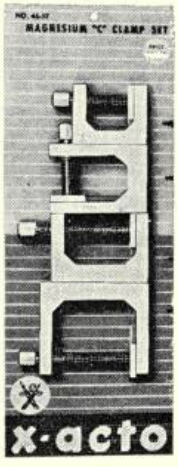

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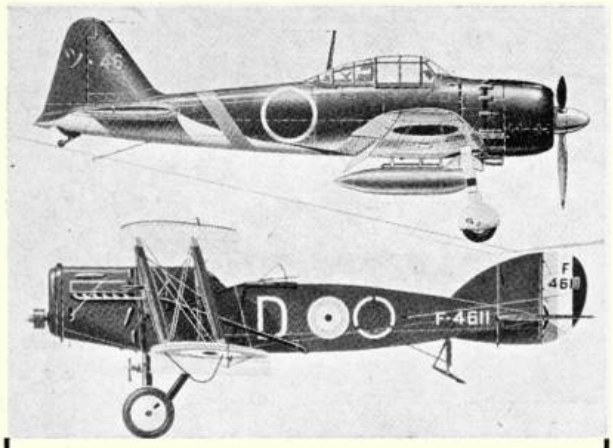

No. 236: Zero-Sen A6M5/8 ('Zeke 52')
No. 237: Bristol Fighter (1918-30s)

This month – two exciting *Profiles* on outstanding fighters. Many unusual photos, 7,500 words in 24 pp. – including 4 pp. brilliantly accurate full-colour five-view and side views by artist P. Endsleigh Castle, ARAeS. Both 'must' *Profiles* for serious modellers! Only 35p each; now available at local book and model shops and some newsagents. *In difficulty, direct from Publishers*, 40p each and 46p incl. p.&p. OVER £250 WORTH OF PRIZES . . . Entry Forms in *Profiles* 236 and 237 (and Avro Lancaster Mk. II, *Profile* 235). Hurry! Take part in challenging *Aircraft Profile No. 250 Competition*.

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June issue of RADIO CONTROL MODELS & ELECTRONICS reports fully on the highly successful *R/C Expo* exhibition held over Easter, where manufacturers introduced many new R/C hobby products.

Special interest features in this issue include plans for an R/C Gyrocopter, Kit Reviews on the Veron Fournier RF-5 and the P.B. Porsche R/C car, plus Part 2 of Denis Rowland's *Theory and Practice of Engine Tuning*, and Part 2 of Peter Bragg's *Instant Rudder* technical feature which, this month, covers the receiver/actuator side of this simple pulse proportional system.

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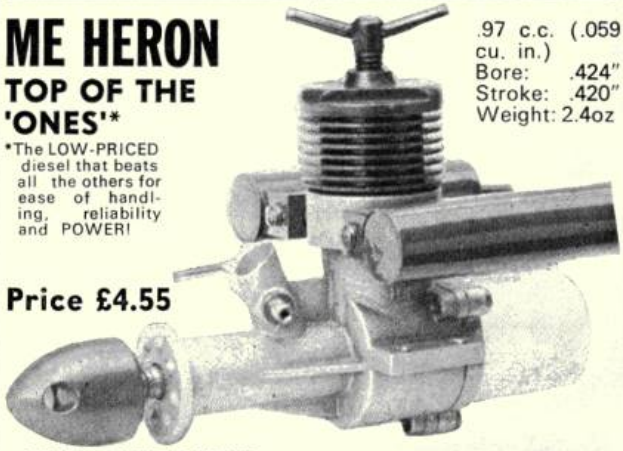

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"Adlerangriff", the German 'attack of the Eagles'. Planned date Tuesday, August 13th 1940. Intention: to crush once and for all the vastly outnumbered Royal Air Force and so 'soften up' Britain for 'Operation Sea Lion', Hitler's planned invasion of England. The invasion that never was.

Up to this time Göring's much vaunted Luftwaffe had had an easy time of it. In Poland and in France, most of the outnumbered aircraft had been destroyed on the ground before the Blitzkreig attack on the cities began. The British army had lost all its heavy equipment at Dunkirk, and the R.A.F. had lost more planes – and more pilots – than the country could afford.

So, on August 13th, with the codeword Adler Tag – 'Eagle Day' – the German attack was launched. At dawn, 84 Dorniers took the air under command of Oberst Johannes Fink. Yet in sight of the English coastline, over Cap Blanc Nez, just South of Calais, the Dorniers – promised clear skies – were met by rising banks of cloud. When the escorting Messerschmitt Bf 110 of fighter group commander Joachim Huth finally appeared, it dived repeatedly past the nose of Fink's Dornier. Fink took this as telling him that the fighters were with him. But this was not the case. The fighter escort was, in fact, returning. *The Eagle Day attack had been postponed until 2 p.m.* So the Dorniers, one key radio out of action, kept on, heading for Eastchurch airfield and Sheerness, Kent.

The British too had their problems. Because of a surprise raid on the previous day by Bf 110 long-range fighters unexpectedly fitted with bombs, Ventnor radar on the Isle of Wight was out of action for weeks and radar installations were damaged at Dover, Rye and Pevensey.

On this occasion little warning was given, and aircraft were still lined wingtip to wingtip on the ground at Eastchurch when Fink's Dorniers arrived. The attack was on. Spitfires of the R.A.F.'s 74 Squadron, Hornchurch, fell on the massed – and unescorted – Dorniers from the rear, but the leaders escaped, and their bombs rained on Eastchurch airfield, smashing the operations block, killing and wounding nearly 40 personnel and writing off five grounded Blenheims. Yet the field was operational again within hours as a result of superhuman effort.

The real 'attack of the Eagles' began in the afternoon, as the Luftflotte groups 2 and 3 arrived over England between 3.45 and 5 p.m., aimed towards Portland, Southampton, Kent and the Thames Estuary. Forewarned by the earlier false start, 11 Group of Fighter Command was ready to meet the threat.

The great battle was joined in the skies over Southern England. 13 Spitfires saw a formation of Junkers 87b bombers below them and dived on them out of the sun, breaking up the escorting Bf 109 fighters and sending at least one down in flames. Score 1 for the R.A.F. Attacked by the Spitfires of 609 Squadron, nine Stukas were destroyed in minutes. The remainder missed their target, the airfield at Middle Wallop, and did little damage to Andover airfield, not a key target.

During this long-awaited Eagle Day the Luftwaffe flew 1,485 sorties – their most active day ever to that date. R.A.F. losses in the air were 13 fighters against 45 German aircraft brought down. Two of Britain's airfields were damaged, but one supposed fighter station turned out in fact to be a Coastal Command air station, 'a major error by German reconnaissance'. The main aim of Eagle Day – to crush Britain's fighter strength – was not achieved.

Yet Eagle Day was decisive. It is possible that the R.A.F.'s victory on this day set the pattern for the remaining days of the Battle of Britain. In this battle, the Nazi Eagle had its wings clipped.

✳ It is only a fitting tribute to the Spitfires and Hurricanes that gained this great victory that Revell should make them in both 1/32nd scale and 1/72nd scale, so that they can be represented in everyone's WW11 model collection—an appropriate reminder of a great victory.

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✳ The Junkers Ju 88 A-4, the most versatile of German planes also comes from Revell's vast range of 1/72nd scale model kits.

✳ There are over 60 World War I and II aircraft in the Revell range—ask for details where you buy your kits.

Adler Tag

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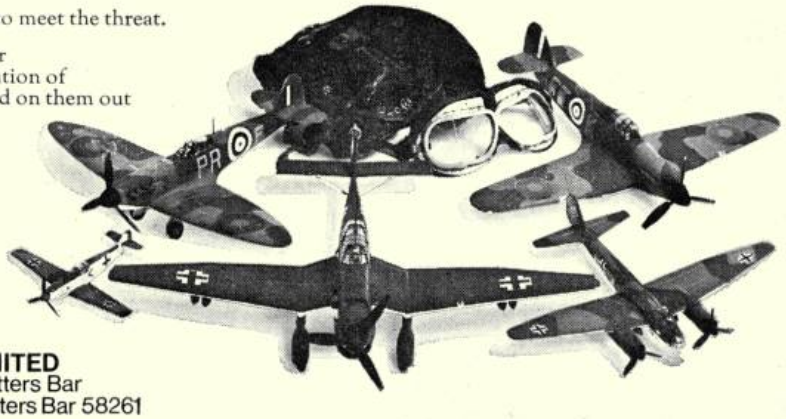

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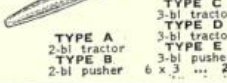


TYPE A
2-bl tractor
TYPE B
2-bl pusher

TYPE C
3-bl tractor
TYPE D
3-bl tractor
TYPE E
3-bl pusher

TYPE A				TYPE B		TYPE C	
5 x 3	11p	8 x 8	29p	5½ x 3	13p	5 x 3	26p
5 x 4	11p	9 x 4	37p	5½ x 4	13p	5 x 4	26p
5½ x 3	13p	9 x 6	37p	6 x 3	16p	6 x 3	28p
5½ x 4	13p	9 x 7	37p	6 x 4	16p	6 x 4	28p
6 x 3	16p	9 x 8	37p	8 x 6	45p	TYPE D	
6 x 4	16p	10 x 4	45p	9 x 6	53p	7 x 8	43p
7 x 4	21p	10 x 6	45p	10 x 6	60p	8 x 6	64p
7 x 6	21p	11 x 4	53p	Types A, B, C and E yield low Type D, aluminised nylon,		8 x 8	64p
7 x 8	21p	11 x 6	53p			9 x 6	75p
8 x 4	29p	11 x 8	73p			10 x 4	75p
8 x 6	29p	12 x 4	75p			10 x 6	75p
6 x 3 ... 28p.		12 x 5	75p				
		12 x 6	75p				

SEE THEM ALL AT YOUR LOCAL MODEL SHOP!

Heard at the HANGAR DOORS

SPORTS COUNCIL chairman Dr. Roger Bannister was the target for an hour of telephoned questions on the B.B.C. National Network, Tuesday, April 11th, in the *It's Your Line* programme. Inevitably, the forum was concerned with finance for sporting activities, and excellent cases were presented for ice speed skating, angling and badminton, while the fortunes of a 3,000 strong Yorkshire football club obliged to share fields with wandering bovine herds, were unfavourably compared with heavily subsidised amateur theatricals who are generously endowed by the Arts Council. The listener was treated to a frank explanation of how grants are dispersed; how some 80 different activities are 'recognised' and an effort was made to assure questioners that the minority interests have been given consideration. But this was of no consolation to aeromodellers. A number of prominent modellers endeavoured to lodge questions on the broadcast. One succeeded, and his exchanges with Dr. Bannister and Robin Day did nothing more than to expose the incredible attitude of the Sports Council to aeromodelling.

George Bushell was the questioner. He opened with the ploy of required numerical support for a recognised sport, and having drawn the curiosity of both the studio broadcasters, revealed that he was speaking for model aeroplane flying. Day and Bannister could not conceal their mirth. Day countered with a claim that if aeromodelling was to be admitted as a grant-claiming sport, then the model boat operators on Royal Kensington's Round Pond had equal right to claim. When George explained the physical effort needed to chase free-flight, it was clear that neither of the personalities had the slightest conception of what is involved. A provoked analogy, with full-size gliding and archery defended by Dr. Bannister as involving physical activity must have had a hundred thousand aeromodellers flushed in protest throughout the country. George declared himself unsatisfied and was faded out with a promise of continuing the crusade in writing.

Sadly, the programme confirmed all the values of aeromodelling as a sport, although the chairman failed to recognise it. Quotations of Anglo-Soviet exchange visits, of potential winners sacrificing a chance to competitors whom they have helped, of family participation, of the merits in physical relaxation as well as recreation, of the National Body finding its own funds to support its teams, of broad age spread in interest, of extensive personal involvement, these are all attributes of model flying which amply qualify aeromodelling as a sport under the Council's own terms.

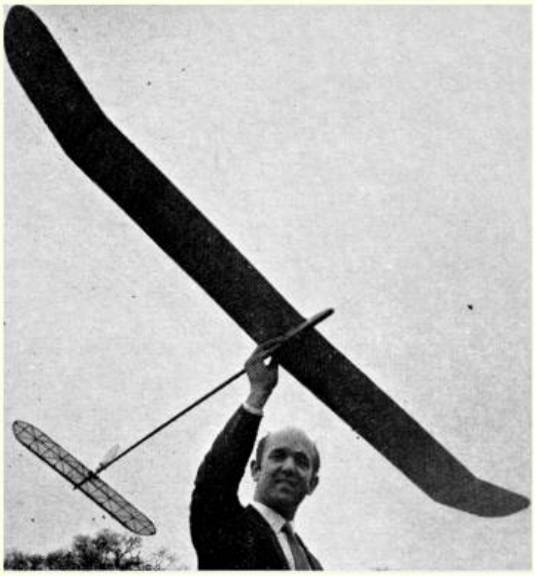
To say at one time that the Sports Council has a special section which is engaged in defining eligibility of an activity claiming to be a sport; and to go on to declare that as compared with the pulling of an archery bowstring, or piloting a glider, aeromodelling has no physical effort or personal skill is no more than an admission of ignorance. It is high time that the Sports Council director, Walter Winterbottom, accepted an invitation to witness a model event or at least delegated representatives to examine aeromodelling closely. Where else, other than in aeromodelling, can one find an activity which in a typical day of seven flights can lead to 15 miles of cross-country chasing an object of one's own creation, prepared and trimmed with skill to operate in three dimensions?

Ours is a TOTAL involvement activity (whoever saw a home-made football, or tennis racket?) which fully deserves recognition as a sport, *and* a degree of aid from Government sources for administration and promotion.

Currently held by Jiri Kalina of Czechoslovakia, who won the 5th Indoor World Championships in a Rumanian Salt Mine, the Stan Rushbrooke Trophy is a unique design, embodying the form of a Dragonfly in Perspex to symbolise microfilm covered Indoor model flight. It is a fitting memorial to one who played a great part in organising the first Indoor World Champs and who was for many years Editor of Aeromodeller.

SUCCESSFUL fund-raising raffles have recently been organised by the Society of Model Aeronautical Engineers, thanks to the generosity of the prize donors. At the Sywell R/C Expo, Mr. G. Thompson, of Wollaston, Northants, won a flight with the Barnstormers, courtesy of David Boddington who runs the Barnstormers Air Circus. The Esher Symposium saw a Schuco Hegi Helicopter (donated by RipMax) awarded jointly to three members of the Valkyries Model Club from Aylesbury, Bucks. Messrs. M. Reynolds, E. Bright and A. McCracken shared the lucky ticket between them. Part of their prize will be a special series of tuition flights to keep them from breaking the machine – quite an important aspect!

APOLOGIES to readers this month for the non-appearance of two promised articles. Firstly, a feature on the U.S.S.R. record-breaking models has been delayed due to translation hitches (our Russian is getting a little rusty), while the third-line control handle was simply squeezed out through lack of space. Better luck next month!



CLASSIC

an 82 in. span class A/2 glider for the more experienced builder, designed by JIM BAGULEY

A/2s come big these days! Classic is both attractive and efficient, as is proved by its fine contest record. A good all-weather performer.

THE CLASSIC series began in mid 1965 and was mainly influenced by clubmate Robin Sleight's model which used the B6456f section with sheet upper surface, elliptical tips, polyhedral wings and 72 sq. in. tailplane on a long (36 in.) tailplane moment. The design had an excellent glide but had a number of structural shortcomings.

The first of the series also used the B6456f section with sheeted upper surfaces, while the tailplane movement was reduced to 28in. with a fin in front of the tailplane plus an underfin. The fuselage used the Lindner style construction of boom i.e. circular from a $\frac{1}{8}$ in. sheet box with $\frac{1}{8}$ in. square spruce longerons, while the nose was dropped slightly. The tailplane used the Lindner tailplane section, which is still retained. This model produced a very good glide but would not maintain trim and had a tendency to weave on tow during gusty weather owing to the thin wing section.

The next versions used a Mike Burrow's wing section (as I believe is used by John O'Donnell on his A/2s). These models were otherwise identical to the first one, and while the glide was not so good (its duration being about 2:25 to 2:30 unassisted and with everything just right) but they were more consistent. Even so, the 1966 Team Trials were lost when a weaving tow caused the cancellation of a flight through throwing the winch, to place 5th with 9 flights out of 10. These models were eventually lost in 1967, one in a fairly spectacular D/T-less fly off of nearly half an hour!

Up to this time, many variations had been tried besides the main development line e.g. different tail sections, moment arms, constructions, tip shapes etc., and in December 1967 stock was taken of the situation. It was realised at this time that the B6456f and Burrows sections had nearly identical undersurface shapes. It was therefore decided to try a section having the average of the upper surfaces. This is not a very scientific procedure but I doubt if many sections used by modellers are created in a better way! This section has been used since and has proved successful, enabling a reliable construction to be developed and having an 'unaided' performance of around 2:35 to 2:40.

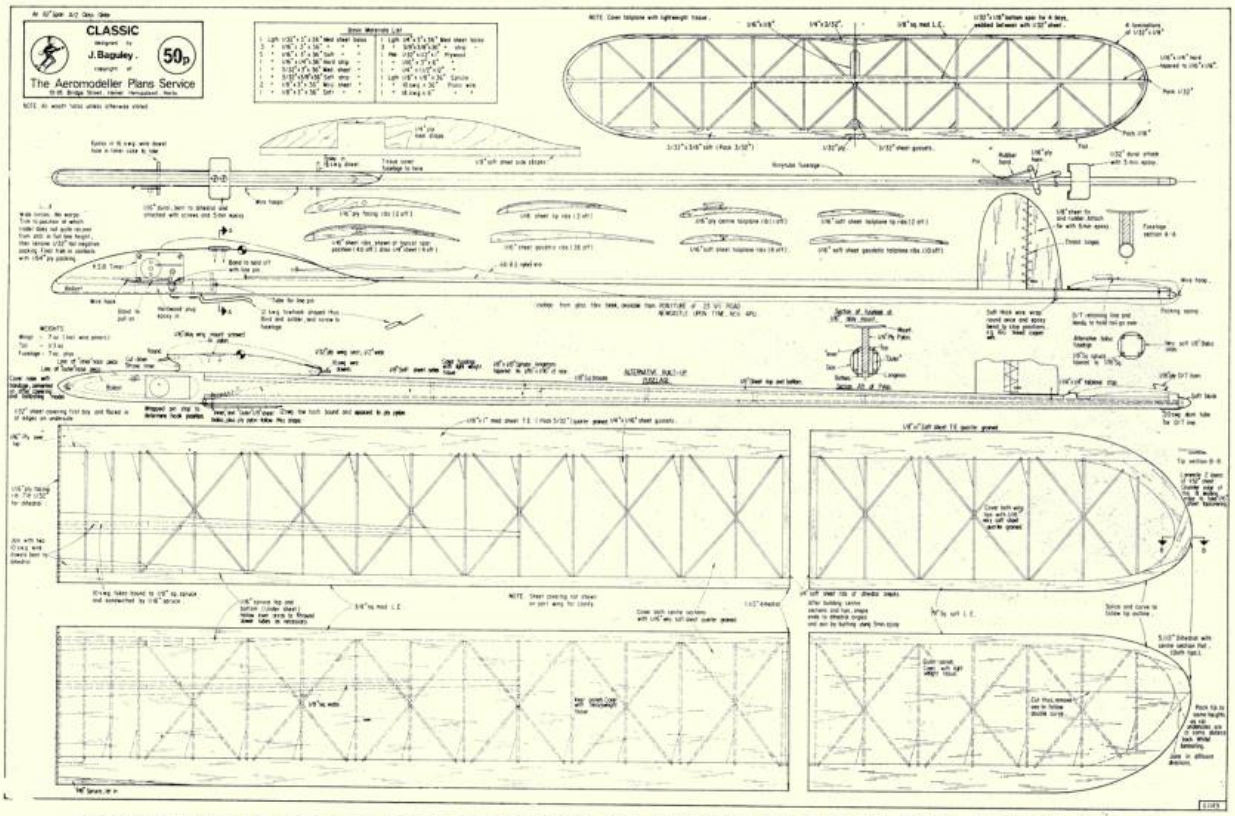
There were a few contest successes in 1968 but the wing was still too flexible, causing a lead in the 11th round of the Team Trials to have slipped to 8th place after the remaining three flights. In 1969 therefore the first modification was to increase the trailing edge width to $1\frac{1}{4}$ in. This was accomplished by the fuselage becoming a streamlined tapered circular tube of maximum 1 inch diameter, surmounted by a shallow $\frac{1}{4}$ in. ply pylon wing mount, and somewhere along the way the tailplane construction had become a more sensible 'Union Jack' geodetic with 3 spars, the front pairs of which were webbed.

This was the first year of the real pay-off, with four 1sts, four 2nds, and four 3rd places in just about as many contests, and 1970 was nearly as successful, including clubmate John Gregory's 1970 Open Glider win at the Nationals.

However, yet again, a slip to 7th place was made at the 1970 Team Trials through flexing wings on tow. Also at the end of the season I had a number of fuselage breakages through flying in contests with even the worst of weather, and put a lot of thought into drastic structural modifications in Autumn 1970.

I at last surrendered to glass fibre fuselages and dispensed with the underfin. The wing construction was changed to use $\frac{1}{16}$ in. sheet soft balsa covering over the whole top surface, as used by clubmate Jim Punter, but with full 'Union Jack' rib formation. This has cured the previous problems. The additional use of tapered $\frac{1}{16}$ in. spruce spar and leading edge reinforcement members to bury the wire dowel tubes into makes an extremely strong wing, and with only ply facing ribs, it is very easy to construct. The jig described later enables wings to be made very quickly but is not essential. It also enables the very thin tip shape to be constructed precisely and the wing shapes to be consistent in section. The tip shape is blunter than on previous versions and automatically washes out slightly at the extremity as required.

The tailplane tips are now elliptical too, mainly because they look prettier(!) while the $\frac{1}{16}$ in. centre ply rib is used because some trim changes were traced to crushed balsa ones, and the all-in-one 'horn' is a convenient method of anchoring the D/T line to



FULL-SIZE PLANS OF THIS 1/7th SCALE REPRODUCTION ARE AVAILABLE AS PLAN No. G1149, PRICE 50p PLUS 5p POSTAGE FROM AEROMODELLER PLANS SERVICE, 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

bands. All three built so far come out on, or slightly under, the minimum A/2 weight, with 7 oz. wings including 10 swg wire dowel joiners.

We return now to construction, which should present few problems since I can make them in 20 hours' building time, or less. 'Five-minute' epoxy is most useful in saving time during construction, and is to be highly recommended.

For the fuselage attach the $\frac{1}{4}$ in. ply keel, fin and tail mount to the glass fibre rod, noting that the front of the tube projects some $\frac{1}{2}$ in. or so in front of the keel. Attach the $\frac{1}{8}$ in. sheet sides to the keel with cement and to the tube with epoxy, noting the chamfer to enable them to fit properly.

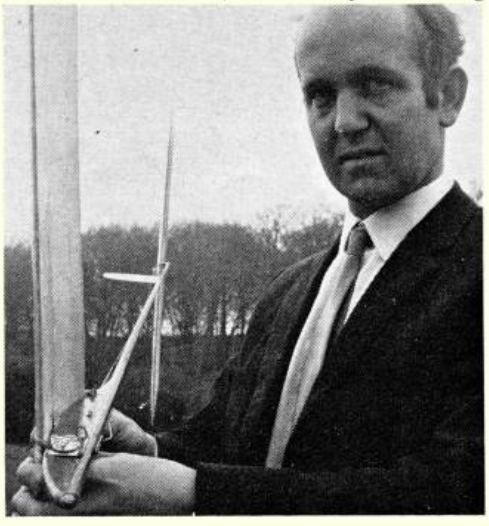
Epoxy the hardwood front plug in position and when dry, fill the front of the G.F. tube with molten lead. Note: if wetting the tube inside, as I do, proceed with caution. Round off and sandpaper the $\frac{1}{8}$ in. sheet sides of the pod, except under the wing, and the lead and tube front. Tissue cover the fuselage to the rear of the pod and the fin, then dope.

Again use epoxy when facing the wing mount, 16 swg dowels, D/T and auto-rudder lines, hooks, etc., tailplane rear packing and soft wire auto-rudder stops.

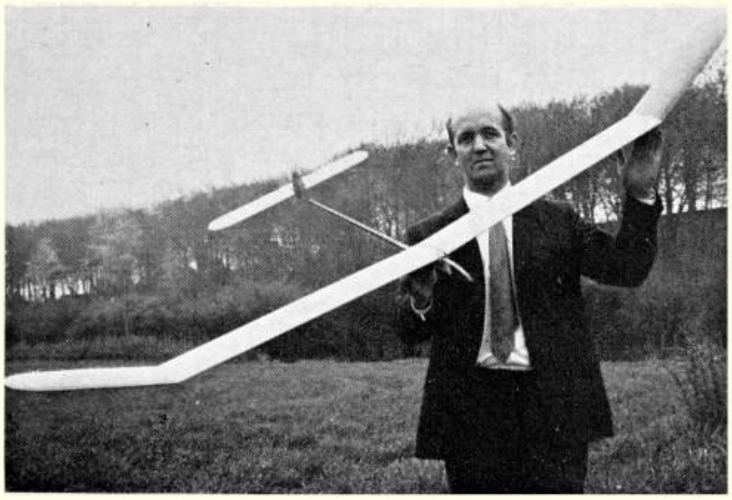
Drill holes to take the woodscrews for securing the wing mount and towhook, then fit accordingly. Fit timer and level up. The 6 lb. nylon D/T and auto-rudder and lines are fitted when the wing and tail are completed and the tension of the line stretch should be adequate to pull the tailplane down and auto-rudder over against the spring pressure.

I build the wings on a former shaped to suit the undercamber. It saves time, ensures consistent wing shape and avoids cracking the rear of the wing ribs. It is far from essential to use it but I find it better. Place greaseproof paper over the jig if used.

Pin down the leading edge and trailing edge (ready notched), then glue a 'straight' rib to the $\frac{1}{16}$ in. ply facing rib and cement it to the ends of the leading and trailing edges, noting the $\frac{1}{32}$ in. tilt to accommodate dihedral. Add all straight ribs, including the $\frac{1}{4}$ in. ones at the dihedral break. Next, add one direction of geodetic, then the other, followed by the trailing



Glass-fibre boom utilised for the fuselage is virtually unbreakable – and, of course, very quick to build. However, 'traditional'-style builders are catered for, as the plan shows details of a built-up structure as well.



Fully sheeted upper surfaces of the wings are employed, and care must be taken with the balsa selection here. Use very soft quarter-grain material, the wrong grade could produce severely overweight wings which would do nothing to improve the glide! Turbulators are being experimented with, but only mixed results so far. Correct trim of the machine is the most challenging part of free-flight – and the most difficult to achieve. Perseverance is the answer, all packing being added little by little to show its true effect.

edge gussets, which are essential. Place the $\frac{1}{16}$ in. tapered spruce spar and leading edge reinforcements over the ribs, nick in $\frac{1}{16}$ in. deep with backed razor blade and remove between the notches. Add the parts. Shape the leading edge and cover with $\frac{1}{16}$ in. sheet which should be soft for the centre section (and almost pithy for the tips).

While drying, bind and cement the 10 swg brass tubes to the $\frac{1}{4}$ in. square spruce (slightly longer) – crimp the ends of the tubes. Remove the panel, lay tube assemblies over the underside of the wing and mark where to remove pieces of rib. Cement in the tube assemblies when removed, locating them through the $\frac{1}{16}$ in. ply facing ribs with 10 swg wire. Insert the webs and $\frac{1}{16}$ in. tapered spar and leading edge reinforcement as for the upper ones. When dry, add the $\frac{1}{32}$ in. sheet to the first bay (do not let it in, it is faired-in when sanding the wing undersurface).

The tips are built in a similar manner except for the elliptical tips themselves. The two layers of $\frac{1}{32}$ in. sheet are laminated one above the other to follow the undercamber shape and therefore form the washout naturally. If the jig is not used, packing of the appropriate height is placed under them. The leading edge is spliced into vertical laminations, cemented and brought round to meet them. The ribs are added, and when dry the $\frac{1}{32}$ in. laminations are tapered off to a sharp edge, the leading edge faired-in and the end geodetic ribs sanded to fair-in also.

The $\frac{1}{16}$ in. sheet top covering has to follow a two-directional curvature at the extreme tip, but this is simply achieved. It is cut roughly to shape, a 6 in. long cut is made longitudinally at the section's point of maximum camber. It is then offered up to the tip, pulled down by hand so that one side of the sheet overlaps the other. This is used as a guide to cut out the excess sheet in the form of a 'Vee' about $\frac{3}{32}$ in. wide. The sheet is then added much as for the centre section.

The tips are attached to the centre section simply by sanding the ends of both to the appropriate angle (this is what the $\frac{1}{4}$ in. ribs are for), pre-cementing and cementing to the correct height. Sandpaper and give the top sheet a coat of sanding sealer, followed by further light sanding – if the jig has been used the undersurface will need very little sanding, except for slight leading edge rounding. The extreme tips are sanded on top to a sharp edge. Cover the undersurface first and then the top surface simply by applying thinners over the tissue; it soaks through, softens the sanding sealer, which then sticks the tissue.

The tailplane is fairly orthodox in construction and should present no problems if the ribs are soft, the other indicated wood grades observed and the correct tip and trailing edge packing used.

Trimming

Check the centre of gravity position – if too far forward, drill out $\frac{1}{4}$ in. dia. holes in the ballast from the underside until correct, and plug with balsa, sanding and recovering as required. If too far back, drill holes downward into the keel and insert lead.

The C.G. position is only critical if you want the best of performance, stability and stall recovery, then it should be within $\frac{1}{4}$ in. of the position shown. The hook position, likewise, is only critical if you want the best results; too far forward and the slight weave is too great and can get you into trouble in windy weather, too far back and you can be fooled into thinking that the air is better than it is as the model overtakes you.

There should be no warps, although I sometimes try to kid myself that a little washout of the outer tip helps to kick the model into its glide turn when stalled off the line. The washout of the extreme tip, built in by the method of construction, is adequate to prevent tip stalling.

Glide turn is fairly wide and will tighten in strong lift. How close you take the trim to the stall is a matter of experience and how good your construction is. Any warps in an elevating direction after trimming will remove the stall 'tolerance' of the trim and any in the reverse direction will knock a few seconds off the flight duration. When in a hurry, I use a 'rule of thumb' of taking out the last $\frac{1}{32}$ in. of tailplane packing which caused the model to stall all the way down. When not in a hurry I trim in $\frac{1}{64}$ in. increments in contests, usually messing up one or two flights getting it just right. You should finish up with the tailplane at about 0° incidence relative to the top of the fuselage blank.

You should by now have a reliable A/2 with good unaided performance, yet able to be used in all flyable weather. Hope you enjoy flying yours as much as I enjoy flying mine!

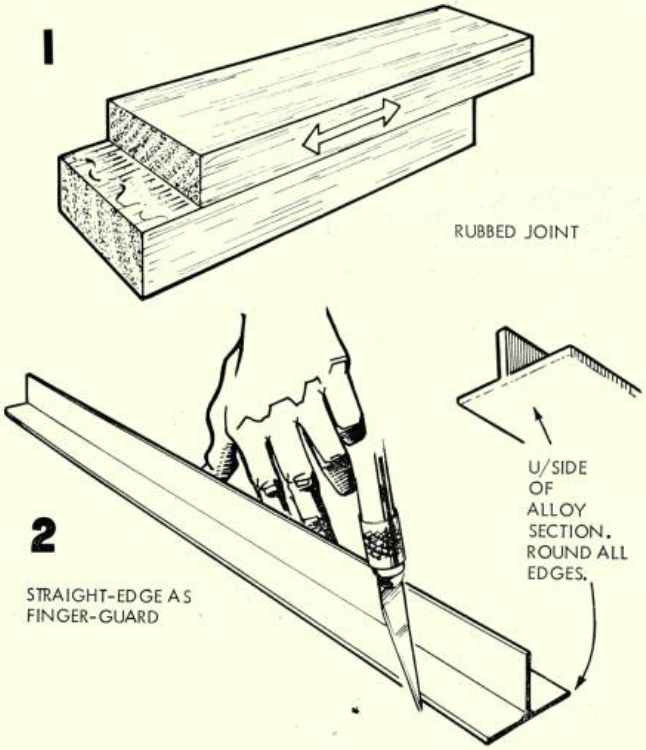
'BUILD A LITTLE BETTER'

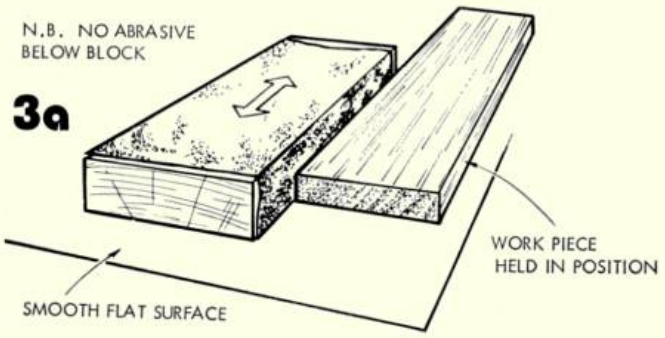
begs TREVOR FAULKNER, who then goes on to explain just how this may be achieved . . .

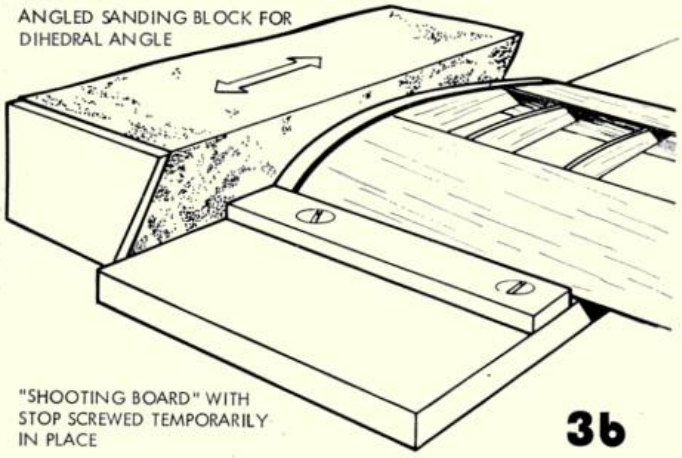
THIS ARTICLE is directed at those modellers who aim to improve the quality of their models' basic construction as opposed to the 'finish'. Insofar as finish is dependent to some considerable extent upon groundwork, improved building techniques do have a bearing on ultimate appearance, but I propose to limit myself to the processes prior to the 'cosmetic' stage.

Most modellers tend to accumulate a stock of materials as time goes by. I am sometimes concerned that it is not always possible for one to buy exactly the right grade of balsa at the local shop, and the answer is therefore to collect various grades and 'cuts' of wood as and when available, rather than to wait until the items are required for use. This means calling in at the local model shop fairly regularly in order to check over the balsa stock, or possibly exploring sources of supply outside one's normal terrain. Eventually, a reasonable supply will accumulate, and in order to benefit from this to the full, thought should be given to efficient storage. The porosity of balsa makes it exhibit *par excellence* the characteristics of all timbers with regard to the absorption of moisture. Put it in an outside shed in the winter, and it will take up water from the atmosphere until a stable condition (i.e. equal humidity) exists in the timber. Take the material indoors, and the process is reversed; balsa does not take long to acclimatise itself to environmental conditions, and so it is not too time-consuming to bring chosen wood into the room used for building a few days prior to starting construction. This simple precaution can be of particular help to 'slow' builders, who could have structures consisting of components of varying moisture content and shrinkage potential. In addition, both strip and sheet are best stored flat, and preferably in boxes to keep them clean. Although balsa quality is usually of a high standard, it is not always possible for all cuts of sheet to remain straight-edged after marketing, simply because of the nature of timber. Stresses relieve themselves slowly, and, like the 'harder' woods, balsa exhibits the faults described in any woodwork text book. Fortunately, with the smaller dimensions which are used by the modeller, faults tend towards the subtle rather than the dramatic, but it is still worthwhile to check straightness before, say, committing oneself to applying sheet to a glued-up job and assuming that all is well.

A natural corollary to the above is to be prudent in using the 'damp-and-curl' technique for sheeting curved parts. Excessive damping causes expansion, mainly across the grain: the drying-out causes an appropriate shrinkage, which can give distortion (warps), splitting, or the creation of gaps at points assumed to be flush-fitting. It is far better to induce the damped wood to dry whilst pinned or bound in position, then to remove it, apply glue, and pin down in the normal way. Anyone building a tubular sheet fuselage will need to observe this precaution diligently! Mention of gluing brings us naturally to the problem of which adhesive to use, and how best to apply it. Most people are nowadays aware of the properties of various adhesive 'families', and the *AeroModeller* has dealt authoritatively with the classifications in previous issues. I find that, in common with most of my acquaintances, P.V.A. is by far the easiest to use, its main attraction for me being that application via a hypodermic is easy. The syringe can also be cleaned in water, and with the increased use of disposable syringes by various professions, it is not difficult to build a small stock for free. Try a friendly doctor, dentist, or vet! Lavish application of P.V.A. glue is no advantage. A skin forms outside the glue layer which inhibits evaporation, slowing down drying time. A technique which may not be familiar to some is that of the 'rubbed joint', illustrated in Figure 1. Originally used with the glue-pot glues of a decade ago, it distributed the adhesive evenly, and built up a seal which felt as though the pieces were being 'drawn' together. A slightly similar effect can be obtained with P.V.A., although to my mind, the action is mainly of use in the way that adhesive is worked into those pores of the timber not lying at or near 90° to the surfaces. Sanding P.V.A. glues is not now such a problem as it used to seem, and the rather rubbery texture pre-



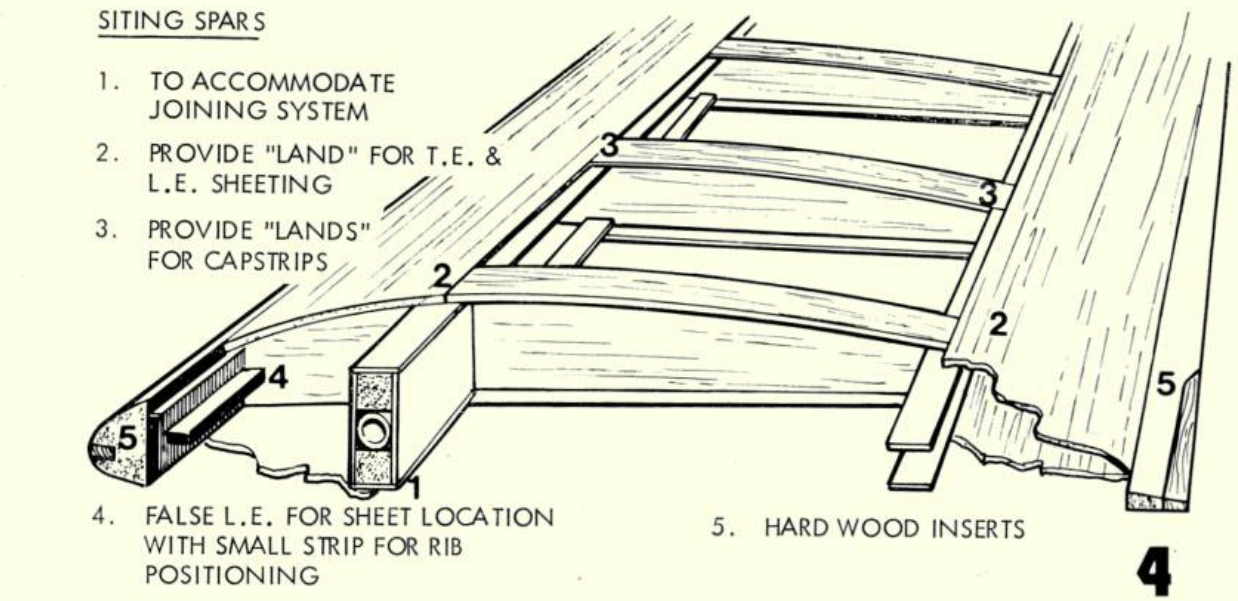


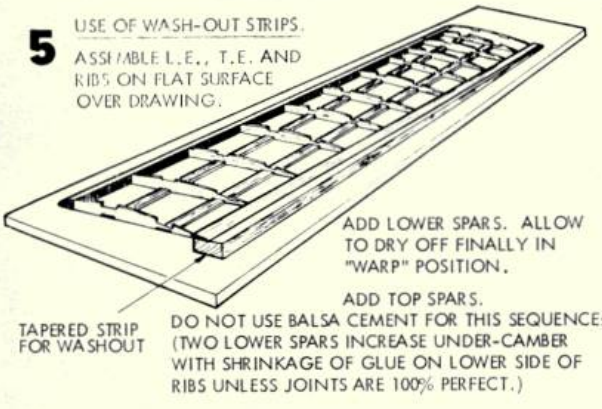


viously associated with this material seems less pronounced with both the I.C.I. and the Evode products. A last remark on gluing: always check that each joint is properly made before sanding or covering by either listening to the airframe when it is twisted slightly (poor joints will either give audible indication rather in the nature of a scratching sound), or by lightly dragging the fingers over the structure to feel local movement of the unsecured members.

Good building implies accuracy, which in turn indicates fidelity to patterns or templates, accuracy of straight edges, and good tools. In the past year I have been fortunate in having received two gifts which have made this goal a little easier. First, a quantity of aluminium-sheeted mahogany ply, most useful for rib templates. The big advantage is that the alloy makes for accuracy as a scribed line is fine and decisive, whilst resisting the sanding block well; in addition, the ply stiffens the alloy, and prevents fine trailing edge profiles from flexing quite so readily when in use for sanding or cutting. For some time, I have also used the spray contact adhesive aerosol marketed by Model Flight Accessories to secure template drawings to the material from which they are to be made; this does obviate the use of carbon paper, pricking through, and other methods, all of which contribute to an increased cumulative error. Does this matter? I would think that a computer-designed airfoil would benefit from a hi-fi treatment, particularly in larger chord-sizes. The real gain is in the ease of getting an accurate job. The second bequest was in the form of a scalpel handle and a quantity of disposable blades. These were a revelation in their quality and performance, and have just the correct cutting angles for soft balsa. Various shapes are available in profusion, and I can vouch for their efficiency.

A good form of straight-edge is a length of T-section alloy. A 1 in. x 1½ in. extrusion is adequate,



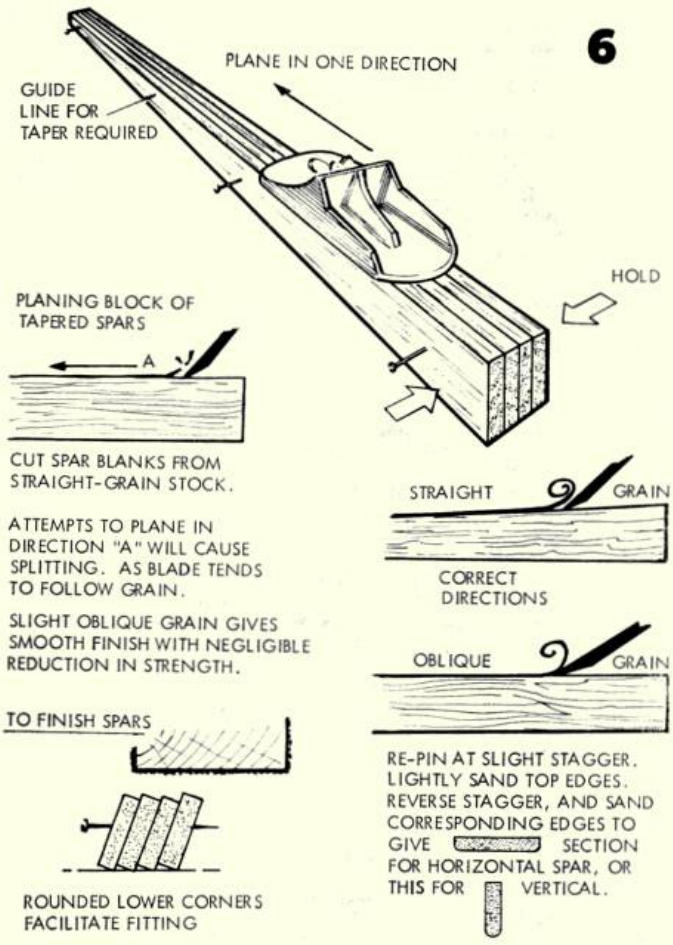


giving rigidity and a useful finger guard into the bargain – as shown in Figure 2. The ends of such a piece should be smoothed and half-rounded to avoid unsightly denting of the balsa being trimmed. Most modellers know that sanding blocks are essential to controlled finishing, yet so many persist in either holding the paper in contact with the block, or relying on drawing pins. My contention is that we need all the help we can get, and would find it well worth the effort to glue the abrasive paper in place. This avoids the frayed end of the paper which lurks below the general level of the block, ready to snag and break fragile structures. If the blocks are accurately prepared, they can have a wider application than that of merely smoothing material. Dihedral angles as applied to butted ribs, sheet or block jointed edges, can be prepared as a consequence with speed and accuracy. If your blocks are chosen to match the lengths of standard abrasive sheets, you will not be left with odd lengths of sandpaper to remove as waste.

Experienced builders producing 'own designs' usually adopt methods of construction which have proved to be reliable in a structural sense. It is perhaps worthwhile examining some points of construction which have a bearing on assembly and appearance, particularly where excessive material sections are not to be used. If the amount of 'float' in a structure can be reduced, then quick and accurate assembly becomes easier. Most spar systems prevent movement in the horizontal plane during assembly, but have limitations in the vertical register. The simple leading edge construction shown has some advantages, whilst spar depth and siting can be considered in a slightly wider context than that of optimum strength. My own preference is to build in warps to be used as trimming devices as early as possible. This avoids employing the covering as a warp-inducing member, and is essential with geodetic structures. True lengths of wood matching the lengths of flying surfaces can be planed to give the requisite twisted base for completion of the structures, and are useful again during the doping and 'weathering' processes.

There is no need to avoid the use of tapered spars on the basis of difficulty. Even if you find it hard to cut accurate tapered lengths of spruce, there is always the alternative method of planing down the block of spars to be used. The discreet use of spruce, ply, etc., has much to commend it. Seatings should be hard-faced where possible in the interests of longevity and consistency, as should all points where securing bands can eventually dent the structure. It is, of course, more encouraging to use the harder materials when one is confident in the ability to work them easily. To this end, I would heartily urge any modeller to buy a supply of piercing saw blades. These are like fret-saw blades, but generally finer, going right down to the 'Jewellery' grade, with almost invisible teeth. These blades give a beautiful finish to a cut, can be used equally well on metals and resins, particularly if lubricated regularly by drawing them over a wax candle. They should, of course, be arranged to cut on the 'pull' stroke, as should both fret- and coping-saws. One word of advice . . . ironmongers may have to be asked to order these tools, unless you happen to live near a centre with an amount of fine metal craft as part of the trade scene. If no results are obtained, write to Eclipse, the manufacturers. You won't regret it.

The final 'pre-cosmetic' stage is so much easier if the parts designed to assist assembly are not attached until all rubbing-down, covering and doping are complete. This avoids runs, allows easier sanding, and makes the likelihood of incomplete coverage rather less. A final dust-down, and the finishing process proper can begin, probably on a better foundation than before.



FLYING SCALE COLUMN

by Eric Coates

The author's D.H.9A seen immediately after its trimming session. Note the unfinished condition – the rear end is completed while the more vulnerable parts are yet to be painted.

WHEN THESE WORDS are published, it will only be a few days before the principal scale competitions of the year take place: the Nationals at Hullavington. I personally am sorry that the duration free-flight classes have been broken away from what most people regarded as the best social and model flying jamboree in the British Isles – anyway, the out-and-out contest men have won the day, for this year at least, and will be having their own event at R.A.F. Strubby. A lot of people automatically assumed that the F/F Scale event would also be at Strubby. It is, however, not possible for the Scale Committee to organise events in two places on the same dates, nor is it desirable for the scale man's interests to overlap all three classes.

It is often put to me that the true scale man is not interested in contests and that I put too much emphasis on this side of the hobby. This may well be true, but as in any other branch of our hobby, and many other activities too, competition is the driving force of development. When one looks at photographs of scale models taken 20 years or more ago (my own make me shudder with shame – and thank goodness that my photographic equipment of those days, a Kershaw Penguin, put a soft line round everything and was incapable of showing details which didn't exist!), one realises just how much the scale modeller's art has advanced. A lot of this is due, no doubt, to the introduction of new materials, but most of the improvement is due to one chap looking at the next chap's model which beat him in the contest, and being determined to make a better job next year and reverse the tables. All this rubs off into published designs and, therefore, the non-competitive modeller benefits accordingly. Another advantage of competition flying is in the fact that it brings people together with a common interest in scale models; both organisers and competitors alike. The exchange of information at a meeting like the Nationals would probably fill 10 volumes of the *AeroModeller*.

There is the display aspect as well. If there were no competitions there would be no 'shop window' in which to attract the general public to the hobby. There is no doubt that it is scale models, of all the classes, which the public likes to watch. The number of these who are converted to building model aeroplanes, and not necessarily just scale models, must number many hundreds per year.

One final advantage of regular competition flying which I don't think many competitors themselves realise, is that it gets models built a darn sight quicker than they would otherwise have been! The Nationals acts like a spur to the model aircraft builder in a similar manner to which the Farnborough Show did to the aircraft industry 20 or so years ago.

This is exactly the position I find myself in at the time of writing (early April), with the D.H.9A. I had the airframe covered and ready for test flying by Easter but we were in a period of continuous wind and rain and it looked like remaining so for weeks, so I continued working on the machine. This is something I do not like doing until after the first test flights but, with the number of weeks to the Nationals rapidly diminishing, I could hardly afford to wait. I, therefore, concentrated on finishing off the back end, as it is the least vulnerable and also this would mean that the C.G. was somewhere near its final position. I applied rib tapes to the tail surfaces, control horns, rear fuselage stitching plus final paint and decoration, then started on the pre-paint details at the front of the fuselage when lo and behold, Sunday, April 10th, dawned flat calm. The model was quickly assembled and test glides carried out in the field of long grass behind my house.

Perfect results – with the weight at 29 oz. she had a beautiful flat, floating glide as straight as a die with neutral rudder. A test run of the engine revealed fuel feed problems, which took an hour or so to sort out. (Always test the engine before going to the flying field, otherwise a session can be wasted). After lunch the wind was still minimal, so down to the airfield we went for the test flying. As built, the engine thrust line was 3° downthrust and 3° right sidethrust. Low power flights soon indicated a tendency to stall, and at first this was damped out with a little down elevator. An extended power run, at about 60 per cent power, revealed a tendency to a rather steep glide with rather too-tight a turn to the left. A little right rudder removed all left turn on power and power stalling re-occurred. There was only one solution – more downthrust.

This is always a problem with low thrust line aeroplanes; as many of the inline, upright engine jobs of the First War period were. As power is increased the nose-up couple becomes greater, worsening the problem. One just has to get the thrust line through the centre of drag, and this can only be achieved on a F/F model by pointing the crankshaft to the floor. It is worth noting that most aeroplanes of this period, with low thrust lines, had variable incidence tailplanes. As the throttle was opened, down trim must

have had to have been wound on by the handful.

A couple of washers were slipped under the rear lugs of the Mills and the downthrust increased to 6° – short of making a new engine plate, nothing can be done about sidethrust on the airfield. The power climb was now satisfactory, apart from being dead straight; followed by a nice shallow glide to the left. More left rudder to produce a shallow left turn on power produced an over-tight left turn on glide. It looked as if another degree or two of right side thrust was going to be necessary!

Up to now I had done all the test flying on a 10 x 4 in. prop., usually the best for maximum usable power, on a Mills 1.3 cc, in a scale model. As I had plenty of power in hand, I therefore tried the last dodge I knew and changed the prop. for a 10 x 6 in. This loads the engine up more, reducing its maximum power, but increases the torque – and this worked! The greater torque produced the desired left turn on power; without interfering with the glide turn.

It only now remained to check the take-off performance and the model was trimmed. The take-off from Lee runway was a classic – a straight run of about five yards, followed by a straight climb out before dropping the port wing for the normal power trim. I was well pleased with my afternoon's work which, in all, had taken about three hours, including the thrust line modifications. This had necessitated removing part of the lower cowling to give engine access. The radiator shroud had also been dented slightly at the bottom, as a result of one of the stalls, but apart from this no damage had occurred. The Gods were no doubt looking after me that afternoon, for as soon as I had taken a couple of photographs, at the completion of the test flying, then the wind changed direction and blew up to 15 knots.

* * *

I visited Terry Manley over the Easter period and saw his now almost-completed D.H.4. Very nice it looks, too. Terry was most upset about me suggesting he always built to awkward scales, such as 1/9⅞th. The D.H.4 is 1/10th, which makes the span exactly the same as my 1/11th Ninack, i.e. 50 in. Terry always believes in fully finishing his models before test flying – he regards my methods of trimming as soon as covered, as having no confidence in one's ability as a modeller! Be that as it may, I always think my method is a lot safer. It will be interesting to see if Terry needs a load of downthrust as well when he gets round to flying it.

I am afraid time will overtake John Turvey and we shall not be seeing his Puma D.H.4 at the Nationals.

Nationals timetable

(a) *Radio Control.* Scale Flying will commence at 4 p.m., Saturday, 27th May, and will continue throughout Sunday and Monday. Flying will be simultaneous with the aerobatic event and will alternate with pylon racing. Static judging will take place on Sunday and Monday.

(b) *Free Flight.* Flying will take place on Sunday, commencing at 11 a.m., with static judging on Monday. If a competitor can produce a valid reason for not being present on Monday, the Judges may static judge his model after the flying session on Sunday, if time permits.

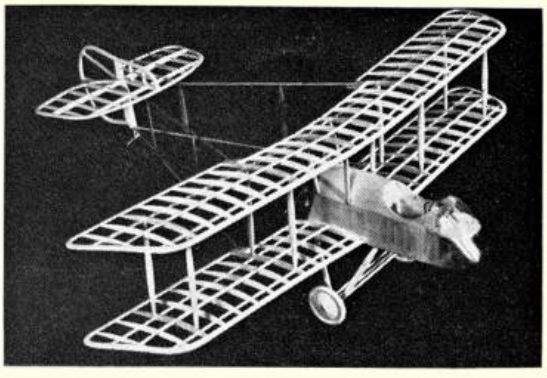
(c) *Control Line.* A similar timetable to the Free-Flight event will be used.

Anita Seskutin holds her husband's 'Honey Bee', built from the AeroModeller drawings (Plan No. FSP505, price 30p). Builder has yet to summon the courage to fly it!

World Championship Team Trials. June 25th

R.A.F. Cottesmore will be the central venue for Team Trials; R/C and C/L only. Entrants must state that if selected for the team, they are willing to pay their own transportation costs to Toulouse. In order that the Judges can devote the maximum amount of time to the serious entrant, no one who is not prepared to travel, at his own expense, will be allowed to compete in the Trials.

Two views of Doug McHard's latest miniature project, a 1/24th scale D.H.2 for CO_2 power, which weighs just 1 oz. complete! The Brown Jnr. engine blends nicely into the bank of rotary cylinders, while the 'tank' lies in the nose, visible through the acetate moulded portion in the lower picture. A superb masterpiece and just 14 in. span.



GOLDEN WINGS AEROMODELLER MODEL CLUB

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

NATIONAL NEWS

Remember that at this year's National Championships, there will again be 'Juniors only' contests for both free-flight and control-line models.

Firstly, the control-line event. This will be held on the afternoon of Sunday, 28th May at R.A.F. Hullavington – details of how to find this venue are published elsewhere in this issue. Any type of model may be flown on lines up to 60 ft. long, and as no take-off or landing points are given, hand landing will prove no handicap. The manoeuvres to be flown are: four laps level flight, wing-over, three consecutive loops, four laps inverted, three consecutive outside loops, a horizontal eight, a vertical eight, and finally, an overhead eight. A handicap system, based on the age of the competitor, will be used to even out the scores so that very young competitors can compete on equal terms with those of more experience.

Organiser of this contest will be Bob Walker, and the event will be located near the control-line area, but on the grass. The control point will be from a frame tent pitched on this area.

Remember to bring proof of third party insurance cover (such as S.M.A.E. membership card or an M.A.P. insurance card) with you.

The free-flight events are the *Junior Kit* contests. One will be held at Hullavington on Monday, May 29th, one at the Free-Flight Nationals at R.A.F. Strubby (near Mablethorpe, Lincs.) on the same day. Both events will be located at the upwind end of the airfields, the contest at Hullavington being organised by Mr. Brian Bow, the Strubby event by Mr. Ray Favre. Both events will be run in the afternoon, the entry fees including third party insurance cover.

Full rules for these contests were printed in the March issue, but as a brief reminder, there will be classes for rubber-powered or glider models, built from commercial kits with a wing span of not more than 50 in. No deviation from the original kits is permitted, with the exception that auto-rudders and dethermalisers may be added if required. Snuffer tubes must be fitted if a fuse D/T is used.

Dear John,

I recently started control-line flying with little success. I built an A.P.S. *Shoestring* which never flew. It was powered by a Fox 15X. Could you please tell me if my Fox 15X is powerful enough for competition (e.g. combat), as I have built an A.P.S. *Ruter-ess* which I am learning to fly with? Also, would it be possible to run my Fox 15X on a 7 in. x 8 in. prop. for Goodyear racing? How's this for a tip? When using 8 in. x 6 in. props for control line, they had a high mortality rate as I was using no undercarriage, so I now use cut-down 9 in. x 6 in. props which are much stronger and cost slightly more, but in the long run, they work out less expensive.

Dartford, Kent. *I. Prior*

Sorry to hear of your misadventures Ian, but what exactly do you mean by saying that 'Shoestring' never flew? Do you mean that it would not take off, was unstable in flight, or there was insufficient speed to keep it airborne? A model of this type is normally very easy to fly provided that the centre of gravity is in the correct position. Many people go so far as to say that any control-liner will fly if the engine is going, but that is a little unkind! The Fox 15X is a good, lightweight sports unit, but is not intended for out-and-out power, and thus, is not suitable for 'real' combat flying. However, it would certainly provide you with plenty of fun flying such a model as the 'Ruter-ess', and quite good enough for average club combat contests.

The 7 in. x 8 in. propeller you mention for Goodyear racing would not suit the Fox, or any other glow engine for that matter. Glow engines rev much higher than diesels, but an 8 in. pitch would prevent them from doing so. Suggest you try a 7 in. x 6 in. propeller and let the motor 'scream'.

Your idea concerning using cut-down 9 in. x 6 in. propellers certainly produces a stronger prop., but remember that the performance would not be the same as with an 8 in. x 6 in. For one thing, the blade area would be greater and the tips themselves much wider. Likewise, the cut-down prop. would also be heavier – which may, however, aid starting. Nylon props used on engines of this type should not break on landing anyway, whether or not there is an undercarriage fitted. Perhaps you are landing rather hard? And, fast? If not, check the broken part of the prop. to see if there was an air-bubble formed during manufacture. This weakens props enormously and makes them dangerous to use. If you find evidence of such a bubble, return the parts to the manufacturer for his examination.

Dear John,

I recently bought my first engine, a second-hand D.C. Bantam. I flew it with a 7 in. x 5 in. prop., while my friend informed me that the recommended prop. for C/L is 6 in. x 4 in. He also informed me that running an engine on an over-large airscrew can damage an engine. If you think I have in any way damaged the engine, could you please tell me how I could repair the damage.

Ipswich, Suffolk. *Sean O'Farrell*

The 7 in. x 5 in. propeller is rather large for a D.C. Bantam – a 6 in. x 4 in. would certainly permit the engine to operate nearer its peak r.p.m. However, such a propeller as you have been using will not have harmed your engine – so do not worry about that. Harm will only be caused if using a much larger prop., say a 9 in. x 4 in., for long periods when a great deal of stress is put on the engine, as it is prevented from reaching high r.p.m. This would prematurely wear the cylinder liner plus the bearings.

Dear John,

I will soon be finishing my latest model, an A.P.S. Saab Safir which is a 37 in. span control line model powered by an O.S. 19. Could you please tell me about what weight it should turn out at as it is not indicated on the plan. Also could you please tell me what lines I should fly on and what length they should be.

Burton-on-Trent, Staffs. *P. Foster*

The original model weighed just 28 oz., and while you should strive to meet this figure, you could in fact afford to exceed this by as much as 5-6 oz., particularly with the engine you will be using. As for the type of lines to use, these should be of three-strand lightweight 'Laystrate' of approximately 50-55 feet in length, although this would not be critical unless your model turns out to be excessively heavy.

Why not send some pictures of your finished Safir for possible publication? In fact, let's see some pictures from all you Golden Wingers, and see what the other fellow is doing. Photographs should be in black and white only, preferably sized 6 in. x 4 in. – or just send the negatives and we will do the rest.

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.

NAME IN FULL.....

ADDRESS .....

.....

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

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

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

6/7½p in the £1 Rebate on plan purchase coupon for Golden Wing Members G.W. No. .....

R/C EXPO '72

an 'extravaganza' of both model and full-size aviation, plus a first-rate Trade Show.

MODESTY should prevent us from 'reviewing' the **Radio Control Models R/C Expo** too enthusiastically. It doesn't! This most successful-ever R/C trade show, sponsored by **Model & Allied Publications** in conjunction with **David Boddington,** attracted over 13,000 spectators to the grass airfield at Sywell, Northampton, over the Easter weekend. What made this event so different from previous trade shows was that it was held in conjunction with full-size aviation, thus attracting visitors who had never seen a model aircraft perform before. With such a varied programme to watch, the general public cannot have failed to have been impressed, nor did they have the chance to get bored. Full-size flying included displays of the *Rothman's Aerobatic Team* of Stampes, the Army's *Blue Eagle* demo team and, of course, the Boddington *Barnstormers* – a type of Flying Circus so popular between the wars, and of which they are now the only type still performing in this country. Wing-walking, limbo, 'pylon racing' and other 'fun' acts were all parts of the scene, performed by craft ranging from a Tipsy Nipper to that faithful standby, the Tiger Moth.

The model flying was slickly organised so that each demonstration lasted just 10 minutes, giving a rapid turn-around and variety of aircraft. We just loved

Now do you believe it? The star of the show was undoubtably the Bell Huey Cobra of Dieter Schlueter (seen below) which performed so well, despite the wind. Indeed, it probably flew too well – no one would think that developing and flying a helicopter could present any headaches at all after such a demonstration!

Classic Bipes – Stampe SV4 lands with Manx Kelly combating a cross wind. Barnstorming Tiger Moth in foreground.

Beautifully rebuilt Tiger Moth by Mike Parker of Barnstormers with Jack Morton and his mini Tiger, ready for formation aerobatics. Really impressive together in the turbulent air.

Tony Hooper shows his Complete-a-Pac Tiger Moth to Colin Goodman who owns the Barnstormers' R.A.F. camouflaged Tiger Moth. Ideal opportunity to check on the correct colour scheme!

David Boddington and Gerry Cumberland take time off from the full-size display to fly the Expo 80 – latest DB design.

'Stall of the Show' accolade must have gone to the RipMax/Model Hobby Consortium affair, of which just a fraction is visible here. The Spitfire is the latest Mick Reeves design for sport flying – looked very attractive despite 'simplified' construction, and flew extremely well.

Jack Morton's Tiger Moth routine. Jack's R/C model took off at the same time as a full-size example (same colour scheme, too!), then proceeded to formate on it. Next, synchronised manoeuvres were flown. As the 'big' Tiger pulled up to perform a stall turn to the right, Jack's 1/8th size version did the same to the left. Loops, too, were flown simultaneously – and in fact the whole flight was most enjoyable – even if it did demonstrate how fast a scale Moth flies! Spectacular is the only word for the glider towing demo of a Stinger/Nebula by Solarcraft. Aviette Kit's new *B.25 Mitchell* looked good in the air and performed well in the wind – and it was gusty, too! Indeed it gusted up to 40 knots on the Sunday, and we rather doubted that the 'star' of the show, Dieter Schluter and his Bell Huey Cobra helicopter would be able to fly. Wrong again! The incredible machine took to the air quite unconcernedly, and flew steadily, although when coping with a 40 knot gust on one occasion the tail rotor broke off and damaged the stabiliser. Undaunted, Dieter slowly landed the craft, only to have it blown over on touchdown, breaking the rotor, something that has never happened before! Fortunately, little harm was done, and a new rotor fitted for the morrow. Then, it behaved impeccably, even though the winds were again high. With perfect control, the helicopter was flown at an altitude of approximately six feet for the entire length of the roped-off spectator area – approximately ¼-mile, at walking pace. What greater proof of control could you ask for? It even landed right next to the model box after a flight sequence ranging from nose-down full-speed ahead to a stationary hover.

Meanwhile, back in the enormous marquee, the members of the Trade displayed, and sold, their wares. A detailed 'stand-by-stand' account appears in the current issue of *Radio Control Models & Electronics*, but the items which caught our eyes were the wide range of two-function proportional outfits now available, at most reasonable cost. No less than six companies had new two-function sets on view – namely Messrs. Skyleader, Horizon, Fleet, Waltron, Flight Link, and Model Flight Accessories, although the latter is intended for R/C car use, being supplied with a steering wheel – miniature, of course.

Other items which were particularly noteworthy were Skyleader's new light-impulse tachometers. Two are available, each having three different r.p.m. scales – choose the one to suit your needs best. Solarfilm is now accepted ware among all branches of the sport, and Derek Hardman displayed his latest colour – a pale metallic blue. How about some fluorescent colours for free-flight models? Ah well, the range is large, almost enormous already! Format displayed some interesting 'goodies' consisting of quick-setting epoxy glues, ranging from five minutes to three hours in curing time, epoxy fillers (soft as balsa, 'tis said), plus polyester resin for glass-fibre moulding or simply for using as a sealer. Very useful. They also cater for the ready-moulded glass-fibre fuselage market, with many designs, both R/C aerobatic and glider fuselages.

If there was a prize for the 'Stall of the Show', then it must have been awarded to the Rip-Max and Model Hobby Consortium offering: enormous, professionally 'styled' and packed full of kits, equipment, and accessories to set anyone's mouth watering, whatever their interests, and containing more items than many retail shops have ever seen in their lives! What a feast!

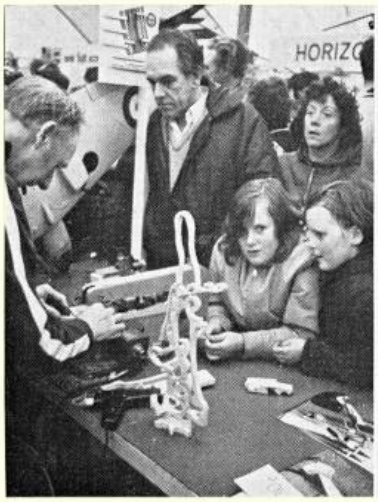
All in all, a magnificent show, aided by bright, if breezy, weather. If you missed it, then mourn just 11 months more until the next one. There *will* be a next one!

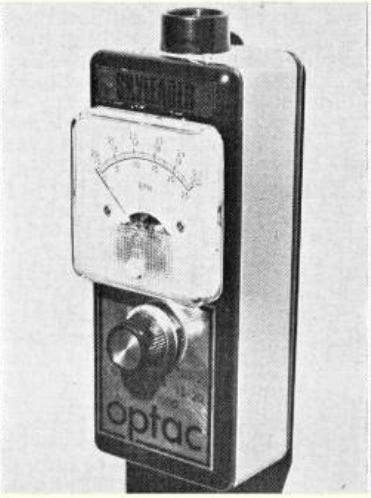
Jim Scott of Complete-a-Pac displays his Puss Moth – another monster scale R/C model available in kit form as well as just plans from his rapidly-expanding range. Jim must now have the largest specialised range of radio-controlled scale kits and plans.

Idris Francis of Flight Link is one of the latest manufacturers to cater for the two-function flier with his Duette outfit. Ideal for the growing band of slope and thermal soarers, or even sports power models.

'Well, Stuart, y' see, we dropped it, and we couldn't find anywhere else to put the cockpit'. Arthur Giffin explains his predicament to Stuart 'Mr. Skyleader' Uwins, who seems a little puzzled over the Blohm and Voss 141's configuration – centre piece of this stand which revealed their entire range of R/C equipment.

Instant 'modern art' was created by Len Hooley with the aid of a Dremel Jig Saw and a Weller automatic glue gun. Convincing demo – especially as the Dremel is some 10 years old.



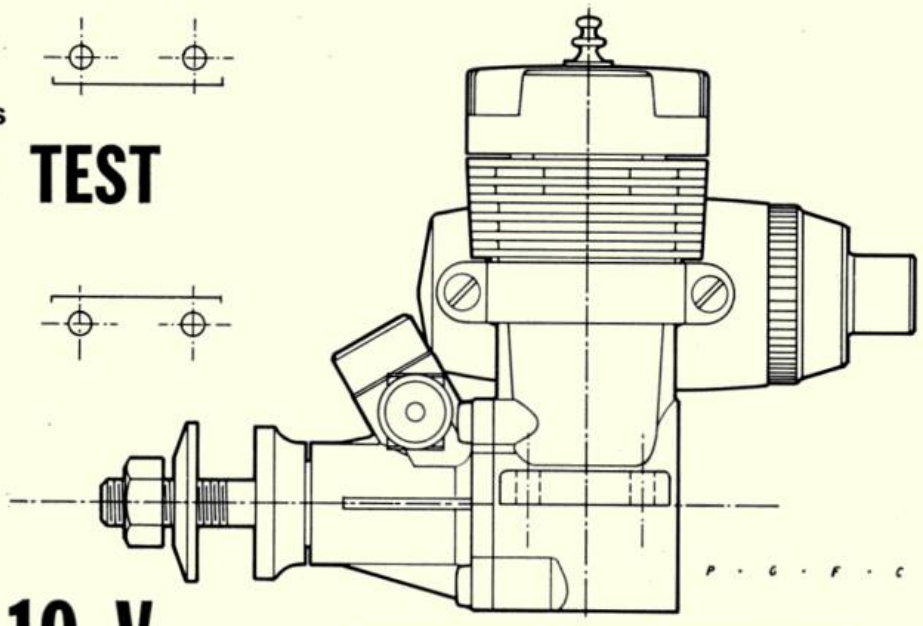


Skyleader's Optac uses the familiar light-impulse form of operation – just select the appropriate rev. range, hold in front of the prop., arc and read off the r.p.m.

Tailpiece! The attractive Rothman Stampes prepare to 'scramble' for another display of precision aerobatics – greatly appreciated by all spectators, even if they were frequently referred the Dremel is some 10 years old.

Peter Chinn's

ENGINE TEST



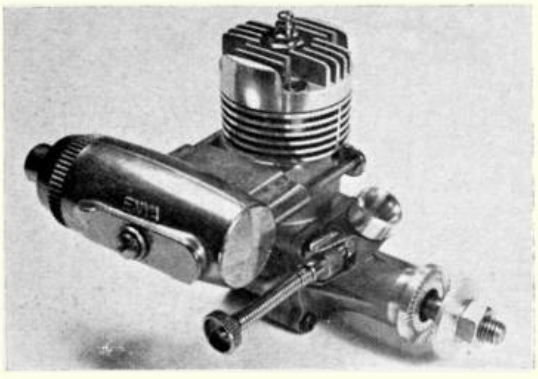
ENYA 19-V

'more powerful, more compact and fractionally lighter than its predecessor'

THIS engine is the successor to the Enya 19-IV, an example of which (in its throttle-equipped 19-IV "TV" version) was dealt with in the *A.M.* Engine Tests some 3½ years ago. As its title suggests, the 19-V is the fifth model in the Enya 19 series, which began life more than twenty years ago.

The basic difference between all previous models and the current 19-V is that the latter has a lower stroke/bore ratio (just over 0.9 to 1 instead of "square"). This has enabled a shorter connecting-rod and a shorter piston to be used, the overall result of which has been to reduce the engine's height and crankcase diameter. This has given the 19-V a more compact and up-to-date appearance and has also reduced its weight fractionally.

Although none of the major parts of the latest version are the same as those of the 19-IV, the 19-V continues the construction methods and general layout of all previous Enya 19s. It has, for example, an integral crankcase and cylinder unit with detachable bronze-bushed front end. A lapped piston runs in a drop-in steel cylinder with crossflow porting through orthodox rectangular unbridged ports. Induction is via a conventional shaft-type rotary-valve.



In the 19-V, the cylinder bore has been increased from 16.0 mm. to 16.6 mm. and the stroke reduced from 16.0 mm. to 15.0 mm. Despite its larger diameter, the piston is actually slightly lighter. The reduced crank-throw has enabled the connecting-rod length, between centres, to be reduced by 2 mm. without increasing con-rod angularity (i.e. no increase in piston side-thrust) and the combined effect has been to reduce primary compression chamber volume for increased fuel suction and transfer pressure. The smaller crankcase diameter also means that the engine will now fit a 1.1 in. bearer spacing – whereas the older models required a wider bearer spacing than most other popular 19 size motors.

A short intake boss with machined aluminium choke tube is now used. This has a 6.6 mm. throat and, after allowing for the o.d. of the spraybar, gives an effective choke area of 20 sq.mm. – rather larger than one finds on most general-purpose .19 cu.in. motors. Incidentally, it is only necessary to remove the choke tube and spraybar assembly and replace them with the appropriate Enya "TV"-type carburettor to convert the engine to throttle-control for R/C use or third-line C/L.

The 19-V takes the same Enya 15/19 size silencer as was used by the 19-IV. The 19-V no longer has provision for tapped holes in the ends of the exhaust dust as a means of fixing the silencer. This must now be secured with the plated steel strap supplied.

Two examples of the 19-V were submitted by the manufacturer for our examination and test. Neither bore any evidence of having received anything more than a brief check-out run and both were therefore given a normal one-hour running-in period. Running-in followed our standard practice of a series of short, rich runs, initially, on straight methanol/castor-oil fuel, gradually leaning out the needle-setting towards the optimum mixture strength as running-in progressed. Both engines ran

steadily without any tendency to overheat or tighten up.

A few quick rpm. checks at this stage indicated that one engine was up to 400 rpm. faster than the other on a 9×4 KeilKraft nylon prop. and this better example was therefore selected for all subsequent testing. Both engines improved about 300 rpm. during running-in.

Checks on different fuels showed that the Enya would run satisfactorily on inexpensive blends. Straight fuel did not cause any power loss (when using the Enya No. 3 glowplug) on removal of the battery lead, but the addition of 5 per cent (pure) nitromethane was worth an extra 200-300 rpm. in the 10,000 - 12,000 rpm. load-speed range. Not very much was to be gained by using more expensive, higher nitro fuels.

The starting qualities of the two test models were not as good as those of most other Enya engines we have handled in the past. The best conditions for a quick start were (a) a cold engine and (b) some nitro in the fuel. When the 19-V was hot after a run, it had very little compression and was slow to restart. Incidentally, starting also seemed to deteriorate slightly when the silencer was added. In all other repects, however, handling characteristics were satisfactory. The engine remained docile, showing no tendency to backfire and kick its prop.loose, or to snap round and catch one's fingers. The needle-valve was easy to adjust and the motor responded positively without need of undue twiddling to find the optimum setting.

Where the 19-V really scored was in terms of power output. Here, even allowing for the fact that the example tested (10 per cent more powerful than the second sample) may have been above average, the 19-V showed a useful improvement in brake horsepower over the 19-IV and all earlier types. Its gross output was equal to, if not better than, that of any plain bearing 19 tested to date.

The silencer chopped a little more off the performance of the 19-V than it had done with the 19-IV, but the peak power output, reaching 0.28 bhp. at just short of 13,000 rpm., was still well up on that of the older model. The silencer, which has a 6 mm. i.d. outlet (just over 28 sq.mm. area) is reasonably effective in reducing noise level.

Using the silencer and 5 per cent nitro fuel, the following prop. rpm. were recorded: 8,200 on an 11 ×5 Power-Prop. wood, 8,800 on a 10 ×5 Punctilio wood, 8,900 on a 10 × 4 Punctilio wood, 9,600 on a 9 × 6 Top-Flite (maple) wood, 10,800 on a 9 × 4 Punctilio wood, 11,400 on a 9 × 4 KeilKraft nylon and 12,400 on an 8 × 6 Power-Prop wood. The engine held all these speeds steadily.

SPECIFICATION

Type: Single cylinder, aircooled glowplug-ignition two-stroke with crankshaft rotary-valve and bushed main bearing.
Bore: 16.6 mm. (0.6535 in.)
Stroke: 15.0 mm. (0.5905 in.)
Swept Volume: 3.246 cc. (0.1981 cu.in.)
Stroke/Bore Ratio: 0.904:1
Checked Weights: 160 grammes – 5.64 oz. (less silencer) 202 grammes – 7.13 oz. (with silencer)

General Structural Data

Pressure diecast aluminium alloy *crankcase/cylinder-casing* with drop-in steel *cylinder-liner*. Pressure diecast aluminium alloy detachable *front housing* with cast-in phosphor-bronze main bearing and secured to crankcase with four screws. Hardened, counterbalanced *crankshaft* with 11 mm. dia. journal, 8 mm. bore gas passage and 5 mm. dia. crankpin. Lapped cast-iron *piston* with straight baffle and fully-floating 4 mm. dia. *gudgeon-pin* fitted with brass pads. Pressure diecast aluminium alloy *connecting-rod* with cast-in bronze big-end bush. Pressure diecast aluminium alloy deeply finned *cylinder-head* with machined joint face and cast-in brass thread insert for glowplug and secured to cylinder casting with four screws. No head gasket. Machined aluminium alloy *prop driver* fitted to matching taper on crankshaft. Machined aluminium alloy *choke tube*. Nickel-plated brass spraybar assembly with flexible needle-valve extension, reversible for left or right hand use. Beam mounting lugs.

OPTIONAL EXTRAS

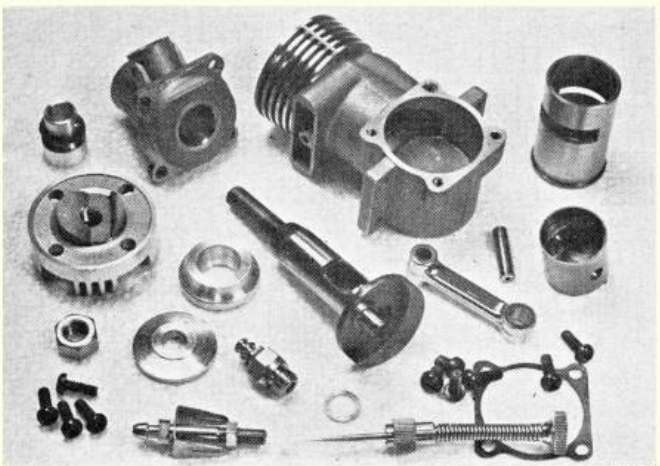
(i) Enya expansion-chamber type silencer.
(ii) Barrel-throttle carburettor (for conversion of engine to 19-V TV type).

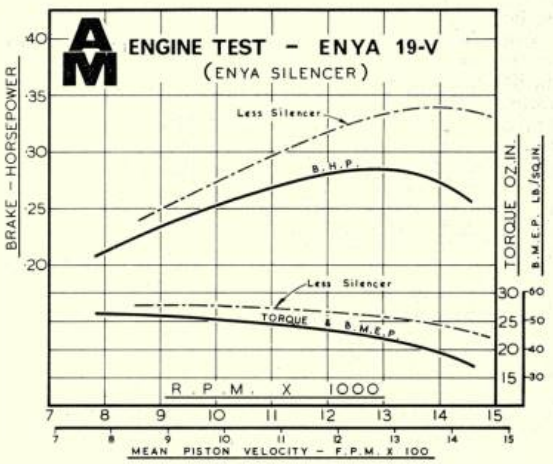
TEST CONDITIONS

Running time prior to test: 2 hours approx.
Fuel used: 5 per cent pure nitromethane, 25 per cent Duckham's Racing Castor-oil, 70 per cent methanol.
Glowplugs used: Enya No. 3 (Medium reach 1.5 volt platinum-rhodium filament).
Air Temperature: 13 deg. C (56 deg. F).
Barometric pressure: 30.30 Hg.
Silencer: Enya expansion chamber type. (28 sq.mm. outlet area).

To recap, then, the Enya 19-V is more powerful, more compact and fractionally lighter than its predecessor. It remains a well-built, serviceable and competitively-priced motor.

Power/Weight Ratio (as tested with silencer): 0.63 bhp/lb.
Specific Output (as tested with silencer): 87 bhp/litre.





LE GARRICOUPE

A 44 in. span Coupe d'Hiver model, designed by Jean Louis GARRIGOU

So that's what he means by 'getting down to it!' Roger Garrigou releases his version which won the recent International event.

YOUR FRE

A top-notch Coupe d'Hiver class r
producing airfoils for those

A 'FAMILY AFFAIR' is how one could describe the Garricoupe. Why? Well, this four-year-old design has met considerable success in the hands of both Roger Garrigou (who won the 1972 International Coupe d'Hiver meeting), his wife, who took the Ladies' Cup at this same event, and his son, Jean Louis, who placed second in the fly-off for the 1971 International – incidently beating 'dad', who was placed no higher than tenth – while he took the Junior honours at the 1972 meet. One family thus took home all the 'gold' from just one International – it just cannot be purely attributed to luck. And its pedigree does not end there – the contest successes throughout 1969 to 1971 bear testimony to its consistency, while Roger collected the Champion of France title in 1970.

The models used by the Garrigou family are identical, except that Roger's now sports a sheeted motor tube section, and he uses a two-bladed propeller. The plan, of course, relates to a model built prior to the 100 gmm rule, so if the balsa you select is a little harder than you would normally use, then there will be less ballast to add to bring it up to specification!

Construction is quite straightforward and should not present any difficulty to those of experience with similar models – points to watch being to ensure an accurate, twist-free structure. The fuselage must be straight, and this is easily achieved if two fuselage sides are built directly over the side elevation. Cut out the $\frac{3}{32}$ in. sheet for the nose and motor peg reinforcement, then add the upper and lower $\frac{3}{32}$ in. sq. longerons. Place pins either side of these longerons so that they conform to the outline shown – do not pin through the wood direct as this will cause splitting. Next glue the $\frac{3}{32}$ in. sq. uprights in place, followed by the $\frac{1}{16}$ in. x $\frac{3}{32}$ in. diagonals. Lastly, add the $\frac{1}{16}$ in. sheet gussets and when the glue has dried, remove from the board and repeat for the other side.

Continued on page 332

Jean Louis allows his model to rise-off-ground as it takes to the air to bring his victory in the Junior section of the '72 International event. His mother won the Ladies' section too – same model, of course!

E.S. SECTIONS

EE PLANS!

rubber model, and a unique way of se attractive tapered wings.

devised and described by R. ANNENBERG, B.Sc., F.R.Ae.S

BUILDING A MODEL of your own design? Odds are that the wing has a parallel plan-form for the greater part of the span and a constant wing section – the reason being that the average aeromodeller is very loath to draw out ribs for an eliptical wing due to the extra effort and time involved for any slight increase in performance. It is strange, but nonetheless true, that the boffins have generally been so concerned with improving the theoretical performance of wings that the practical aspect of how easily they may be made and repaired, has been overlooked.

The E.S. templates are in effect a somewhat refined variation of the idea universal among microfilmers who cut the ribs to the desired chord width by trimming away the trailing edge. The refinement lies in the shapes, each of which are such that whatever the chord length, if the trailing edge thickness is zero, a proportional shape is produced. Lest the sceptics assert that this is impossible, let me hasten to add that a truly proportional shape is produced, provided the templates are used correctly.

Mathematically, the basis of these templates is a curve known as the *Logarithmic* or *Equiangular Spiral* (E.S.) which has the unique property that the shape to the left of any radius from the origin is independent of the position of that radius. Despite this definition, E.S. could equally well refer to *Extremely Simple* – which describes their use!

These templates are designated by the letters E.S., followed by a number, i.e. E.S.6 is the template whose maximum camber is 6 per cent and E.S. 6,6 is a symmetrical section 12 per cent thick. Incidently, it is not suggested that there are theoretical aerodynamic reasons behind the E.S. sections which make them particularly desirable – indeed, there is a possibility that these sections may produce a worse-than-normal performance when compared with similar sections, although usually there is a good reason for such a variation (such as a greatly different nose radius or even a faulty method of comparison). The significant value of the E.S. curves lies in their permitting consistently controlled variations in wing section designs with exceptional ease of construction.

This R/C delta by John Stevens of the Valkyries club utilised the E.S. templates to good advantage. A highly-tapered symmetrical section such as this wing uses, can be difficult to build, but Bob had the solution. Build the wing in two halves – top and bottom – flat on the bench, then join together. Presto, a 'complex' structure completed quickly and accurately without recourse to jigs, etc.

Constructing the Template

Cut out the paper patterns, with a small margin to spare around the outline, and glue to a piece of dural, plastic or plywood not less than $\frac{1}{16}$ in. thick, preferably with a non-water type of adhesive to avoid paper stretch.

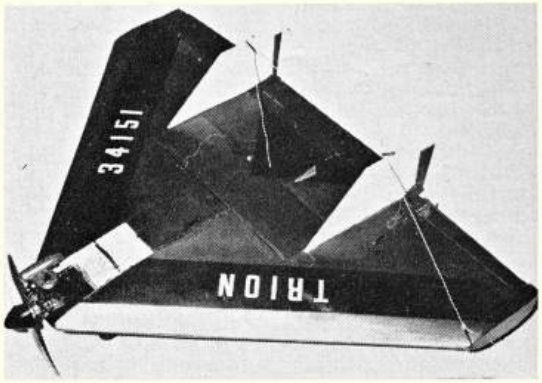
Saw and file carefully to the *exact* outline. The leading edge notch is *exceedingly* important. Remember to be very careful and do not hurry as mistakes or inaccuracies in any master templates are manifest in each and every wing rib produced from it.

The paper patterns are for 10 in. chord ribs or less and the maximum camber goes by intervals of 1 per cent to 12 per cent, giving six templates in the following combinations: (1,12), (2,11), (3,10), (4,9), (5,8), (6,7). These six templates should satisfy the requirements for everybody except radio fans who 'build 'em big'. To these we must apologise for not providing patterns 20 in. long. However, for those who want to make templates for longer ribs, the table of ordinates given on the plan will enable the templates to be plotted out – preferably on to sheet metal for ruggedness. The notch apex is the leading edge.

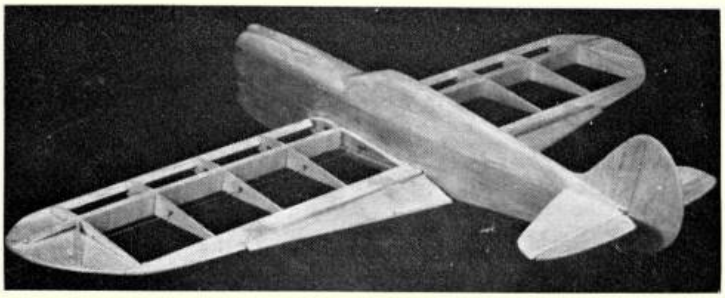
Using the Template

This depends primarily upon whether the section is to have a concave or convex lower surface, as with an undercambered lower surface the leading edge tends to get excessively thin. Firstly, a symmetrical section – noting that the same curve is used for both sides and consequently the maximum thickness chord ratio can only be varied by intervals of 2 per cent up to 24 per cent. As an example, let us take a symmetrical section 10 per cent thick, 7.2 in. long with a trailing edge depth of $\frac{1}{16}$ in. for constructional reasons.

Press two pins vertically 7.2 in. apart into the sheet of balsa which you are going to use for the ribs. Locate the nick in the leading edge of the template E.S.5 in one pin and rotate the template until the edge is pressing against the other pin. Holding the template down firmly, cut round the outline with a balsa knife. Leaving the leading edge pin in place, move the other pin $\frac{1}{16}$ in. at right angles to the chord



The Aero Modeller Kittywasp design (Plan No. CL/1122) also utilised an E.S. section, even though the wing was not tapered – it just proved to be an easy way of cutting out the ribs! Actually, this model was based on a 54 in. span stunter which did have a tapered wing planform (using the templates) and this proved most successful. Several members of the Valkyries club have used these templates to produce all types of wings and tailplanes for widely-differing types of models.



and press into the wood. Turn the template over and repeat the aligning and cutting process. See sketch A.

How long did it take? Thirty seconds per rib, *and* there is no balsa dust on the mantlepiece!

Semi-symmetrical sections can be treated in an identical manner except that two different templates are used, one for each surface.

Now what about undercambered sections? We must take the bull by the horns and repeat *very* firmly that the *theoretical* E.S. sections give an impractical leading edge thickness. However, let us not be deterred by such academic obstacles; provided that the leading edge 'nick' positions are *not* coincident (i.e. separated sufficiently to produce a reasonable and effective nose radius) a 'practical' wing-section results. Did I forget to mention that these undercambered sections have a nose shape decided mainly by sandpaper? Perhaps I am being just a little cynical in pointing out that very few practical wing ribs are 'designed' by any other method.

Briefly, the main value of E.S. templates for the design of a contest model is when the leading edge is of constant section even though the wing chord is not constant across the span.

In this case we can cut out our ribs by adjusting the pin locating the lower surface 'nick' the requisite distance below the upper surface pin 'nick', and using the procedure described above. See sketch C.

This method of leading edge 'bias' may also be utilised at the trailing edge, should, for example, strip ailerons be contemplated on a radio control model, or even flaps on a control-line stunter – in which case $\frac{1}{8}$ in. bias is suggested, although experimentation will soon reveal the correct amount.

The above procedure is appropriate to sheet ribs. It is not proposed to go into the details of the construction of built-up ribs except to note that the templates make drawing out the ribs on paper really easy.

GARRICOUPE

continued from page 330

Cut out all the cross braces. Aft of the motor peg, the fuselage underside is flat, so pin the $\frac{3}{32}$ in. square cross braces to the plan rearwards of this point, then add the fuselage sides, one at a time, checking that they are truly vertical. When quite dry, add the corresponding top cross braces. Again leave to dry, then remove from the board and draw the nose together around the $\frac{3}{32}$ in. sheeting, checking carefully for alignment. Finally, add the top and bottom cross braces for the forward section. Complete the fuselage by adding the $\frac{1}{16}$ in. x $\frac{1}{4}$ in. wing mount, soft tail block with ply D/T hook and 1 mm. nose facing.

Now for the flying surfaces. The wing centre section is flat, and thus built in one piece. Pin the $\frac{1}{8}$ in. x $\frac{3}{16}$ in. L.E. in place, followed by the pre-notched $\frac{1}{8}$ in. x $\frac{1}{8}$ in. T.E., raising the leading edge of this piece $\frac{3}{32}$ in. to correspond with the wing section. Cut out the ribs, and place in position, then when the glue has set add the two $\frac{1}{16}$ in. x $\frac{3}{32}$ in. spars and the $\frac{3}{32}$ in. x $\frac{3}{16}$ in. main spar. Remove from the board and add the lower $\frac{3}{32}$ in. x $\frac{1}{16}$ in. spar. Trim away the tip ribs to accept the 1 mm. ply dihedral braces and connect them securely in place to the spars. The tips are built in the same way, except that the spars, L.E. and T.E. must be chamfered to suit the dihedral of $3\frac{1}{2}$ in. Add the tips to the centre section, reducing the dihedral angle, then add the $\frac{1}{16}$ in. sheet gussets.

The tailplane is equally conventional, and is built flat over the building board, but remember that light weight is essential here.

Lightly sand the entire model, using a sanding block to prevent damaging the ribs, etc., then cover the entire model, preferably with Jap tissue, but if this is not available, then use lightweight Modelspan tissue. Apply three coats of 50 per cent thinned dope, taking care to avoid warps by pinning down the structure while the dope is drying.

Complete the fuselage by adding the tailplane mounts, the 1 mm. ply reinforcement for the motor peg plus the wing dowels, and finally the $\frac{3}{32}$ in. sheet underfin. Tailplane tip fins should be cut from $\frac{1}{16}$ in. sheet and glued in position. These sheeted surfaces should then be tissue covered and lightly doped.

Laminate the noseblock from $\frac{1}{8}$ in. sheet, carve to shape, then bend the ironmongery to shape. Complete by adding the wire prop step, then balance the single bladed prop, checking that it folds alongside the fuselage when the rubber motor is expanded. Make up the 10-strand motor of 4 x 1 mm. Pirelli, 'pour' it into the fuselage, and off to the flying field for those test flights!

Father and son teamwork here – Jean Louis holds while Roger Garrigou puts on the turns. Both single- and two-bladed prop. assemblies are used.

topical twists

by 'Pylonius'

Illustrated by 'Sherry'

'I see why they want an increase in the old age pension. So that they can afford radio control.'

Money Doesn't Fly

What do we spend money on in this country? Is it motor cars, cat food, or perhaps Bingo? Not a bit of it, it is, according to a report, model radio gear, which we consume with such a gluttony that it puts the rest of the world in the chuck glider class. Whereas a few years ago it was a mark of social prestige to own a proportional outfit, these are now as commonplace as transistor radios and no longer a considered factor in the rat race. In fact, it's now quite the snobbish thing to disclaim radio in favour of the purity of free flight, just in the same way as people let it be known they have no television but lots of good books.

But, giving that the British are buying up radio gear like hot cakes, where does it all go to? The sales figures suggest it should be useless going to the flying field without advance booking, for surely the happy purchasers must be queuing up a mile deep on each colour code, and flight organisers thinking seriously of setting up a stacking system to avoid collisions in the congested air. But happily for us older hobbyists to whom the near empty flying field is a traditional luxury, the clamouring radio buyers do not seem to put their purchasers to a viable model use; so in spite of the depressing threat of these high sales figures you can still find a bit of elbow room on the flying field and mainly only the ducks to contend with on the yachting ponds.

This state of affairs should also be encouraging to the authorities, for if only a small proportion of that deadly radio gear got on to the public spaces they would be so busy with model-banning legislation that they would not have time to engage on those projects even more dear to their hearts like high rise flats and motorways, although it would make conservationists happy.

Own Design

The old approach to scale modelling was to find a design that combined a certain amount of eye appeal with a fair degree of flyability; and even at that it was a tough life, for all too often the airborne antics of the scale model made people realise why the flyable sort of model aircraft looked nothing like the real thing. What the scale model desperately wanted was a pilot to correct those unstable spins and wallows, and this is what it got with the coming of radio; so now the modeller who comes along with the nice stable Puss Moth or S.E.5., is likely to get the horse laugh from the boys who played it tough by probing into the remote corners of the aviation world for the odd machine out.

One thing the odd machine out is not, is pretty. Take that one recently paraded on the cover of this magazine; charmingly called *Woolaroc*. This looks as if it had been designed by a committee which had failed to turn up for the meeting. They seem to have got the bits and pieces in some sort of order, but apparently forgot the pilot who was put in a kind of penthouse as an afterthought.

There must be many fearsome aircraft yet to be ferretted out by the zealous scale fan, some so obscure that the modeller could quite well design his own ugly duckling without anyone knowing the difference. It would be quite easy to provide a phoney history. You could, for example, say that 'Wotisit' was specially built to take part in the 1925 air race from Clapham Common to Tashkent. You could go on to describe how 'Wotisit' got roughly half way there by crashing near Sevenoaks. And only the most suspicious of people would notice that your odd craft out had characteristics very similar to that of a modern aerobatic multi, though suitably uglified.

They Grow Not Old . . .

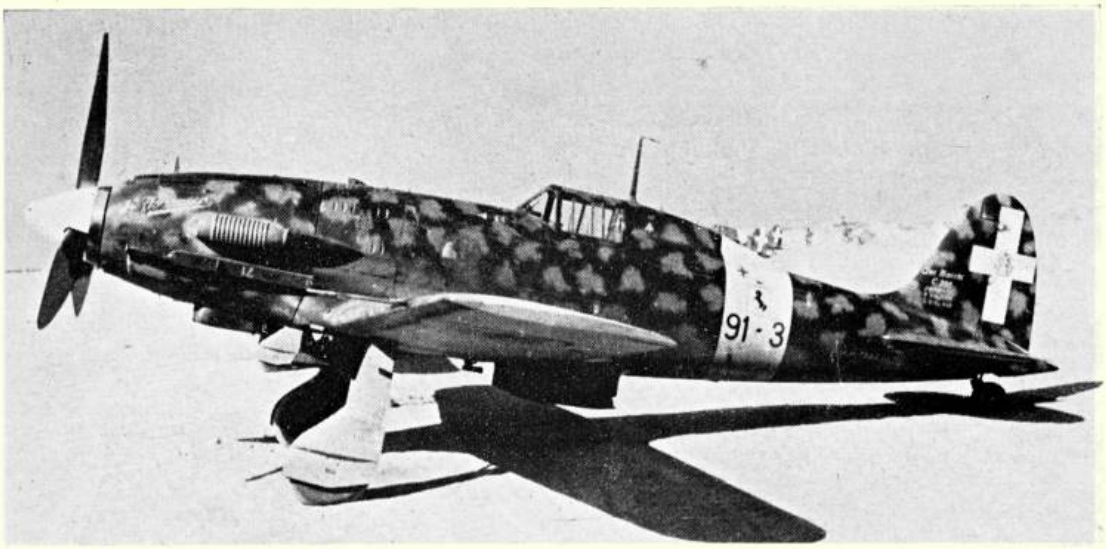
One club complains that it is going over to Radio, albeit reluctantly, because its elderly free flighters are getting a bit beyond the rigours of the chuck it and run art. And it has been a bit ruthless the way the young immobile radio flyers have looked on while the old chaps have been panting and puffing up and down the field.

It is also a sad comment on the frailty and impermanence of mortal man that the very kit models which may well have introduced him to the hobby back in the days when the rubber powered models had cabins and spindly undercarts are featuring just as prominently in the adverts as ever.

Taking the Rise

Those modellers who bemoan the fact that the popular press does not put the model plane on the same dramatic plane of public interest as the other sort of model, clad or unclad, should have paid careful attention to the sort of ha ha publicity given to the recent successful attempt at man powered flight. What the public were assumed to find so irrepressibly funny was the idea of a bloke riding a bike up in the sky, with no credit given to the nerve and skill required to take such a machine off the ground, powering and controlling it at the same time. Nor was there any discernable reference to the technical achievement involved.

I'm afraid, therefore, any future write up on the Wakefield contest will concern the foibles of grown men addicted to playing with elastic powered toy planes.



AIRCRAFT DESCRIBED No. 214

MACCHI C202 A. S. 'FOLGORE'

described by R. C. JONES and drawn by P. DELL'ORCO

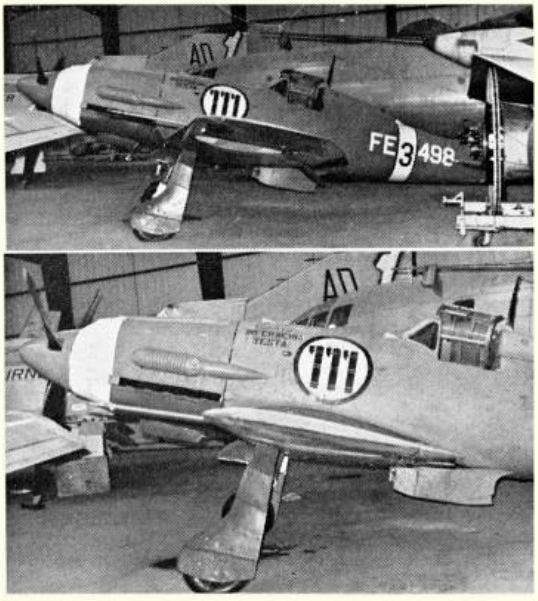
PRIOR TO the commencement of hostilities between the Allied and Axis powers, the pre-war fighter aircraft of the Italian Air Force were all powered by radial engines. Apart from offering the Allies a recognisable identification feature, these units were also somewhat lacking in aerodynamic effectiveness, but despite this the CR.32 and its successor, the famous Fiat CR.42 biplanes, proved to be extremely manoeuvrable, if lacking in outright speed superiority, over the emergent monoplane, in-line engined fighters of the Allied and German air forces.

The delightful Macchi C.200 Saetta fighter, which was probably the most modern Italian design in service at the time of their declaration with the Axis cause, was also powered by a radial engine, but as with the CR.42, the superb manoeuvrability and handling characteristics of the Saetta made it a formidable machine in dog-fights against the British Gloster Gladiators and early Blenheims and Hurricanes in service at that time.

However, by 1941 the Spitfire, together with later marks of Hurricane, were at last trickling through to the Mediterranean and Middle East theatres, and the Italian Air Force began to regret that the radial engine had obtained such a firm foothold in the minds of Italian aircraft designers. The spectacular performance of the original Italian seaplanes, as designed and built for the *Schneider Trophy* races of the 'twenties and 'thirties, makes the wholesale acceptance of radial engines (as opposed to the in-line, liquid-cooled power units of such machines as the Macchi M.39, 52, 67 and the superb MC.72, which gained the world speed record for floatplanes at a speed of 441 m.p.h. as early as 1934) even more unusual.

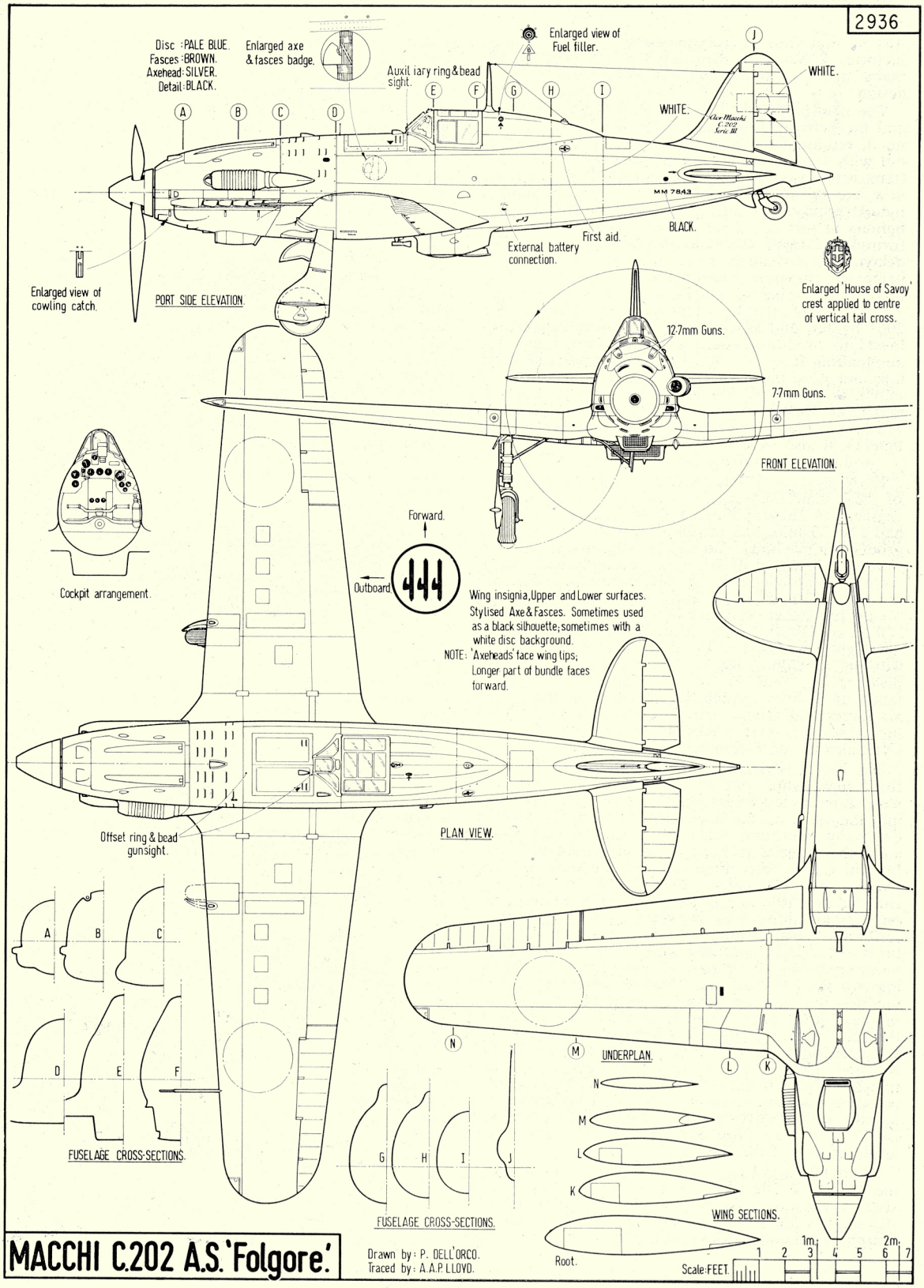
When Italy declared its intentions of aligning its forces with those of Germany, one of the benefits was that the Macchi Company were able to obtain an example of the Daimler-Benz 601 in-line engine from their new allies. Around this proven engine, Mario Castoldi, chief designer to the Macchi Company, designed and built the MC.202 fighter. This was, in fact, a private venture (that is, not built against a specific government or Italian Air Ministry design project), and as the radial-engined MC.200

REPRINTS OF THE 1/72nd SCALE FEATURE PLUS DYELINE COPIES OF THE 1/30th SCALE ORIGINAL DRAWING ARE AVAILABLE AS PLAN PACK 2936, PRICE 40p PLUS 5p POST AND PACKING, FROM AERO MODELLER PLANS SERVICE, 13/35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.



Heading M.C. 202 of 4° Stormo., 91 Squadriglia, 10 Gruppo C.T. taken at Martuba, Libya, May 1942, code 91 is in black, aircraft numeral 3 in red M.M. 7844. The manufacturer's data on the fin and also the M.M. numbers are in yellow and the script on each side of the engine cowling reads 4° F. BARACCA, this also in yellow. The camouflage is deep olive green basic upper surface finish with Earth mottle. Spinner and rear fuselage band and the wing tips are white. S.M.A. Official photo via R. C. Jones. Right: Stored by the Smithsonian Institution, this sole survivor still bears the Foreign Equipment numerals as well as spurious insignia and a desert pink colour scheme.

2936



MACCHI C.202 A.S. 'Folgore.'

Drawn by: P. DELL'ORCO.
Traced by: A.A.P. LLOYD.

was at that time in full production at the Macchi factories it was not surprising that Castoldi utilised many major components from the existing fighter design.

The new prototype first flew on 10th August 1940, and the performance and handling was exceptionally good, retaining the manoeuvrability of the MC.200, but with a speed advantage of some 60 m.p.h. and a tremendous rate of climb. Here at last the Italians now had the in-line engined, low winged monoplane fighter which was certainly equal to contempory fighters in service, in some respects even better. Unfortunately, there was one problem which had been delaying immediate production of the MC.202, this being the apparent need of relying upon the Germans for supplies of the Daimler-Benz 601 engines. This unit had already been earmarked for the Re. 2001 fighter, and so eventually Alfa Romeo were allowed to produce a licence-built version, under the designation R.A. 100 RC.41-I. This produced 1,175 h.p. and gave the Folgore a maximum speed of 309 m.p.h. at sea level, 338 m.p.h. at 6,560 ft. and 370 m.p.h. at 16,400 ft., a very good performance envelope to meet attacks from Allied bombers and fighters. It also gave an extremely good rate of climb to produce a formidable interceptor type of aircraft.

Early production MC.202s had armament consisting of 12.7 mm. (.05) calibre guns mounted over the engine, but those produced from Series IX-XI also had one 7.7 mm. (0.3 in.) in each wing, one batch of production machines also having one Mauser MG 151 cannon carried in faired units beneath each wing. Another improvement on late-production Folgore was provision beneath each wing for attachment points for either jettisonable fuel tanks or 110 lb., 220 lb. or 330 lb. bombs. The first unit to receive the new fighter was 6° and 17° *Gruppo* of the 1° *Stormo* working at Udine. By November of 1941 the complete *Stormo* was in Libya covering the Axis defence of Tobruk, which was broken by the Allied air forces and ground troops, after which it covered the retreating Axis forces as they moved back to Cyrenaica in late December.

The North African theatre was not ideally suitable for a new fighter just entering service, and troubles were experienced with infiltration of sand and dust into the vitals of the machines. However, the Macchi Company overcame them by fitting tropical filters and other special tropical or desert equipment, and Macchi C.202s thus fitted received the suffix of A.S. (Africa Settentrionale). Technically the Folgore changed but little during its considerable lifetime, the only major differences between various production series were two alternative types of tailwheel structures – not to be confused with the practice of some units removing all or part of the factory-fitted fairings for the tailwheel oleo. Another externally visible modification between some machines was the position of the venturi tube; on some this was carried under the belly of the fuselage, just forward of the radiator, while on others it was fitted to the right side of the fuselage. The additional wing guns have been mentioned earlier, as has the fitting of Mauser cannon on some machines – perhaps the most noticeable external variation between the various series was the large tropical air filter fitted over the intake on the left-hand side of the forward fuselage.

From January 1942 until early winter of that year the Macchi C.202 (A.S.) was to enjoy its height of success, the crack 4° *Stormo* (9° and 10° *Gruppo*) claiming its 500th 'kill' during this period. In all, 19 *Gruppo* were equipped with the Folgore and it served both in the home defence role also, of course, in the desert and against Malta, and the 256°, 382° and 386 *Squadriglia* of 21° *Gruppo* had 12° Macchi C.202s operating on the Russian Front, where these units received high praise both from the pilots of the Luftwaffe, together with German ground forces, who had cause to be grateful for the very close support given to them by their Italian allies flying the Folgore. The Folgore also flew as close escort fighters to Italian and German bombers operating against Allied targets in North Africa and Italy. With the eventual surrender of Italian forces to the Allies in 1943, some Folgores saw service with the *Co-Belligerent Air Force* X° *Gruppo* in the 4° and 5° *Stormo*, while a few others which were flown to Northern Italy saw service with the Axis R.S.I., but here they were relegated to the trainer role, being supplanted by the later Macchi C.205 and the Fiat G.55 types.

The popularity of the Folgore with pilots and ground crew alike was exceptional, and talking with some who flew the type one is given the impression that it was a superlative machine to handle, with very light controls, but which had a rapid and firm response. Perhaps the most fitting accolade to the Macchi C.202 Folgore is the fact that two were still flying at Lecce Training School as late as 1947, being kept in the air as a result of dilligent and often very long-range foraging by ground crew, who built up a 'spares' section by pillaging the wreckage of Folgores which, even today, litter the North African and Libyan Deserts.

Specification

Single-seat fighter/fighter bomber. Power plant: One 1,175 h.p. *Alfa Romeo* R.A. 1000 R.C.41-I Monsini (DB-601A licence-built) engine, 12-cylinder inverted liquid cooled type. **Armament:** 2 x 12.7 mm. Breda-Safat MGs above the engine and (after the initial production batch) one 7.7 mm. Breda-Safat gun fitted in each wing. Provision was also made on late production series for external stowage of jettisonable fuel tanks or bombs. One late batch of machines also carried one Mauser MG 151 cannon beneath each wing.

Span: 34 ft. 8½ in. *Height:* 9 ft. 11½ in.
Length: 29 ft. 0½ in. *Wing area:* 180.83 sq. ft.

MC 202 of 4° Stormo, 9 Gruppo C.T. Martuba, Libya 1942 – note how camouflage extends under leading edge of the wings and beneath the engine cowling. Photo: G. Pini

FLAPPED WINGS - Part II

in which John O'Donnell continues his summary of variable-camber wings for power duration models

Annie Gieskieng prepares her immaculately-built Siren-Ara with which she placed 6th at the 1970 U.S.A. team finals against very stiff competition.

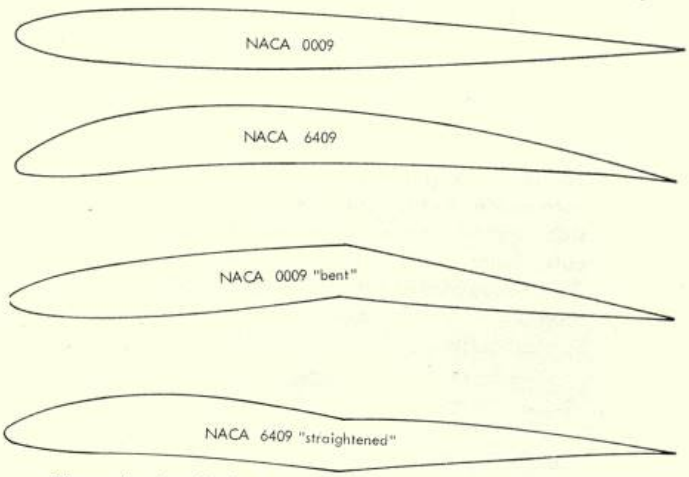
THE FIRST PART of this dissertation was contained in last month's *AeroModeller* and dwelt on the basic principles underlying the use of flaps on free-flight power models.

Before presenting the story of Bill Gieskieng's development work, it might help to spell out one or two points at some length. As already mentioned, there are two basic approaches in designing a flapped wing: the first is to start with a normal glider section and to flatten it out under power, while the other is to take a biconvex 'speed' airfoil and 'bend it in the middle' for glide. Obviously, there are any number of intermediate approaches possible between these two extremes.

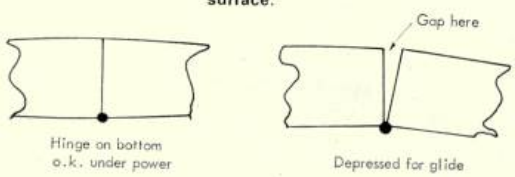
The distinction between the two basic approaches may not be apparent at first sight – and a detailed illustration would seem in order. One very popular, if somewhat 'dated', section well-known for good, reliable glide performance, is NACA 6409. This, in fact, is a particular symmetrical section NACA 0009 'bent' to give undercamber. More precisely, 6409 is obtained by plotting 0009 about a curved datum line having 6 per cent camber at 40 per cent of the chord. Straightening out a wing of NACA 6409 section by using flaps can only give an approximation to the original symmetrical section, and the irregularities in the contour can be expected to cause some unwanted drag.

Conversely, if one starts with a symmetrical NACA 0009 wing, and 'flaps' it for undercamber, the result is only roughly equivalent to 6409 and the glide performance cannot be expected to be the same. These limitations need to be understood, as otherwise one may expect too much. Simple, straightforward, flaps (if the adjectives can be pardoned) *cannot* provide the idealistic combination of the absolute minimum drag on climb and the world's best glide thereafter. What they can do is to reduce drag substantially under power, or improve the glide, or a bit of both. Any of these should give a substantial increase in duration.

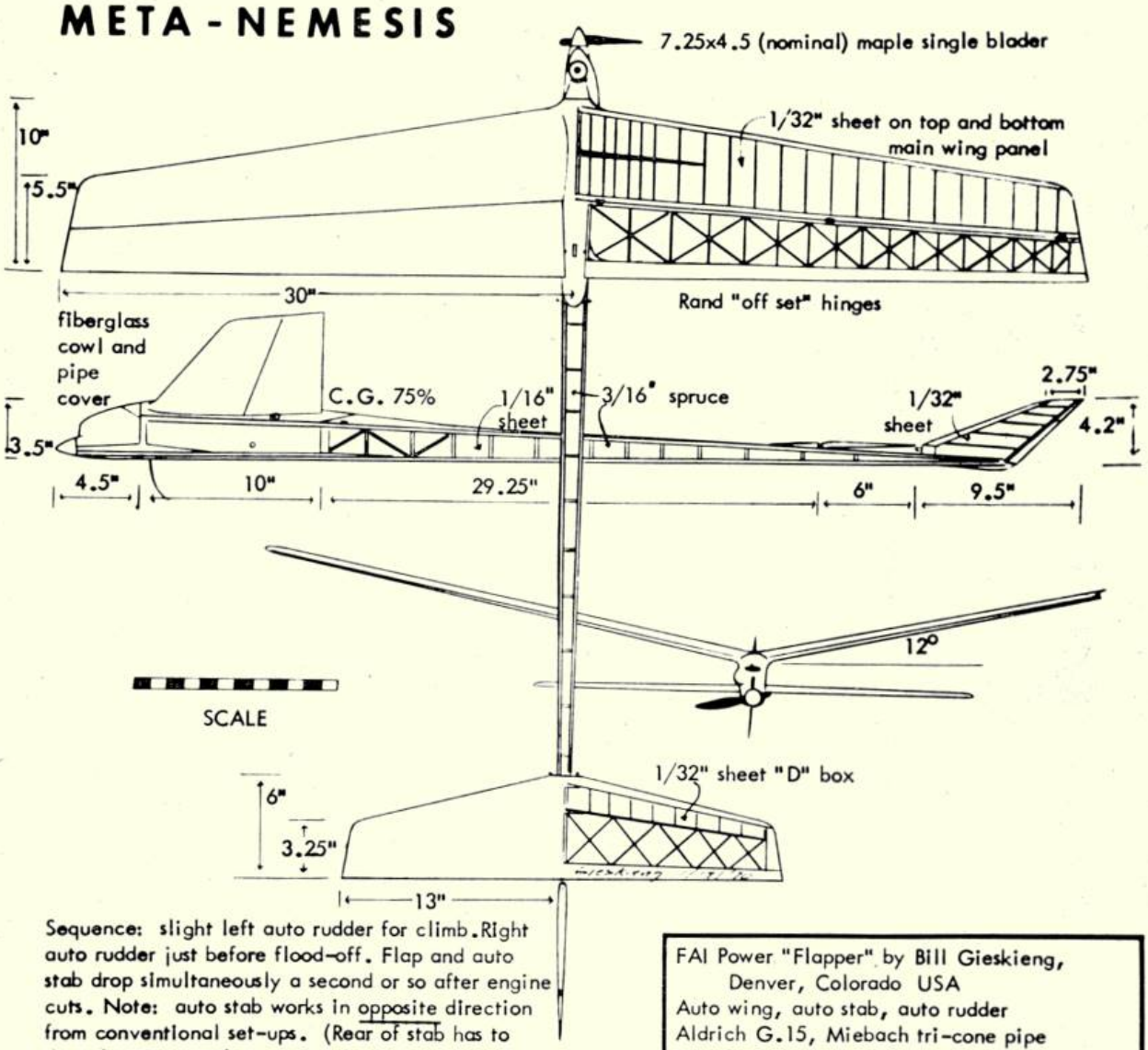
The next 'trouble spot' with the airfoil arises from the practical considerations of hinging the flaps to the rest of the wing. If the hinges are located on or close to the upper surface of the wing, then there will be a large gap on the undersurface when the flaps are deflected upwards. Putting the hinges on the lower surfaces gives exactly the opposite effect. Central hinges give gaps on both surfaces – but of a smaller size. As the production of wing lift is a result of there being a pressure difference between the upper and lower surfaces, it would appear inadvisable to have openings along the flap hinge line. Such spaces would enable 'high' pressure air to leak



Above, the two basic approaches possible for variable-camber. Either 'bend' an airfoil for the glide (NACA 0009) or 'straighten' one for the climb (NACA 6409). Below is seen an example of bottom-hinged flaps with a resulting gap on the upper surface.

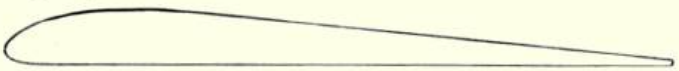


META - NEMESIS

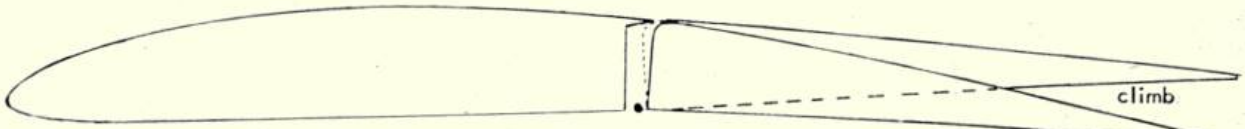


Sequence: slight left auto rudder for climb. Right auto rudder just before flood-off. Flap and auto stab drop simultaneously a second or so after engine cuts. Note: auto stab works in opposite direction from conventional set-ups. (Rear of stab has to drop down to match new wing incidence caused by flap deflection.

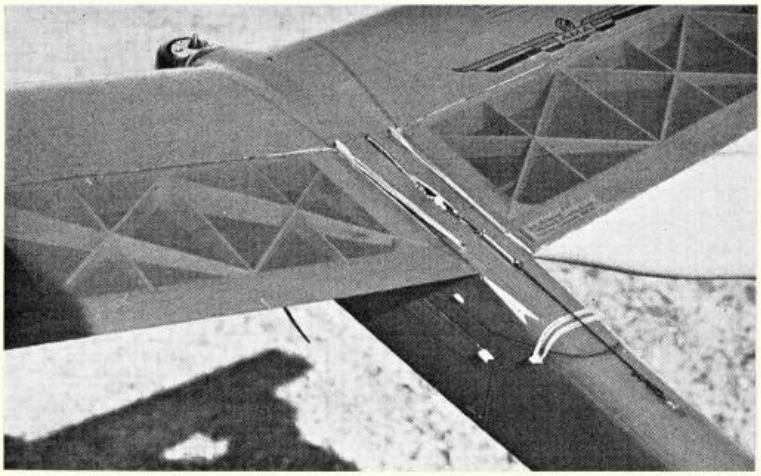
FAI Power "Flapper" by Bill Gieskieng, Denver, Colorado USA
Auto wing, auto stab, auto rudder
Aldrich G.15, Miebach tri-cone pipe
Modified Seelig timer
Pen bladder tank
Red Transparent Super MonoKote covering
Wing area 460" Stab area 120" T V o 1.35
Climb pattern: 1/2 right turn in 10 seconds
Glide: right



Typical stab section



Typical wing section (modified Eppler E 387)



'Meta Nemesis' 'set up' for the climb. Hooking the string on to the cam on the fuselage does not automatically set the flaps – this must be done manually – compare with lower picture. The white pointer indicates where the flap should be for power and gives a last-second warning before release of the model that all is well. This is easily overlooked, and on one occasion the ship was released with the flaps down – producing one of the fastest loops in history!

from lower to upper surface and affect the airflow. The magnitude of this effect demands consideration.

Finally, it should be realised that lowering of large flaps through quite considerable angles does more than change the wing camber. It also changes the wing *incidence* by several degrees. Compensating for this effect necessitates an alteration in tail incidence – and is most of the reason why flapped models have V.I.T. systems that work in the *reverse* direction to usual.

The scene should now be set for an account of Bill Gieskieng's work on flaps. This has covered some half-dozen designs (plus another couple of definite projects) spread over the last five years. Bill's attempts to 'build a better mousetrap' hit the public eye when he took the *Meta Nemesis* to California and won F.A.I. Power at the W.F.F.A. contest. This was an important event, with tough opposition, and high scores – and marks the 'turning point' at which flaps suddenly became a lot more than just another gadget.

Taking the Gieskieng designs in historical sequence, I will try to quote Bill verbatim as much as possible. Space considerations imply my being as concise as is practical – so unnecessary repetitions of the drawn-out model and airfoil details will be avoided.

Scylla – 1967

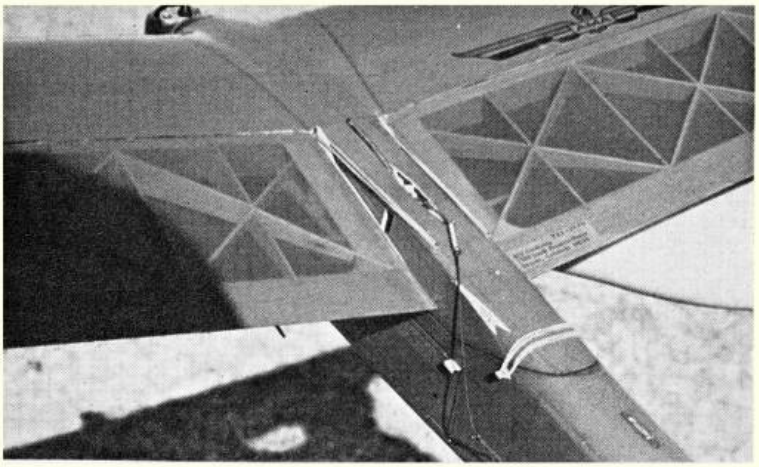
'Looking back, it is hard to remember exactly what I had in mind when designing the *Scylla*. Evidently, I was mostly concerned with the climbing phase and hoped that the well-rounded nose and awkward flap would save the glide. Still, the glide was respectable and a big improvement over the gliding-bricks I had been flying. The 18 degree flap angle is a little much. The plan was to experiment with lesser angles, but the ship didn't last long enough for that. It did show that the basic idea held promise. It also showed that fancy transitions were to be approached with extreme caution'.

Scylla-Siren – 1968

'The S.S. saw more care being shown in the airfoil. This time the emphasis was placed on the glide, at the expense of the climb. The climb always gave trouble on this ship, so it is difficult to evaluate its climbing potential as far as the airfoil *per-se* is concerned. The glide was very impressive, but at times seemed too slow, with a "mushing" quality. In 1969, some changes were made: the wing was moved forward approximately 1½ inches and the flap angle reduced several degrees. The effect on the glide was very noticeable. It now glided slightly faster but much more cleanly. Evidently I pushed the C.G. too far because on its last flight a missed transition caused it to zero-out. The flaps were too flexible with their covering of silk and low-shrink dope and flexed upwards enough to cause a nega-dive.

Meta-Nemesis – 1969

'The ship that I used at the W.F.F.A. meet was the *Meta-Nemesis*. This ship, in contrast to the *S.S.*, was a 'speed' ship and designed to take advantage of a piped engine. The aspect-ratio was close to 8:1 (60



'Meta Nemesis' ready for the glide – note depressed flaps. Transparent Monokote covering is applied over the transfers which accounts for their slightly dull appearance, but they are, of course, completely waterproof! Note the neat method of wing attachment plus the hatch, giving access to the 'works' – only the extended timer button protrudes. Strong anti-warp structure evident on the flaps.

in. span), and the basic airfoil is the Eppler 387. Flap size was 45 per cent. For the climb the flap was reflexed three degrees and for the glide it deflected five degrees (a total of eight degrees travel). The ship proved very fast, but easy to handle. The glide was not bad, but not in the same class as the *S.S.*

'In hinging the flaps I slipped into complete simplicity by covering the wing and flap with Monokote, then ironing on another strip across the top to join them. Compared with other methods I have used, this is certainly the easiest by far. The *only* way it will work, however, is to sand the 'mylar' surface with a fine paper, like 220 Garnet, to take off the gloss. This will give a very good bond. Without the sanding it just won't hold together for more than a few "flip flops" up and down. It is real agony to fit hinges and the mylar ironed-on hinge is a real boon.'

Siren-Ara, 1970

'Annie (Bill's wife) built three of these ships for the 1970 U.S. Team Finals – and secured a most respectable sixth place.

The *S.A.* bears a superficial resemblance to the *Meta-Nemesis* but is actually a completely new design.

'The airfoil probably fits the "compromise" category. The entry is low and the upper surface well arched. Thickness is 9 per cent. This wing was the first to be completely planked and the flaps and main panels are very rigid. Incidently, the flap is the largest used to date and is 50 per cent of the chord. At times the glide can be quite good, but sometimes it seems to fall apart. I suspect that I tried to get too much out of the upper curvature and the wing is operating too close to its critical Reynolds number. If this is indeed true then the extremely tapered wing planform would cause the flow to break away on the outer portions of the wing. Trying to circumvent this led to less flap angle being used than first projected. (Two things are accomplished by reducing the flap angle: the mean camber is reduced – which lowers the critical Rn – plus the gliding speed is increased – which increases the operating Rn.)'

Ruptured Raven – 1971

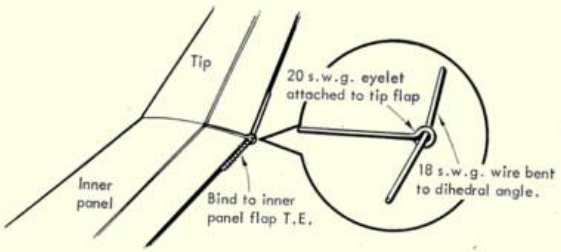
'This was a "quicky" project built in only two weeks and was the first polyhedral flapper. The flaps were so easy to set up that I couldn't believe it. Turned out that polyhedral made it *easier* to set up the flaps.

'The whole system revolves around a simple brass eyelet at the T.E. corner of the outer flap. This eyelet captures a piece of piano wire (bent to suit the dihedral angle) affixed to the corner of the inner flap. After covering the separate wings and flaps hinge inner flaps hinged by ironing on Monokote, the outer flap is put in place with the eyelet going over the wire pin, and hinged with another strip of Monokote. Any movement of the inner flap is transmitted through the pin and eye to the outer flap. There is, of course, a slight gap when the flap is depressed, but this small loss of efficiency means nothing compared with what can be gained from the camber change.

'One of the drawbacks of straight dihedral is its lack of "dutch-roll".

'It just doesn't seem to have that certain "wiggle" that helps the ship keep its nose up. Perhaps part of the problem has been the sweep-back I have been using, so it's not certain, but the action is sluggish in the roll and merely increasing the angle of dihedral doesn't help. Also reducing the fin area doesn't help either as the ship merely crabs a bit sideways instead of rolling. Very strange. The touchy climb is bad enough but the detrimental characteristics carry over into the glide also.'

Method of linking flaps on polyhedral wing.



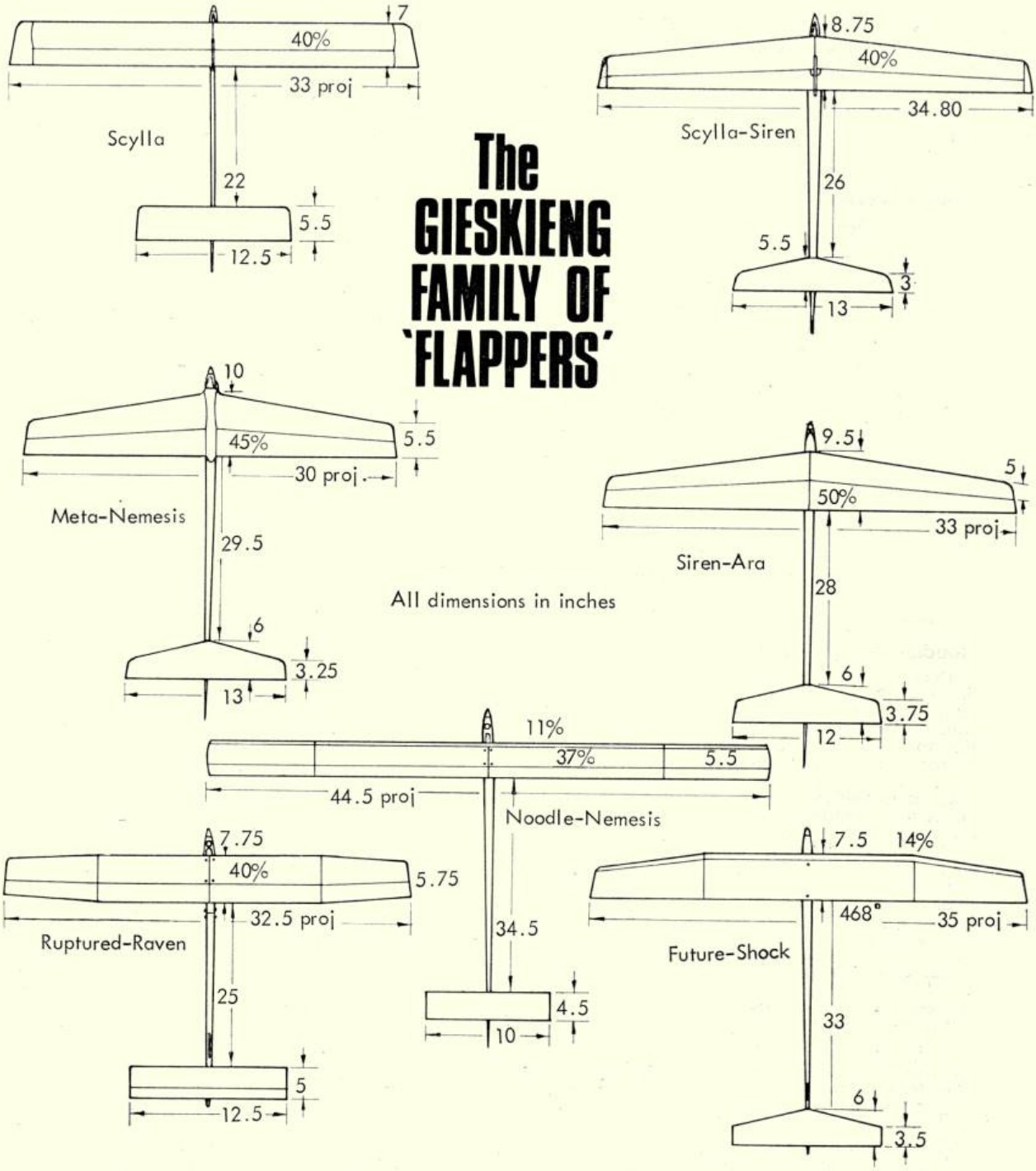
One of the most maddening actions is for the outside wing to stall first and thus pull the ship out of its natural circle. The ship stalls and instead of the inside wing falling off first and allowing the ship to go into a tighter stall-killing recovery, the ship hammer-heads with the wrong wing falling off first and thus fighting the auto rudder's action. It should be mentioned that several types of wash-in/wash-out have been employed, but with negative results. Incidentally, the *flap cannot be used* as a substitute for wash-in on the inside wing. If so used, it only aggravates the tendency for the other wing to stall first. If less flap is used, then there is a very real danger of making the ship spirally unstable towards that side. The flyer is sort of left between the devil and the deep blue!

With the polyhedralled flap so easy to set up, there is no reason for worrying about the above, unless one is determined to prove that it can be done. With polyhedral, everything returns to normal with the usual fine action in the climb and the peculiar thermal hunting properties associated with polyhedral and wash-in of the inside wing. At least the *Ruptured Raven* showed a normal stall recovery without that maddening insistence of opening up the circle.

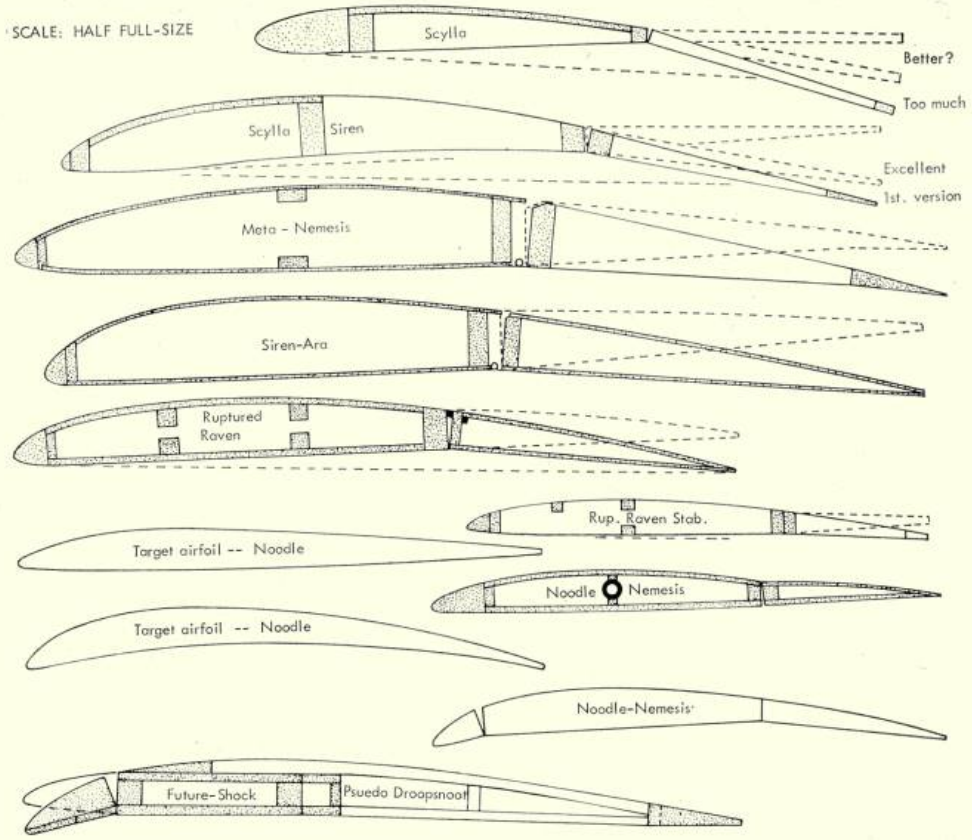
Another unusual feature was the use of an auto-elevator rather than the conventional auto-stab. The reasoning behind this experiment was that it seemed a 'natural' in conjunction with a flapped wing. The auto-stab. on a flapper works just opposite to a model with a fixed wing, i.e. the incidence is increased on the tailplane to match the new airfoil angle when the flaps are put down. An elevator is up for power and 'down' for glide. This permits a different stab. airfoil for the two separate phases. In the climb the stab. airfoil would have almost zero camber and would match the low-cambered wing airfoil. In the glide the flap coming down would give a more highly-cambered section that would more closely match the wing. I still think the idea is sound, but it is very difficult to build a flapped stab. light, yet strong enough.

The *Ruptured Raven* belonged to the high-climb-utility class. The short coupling, large tail volume and short-spanned wing (60 in.) were designed for the every-day gruelling job of making maxs in rough thermal conditions. It is strange that it should have been demolished (when the elevator hinges failed) almost immediately while its more sensitive forbears struggled on for many outings. Other experimental features are (were!) a two-piece body, two-piece wing, and detachable stab. fins. All interesting features that will be looked into more.

The GIESKIENG FAMILY OF 'FLAPPERS'



We are indebted to Bill Gieskieng for the detailed description and history of development involved in his series of flapped power duration models. The photographs and drawings were all supplied by Bill, although some have already appeared in the National Free Flight Society Digest – a most respected newsletter in free-flight circles, which was then compiled by his wife, Annie. Readers who would like to receive the N.F.F.S. Digest may do so by joining the Society. Membership rate for 'foreigners' is $3.50 p.a., Senior membership (15-19 years) is $2.00, and Junior membership (under 15) is $1.00. Subscriptions should be sent to Ron Evans, 83 Blake Street, Newhaven, CTO6511, U.S.A.



Noodle-Nemesis 1971

'Deep in the heart of every frustrated free-flight designer lies the urge to create an impossibly-potent machine. I am not happy with the glide obtainable with the short-spanned ships, they are easy to fly, but the variable incidence principle seems somewhat wasted on them. With a *truly* high aspect-ratio, *à la* Nordic gliders, the inherent reduction in induced drag means that much more camber (flap angle) can be use to advantage. Only problems are in controlling the climb phase and keeping the ship together.

The airfoil was based on Nordic sections. To straighten out this for the climb, both a rear and nose flaps are employed. This permits a timely dramatic change in the profile.

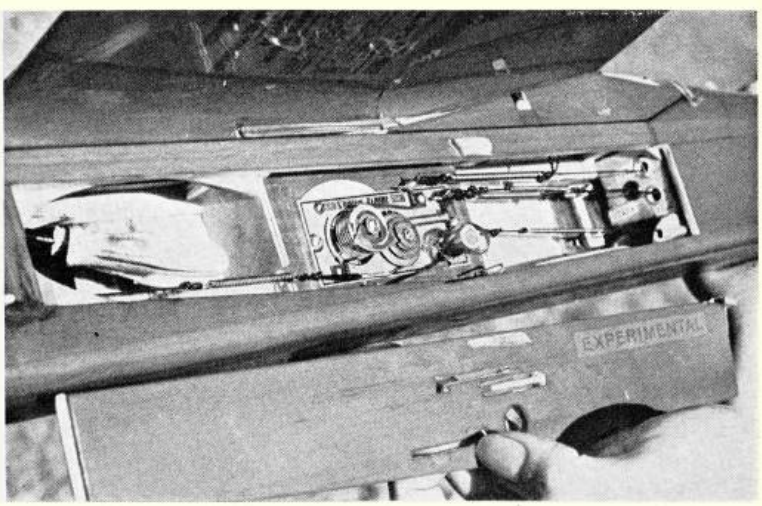
A hint of its performance potential can be gleaned from a flight of 102 seconds with a 3.5-second engine run. Now how do I keep it going up for the remaining six seconds?'

Future Shock 1972

A possible new approach is to use *only* a nose flap. A suitable airfoil ('Droopsnoot') was described in Tom Patrick's article in the *Report of the 4th Annual Symposium of the N.F.F.S.* – and various modifications look attractive to the eye. As the L.E. entry on a speed section and a gliding type are so different, flapping the L.E. should be an important feature. Hopefully, the inevitable gap formed can be located to act as a turbulator in the glide position.

The F.A.I. and ½*A Future Shock* haven't been built yet. But they probably will be before long. They both feature tip dihedral – just another experiment.

Part 3 of this article will describe what is known of Koster's experiments – and also what pointers and advice can be given to those modellers prepared to give flaps a real try. To save needless questions, there is one I **cannot** *answer – the basis and interpretation of Gieskieng's nomenclature system!*



The 'chamber of horrors'. The balloon tank (extreme left) is filled separately, then slipped on to the butt end of a 'T' fitting. A simple 'mousetrap' shuts off the fuel line with the tension from the string and spring to the Seelig timer. More strings at the rear! Top is the D/T line. Next two down are connected to the flap cam and the V.I.T. Bottom line operates the auto-rudder. Hatch cleverly conceals all these works (except timer button), yet allows instant access. When the model is held for launching, the thumb fits over the timer button and rests against the small wood block above the springs. Once timer is touched, it is armed, and will start running when released. Directly above timer are rubber bands that, in conjunction with bands on top, operate flap tension.

1972 BRITISH NATIONAL CHAMPIONSHIPS

organised by the Society of Model Aeronautical Engineers

FREE FLIGHT AND R/C THERMAL SOARING

Venue R.A.F. Strubby, nr. Mablethorpe, Lincs. S.M.A.E. members only. No camping permitted on the airfield.

Saturday, May 27th

F.A.I. Rubber	
F.A.I. Glider	
F.A.I. Power	

Sunday, May 28th

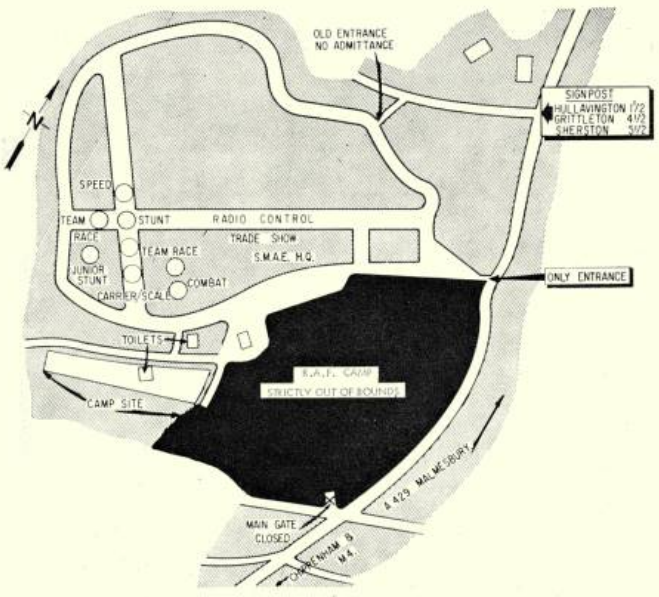
F.A.I. Rubber	
F.A.I. Glider	
F.A.I. Power	
R/C F.A.I. Thermal Soaring	Radio Modeller Trophy

Monday, May 29th

Open Glider	Thurston Cup
Open Power	Sir John Shelly
Open Rubber	Model Aircraft Trophy
A/1 Glider	
Coupe d'Hiver	
½A Power	
Tailless	Lady Shelley Cup
Vintage	
Junior Kit Contest	
R/C Open Thermal Soaring	

CONTROL LINE, RADIO CONTROL AND SCALE

Venue R.A.F. Hullavington, Wilts. (see map below) Spectators welcomed. Camping facilities on airfield.



Saturday, May 27th (from 16.00-19.30)

R/C Aerobatics	S.M.A.E. Trophy
R/C Scale	Radio Modeller Trophy

Sunday, May 28th

R/C Aerobatics	
R/C Scale	
R/C F.A.I. pylon racing	R.C.M.&E. Trophy
C/L Aerobatics	Gold Trophy
C/L Handicap Speed	Model Aircraft No. 1 Cup
C/L F.A.I. Combat	Whitney Straight Trophy
C/L F.A.I. Team Race	Davis A Trophy
C/L Class B Team Race	Davis B Trophy
C/L Scale	Knokke No. 2 Trophy
C/L Junior Stunt	F. Warburton Trophy
F/F Scale	Superscale Trophy

Monday, May 29th

R/C Aerobatics	
R/C Scale	
R/C F.A.I. pylon racing	
C/L Aerobatics	
C/L Handicap Speed	
C/L F.A.I. Combat	
C/L Carrier Deck Landing	
C/L ½A Team Race	R.A.F.M.A.A. Trophy
C/L Goodyear Team Race	
F/F Junior Kit Contest	

CONTROL LINE NEWS

a round-up of the news 'with strings attached'

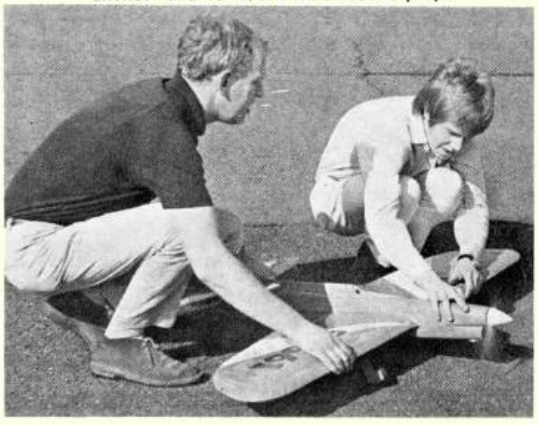
THE FIRST control-line contest of the year, the S.M.A.E. Centralised Meeting held on March 19th at North Luffenham, was celebrated with excellent weather, attendance and flying.

Best supported event was combat – with some 50 competitors. The general standard of flying was much higher than normal, as some top 'names' discovered to their cost, relative unknowns reaching high up the ladder. In particular, Junior members of the Glevum Club performed well, while their 'coach', Frank Smart, reached the semi-finals with his *T-Bird* (plan last month), only to be beaten by the eventual winner, Vernon Hunt with his trusty *Warlord*. This latter model is now being kitted by a new company, *Pegasus Models,* and will be the feature of a kit review in the next issue. Model types have changed little since the previous season, with the exception that several now have tailplanes grafted on to the conventional flying wings as per Steve Jones' *Orcrist*. The combat event was run to the latest set of F.A.I. rules (not included in the latest S.M.A.E. rulebook) and met with a mixed reception. At least they produced a quick turn-around of bouts, but is that all-important?

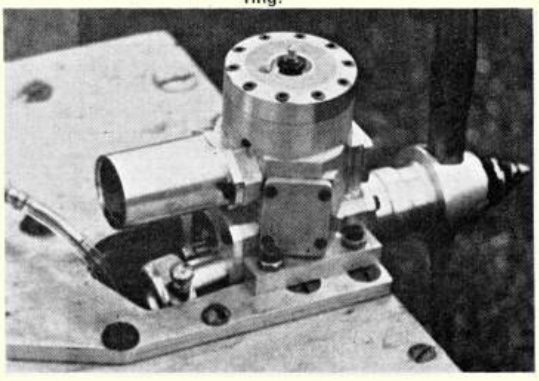
Stunt had 11 compete, with Steve Blake acting as judge. This left Jim Mannall a relatively easy task in winning, both flights scoring over 1,000 pts., well clear of Brian Turner in second spot. Third place went to John Heanen flying an immaculate own-design model based around a *Crusader* and powered by a Fox 40 – a very good showing by a young modeller, particularly as he pushed John Newnham into fourth place. John will now be a member of the British team for the Finland World Champs, now that Frank Warburton is unable to attend. He flew a rather worn model based on Gabris' *Super Master* which, although only a year old, has notched up over 200 flights – some hard practicing evident there!

Only racing class was 'B' and perhaps this resulted in a low entry of just 11 fliers – many people preferring not to travel a long way just for one event. The Eta 29 was the most prominent engine, but three competitors used diesels, and two of these reached the finals – something significant there! Odd men out of this trio were Hammond/Williams, who used a Kosmic 15 with which they were aiming for a fast run with pit stops – not the traditional diesel approach of a non-stopper. However, troubles with their pressurised re-fuelling system caused them to spoil their times. Fastest heat went to Horton/Kirton with a 'proper' Class B model, with a time of 3:48, just a second better than Everitt/Cooke with an F.A.I. racer based on the Canadians Parent/Kelly model, complete with sprung undercarriage. Power was an overbored Eta 15. Smith/Harknett qualified for the final with an F.A.I. racer, Super-Tigre-

John Heenen continued his successes since winning the Junior Stunt event at the '71 Nationals by placing a well-earned third at Luffenham. The Fox 40 uses a Spinaflow silencer and 10 in. x 6 in. Punctilio prop.



Mike Billington's at it again. His latest speed 60 is entirely home-built, apart from the Dooling Shaft and induction disc. Massive-looking construction is deceptive – weighs just 18 oz. due to magnesium castings – note the plates covering the three Schnuerle ports, enabling them to be altered if required. Lightweight piston is fitted with Dykes ring.



powered, with a heat time of 3:59.

The final gave victory to Cooke/Everitt at 7:49, while Horton/Kirton followed at 8:07, slowed by a reluctant-starting engine. It was noticeable how much quieter this lone glow motor was (equipped with tuned pipe) than the two diesels in this race.

Speed, under the direction of Mike Billington, put up the most spectacular showing as far as the record book went, with Martin Radcliffe's Super-Tigre breaking the existing 60 record with a flight of 173.4 m.p.h. This record is now in the process of being ratified. John Dixon also had a good day, recording 164.4 m.p.h. with his Super Tigre 29.

Regular F.A.I. fliers, Messrs. Jackson, Irvine and Woodrow were not quite so lucky, but their Rossis still gave good accounts of themselves, although still not up to speeds presently being recorded on the Continent. Brian Jackson did best with 138.1 m.p.h. to place third.

A Real Racer

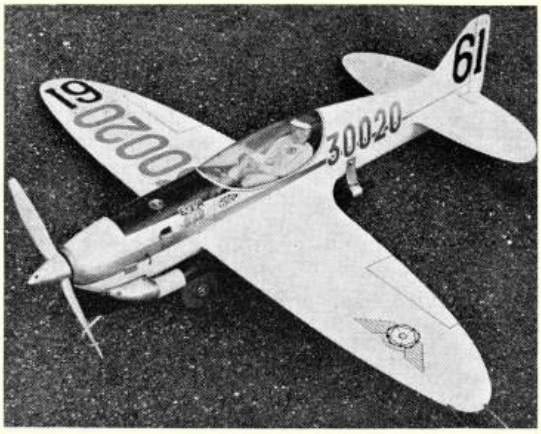
John Horton's latest 'B' racer, *Dalesman V*, flown at Luffenham is an example of what a racer *should* be, and is no doubt how the rule book intended models to be like. The general appearance is that of a full-size racer, and yet gives nothing away to the opposition. The large canopy encloses a full-length pilot (dressed in Leeds United football club colours!) and has an instrumented dashboard. A good, tasteful colour scheme completes the image, while an Eta 29 puts it into the 'proper' Class 'B' ideal of a big motor. Not so noisy though – John bolted an E.D.-tuned pipe to the side just as an experiment, a home-made elbow adaptor to the engine permitting the pipe to lie beneath the wing. With no attempt at 'tuning' this pipe, it provided a 1 m.p.h. increase in speed whilst eliminating the fire risk! Noise was noticeably reduced to quite acceptable limits – although this was really incidental. Further developments should produce better performance. Flying procedure is interesting, the model being relatively slow on take-off, gradually reaching peak speed after 4-5 laps. The E.D. pipe is designed for 'non-peaky' performance and thus has a relatively broad rpm operating range, which is essential for a racer as acceleration is important and the flight path is not so even as with a speed model, the machine constantly changing altitude as it overtakes slower (diesel powered??) aircraft.

The Nats

Budding competitors at this year's extravaganza should be prepared for a few differences from previous years, plus a little tightening up of the rules – so be warned!

In the racing events, competitors should be prepared to time the heat following the one they have just flown in – please, no excuses such as *'I've got to change engines/make up new lines, etc!'* Time involved is little and it makes all the difference between a properly-conducted event and a shambles. Likewise anyone forced to retire should inform the event organiser so that his name is withdrawn from the ensuing heats. Of course, being sidelined, an offer of help could be made. . . . For the F.A.I. event it is hoped to have a three-man jury to decide fair-play, which will also mean more pairs of eyes on *you*, if infringing the rules.

Combat will also benefit from volunteers – all those first round 'casualties' could provide an excellent organisation for later bouts while you can still watch the action!



John Horton's really attractive Class B racer – just what the rules envisaged? Other builders, please note, it can be done! Tuned pipe is an interesting development, especially as reduced noise is a welcome side benefit.

In short, competitor self-help will be much appreciated both by the organisers *and* by the general public, in that a well-run contest is much more interesting to watch than a 'scrappy' affair with long delays between action. The choice is yours! Remember that the control line section will be competing with the slickly run R/C events for their share of spectators – don't let us be the underdogs!

R.A.F. News

The Roselle and Frye (R.A.F.) custom engines are now in the making. A wide range of engines from a .35 cu. in. 'B' combat size to .65 cu. in. Speed motor are envisaged and encompassing interests for combat, stunt, rat race, carrier, R/C and speed, – in all 13 motors ranging from $50 to $200. All are Schnuerle ported, rear-exhaust designs, both front and rear induction according to use.

Only a limited number will be produced, and the terms of purchasing are 50 per cent of the cost with the order, with the balance paid C.O.D. or with the order. Engines will be built as the orders are placed. Interested? Then drop a line to them at 217 West Wenger Road, Englewood, Ohio 45322, U.S.A.

Now a member of the 1972 Stunt team is John Newnham – seen here with a model based on the Super Master, Merco 35 powered and weighing in at 47 oz. Well used!

CLUB NEWS

Despite the prowess of their best-known member 'J. O'D.' the Whitefield M.A.C. is not solely a free-flight club, as is shown by this photograph. As in all clubs, the interests are varied and this is a most healthy sign to prevent 'stagnation'. All newcomers are made welcome, whatever their particular forte.

ONE SPECIAL ATTRIBUTE of the model club is the help and advice available to those taking their first tentative steps in model flying. Perhaps even more beneficial is the creative pooling of ideas that goes on, and we often see this in groups achieving contest success with a specialised series of models. Often, though, the beginner is out on his own, with only the kit instructions as his guide. From observation many beginners come unstuck, or rather their flying surfaces do, through not securing the wing and tailplane firmly on the fuselage. It seems just a minor point, but is often the ruination of a model that has been well and carefully built.

Our first report comes from Anthony B. Holden of the **Stockport & D.M.A.C.** He tells us that, at the A.G.M., the club looked back on a satisfactory year, at the end of which the club membership, all S.M.A.E., stood at 32. New talent had arisen; a notable example being the new club champion, Bob Morrison, who is referred to as a highly consistent performer. An equally keen newcomer to the honours list is Junior champion, Dave Wiseman. On the wider contest field Dave Clarkson and John Daly did well in Goodyear Racing, and are currently lying second in John Horton's 'League Table'. Dave, incidentally, won the North West Area C/L Championship. Unhappily, the interest in Combat has declined to a point where it seemed advisable to cancel the Annual Combat Rally for this year; the magnificent *Mainstream Trophy* going instead on loan to the Woodford Rally.

Northampton M.A.C.'s hopes during the flying season are centred mainly on the free-flight classes, where they hope to retain some of the trophies previously won. General club feeling on the split Nationals is favourable. It is felt that what is lost in carnival atmosphere will be made up by a stronger competitive spirit. The club is disturbed by a dropping away of paid-up members, with no noticeable young talent on the horizon. Naturally, the Secretary is eager to recruit new blood into the club system. His address is 29 Woodhill Road, Dustin. It is hoped that several exhibitions which have been arranged in local halls will help to improve the membership situation. The newsletter accompanying the report includes a history of the club from its inception way back in 1931. Linking the past with the present is the continued involvement of founder member, Mr. Howard Boys, who is still to be seen around the model venues.

The Annual Buffet Dance of the **Morley & D.M.A.C.** was almost not held at the Taverners Club, Batley, on the appointed day in March. The new room was devoid of its new furniture, so it was either a matter of conducting the proceedings at floor level or mounting a huge beg, borrow or steal campaign for chairs and tables. The requisite quantity of 95 guestsworth was eventually obtained, and to get it into position they had to ease out carpet fitters, painters and the cleaning lady. When all was set the steward turned on the beer tap and out flowed the beer from a faulty connection, but they were saved from a glorious death by drowning through the intervention of a workman armed with a large screwdriver. All well in the end though; the successful evening making the frantic, last minute preparations worth the while. The press, which was invited along, gave a good write-up as a reward. Club trophies went to Mr. J. Godden and his son, Alan. Report from R. Ashby, Hon. Sec.

Although **Whitefield M.A.C.** has the reputation of being mainly a free-flight contest group, most branches of the hobby are now represented in the club; this broadening of scope being regarded as a healthy development, countering, as it does, a running down of the old F/F brigade. Some of the veterans have moved away to wider fields and pastures new, and others suffering the effects of *anno domini*, but that hardy perennial, John O'Donnell, we are pleased to note, is picking up the hardware as tirelessly as ever. The main club field at Littleton Road is adequate for most flying, except F/F in strong wind. The site carries a complete ban on F/F but does allow for Radio models of 1.5 c.c. and under. But not to despair, there are at least two stretches of open moorland in the area. The club meets on alternate Friday evenings at Victoria Lane Primary School. New members welcome. Contact the Secretary, Dave Yates, at 11 Edgemoor Close, (Sounds like Lovers Lane), Radcliffe. Telephone 061-723 4526.

Interest in the **Maidstone M.F.C.** operates between the two extremes of controlled flight: electric r.t.p. and radio. Arthur Roberts and his son Andrew have pioneered the r.t.p. flying. Recently, Mr. Roberts, who made the pole and head mechanism, has increased the weight of the lead out wires, with a consequent stepping up of the power output. Models seen lapping the circuit have been a K.K. *Fairey Junior*, a K.K. *Stuka* and a diminutive *Andreason* from an *Aeromodeller* plan. Also seen was a K.K. *P.51 Mustang* and a rubber-powered Sterling *Ansaldo S.V.A.5*. On the radio side thought has been given to the devising of contests which do not require complicated judging and scoring systems. Dick Pavey came up with two ideas. One a Parachute Target Drop, using a 1 ft. dia. chute with 2 oz. weight attached. The other a Power Gliding Contest. Idea, presumably, is to gain as much height as possible in the engine time allowed and float in for a spot landing. Anyone thinking of converting a Power Duration job to Radio?

Keith Lord, who is the Comp. Sec., and acting P.R.O., of the **Sykes M.A.C.**, writes to tell us that the club has abandoned its all junior status and is now seeking flyers of all ages to swell the membership list. They did, however, manage to muster enough juniors to take on the Whitefield Club youth in an F/F contest. Whitefield were the victors, but very much enjoyed by the Sykes members; so much so, in fact, they are on the look out for other opponents, either on the field or postal. Prospective challengers should contact J. Nixon, 53 Sykes Road, Rochdale. The same address also applies for any welcome modeller seeking membership. Mr. Lord modesty informs us that he was the overall 1971 F/F champion, for which he currently holds the Syke Annual F/F cup. Among other matters mentioned is the success of the *Build a Model* night, when members are supplied with two small scraps of balsa from which to produce a flyable craft. Talk of the club name being changed to Rochdale. The proposal was closely defeated at the last A.G.M., but will undoubtedly come up again.

You fly at Nomansland and go on to buy your beer at the *Evil Woman*. This may sound like the itinerary of the original *Hell's Angels*, but according to the **St. Albans M.A.C.** *The Thermal* it is the normal routine for a Thursday evening. A nice variated programme of small field events laid on for the evening flying sessions, including *Keep it on the common* and *One minute please*. In more serious vein mention is made of the two main club events of the year, the Summer Gala on July 30th at Chobham and the Winter Gala on 26th November. During the very flyable winter weather the keener types were out testing their A/2s and Coupes on Nomansland. Dave Tipper found that the addition of a mechanical timer to his old weight Coupe brought it up to the new 100 gramme requirement, but discovered, as I did myself, that the models at the new weight seemed to have leaden wings. Dave, incidentally, is now known as the Green Man of Nosmansland since climbing a horrible green slime-covered tree to get his A/2. There is no longer a

green slime-covered tree but very much a green-slimed Dave, No truth, though, in the story that they put him in one of the fenced-off zones and charged 5p a look to boost club funds.

The first round of the **Leicester M.A.C.'s** *Winter Building Competition*, held last February, gave points to the models in the uncovered stage. The varied selection of skeletal exhibits included such rare birds as an R/C *Siemens Schnkert D111* biplane and an F/F *Lockspeiser Land Development* which I cannot believe is an airborne bulldozer. The final, covered, round is to be held at Leisure '72 Exhibition where the club has a 40 ft. x 16 ft. stand.

The **Wolves M.A.C.** idea of a Vintage event is to get right away from the archetypal modern machines of the post war era and go back to the real pre-1940 oldies. This, of course, makes for difficulties in the acquiring of suitable plans, although the Chairman has six such plans on offer, one of which, an American Gassie, is proving popular. Personally, I would like to see a streamlined Wakefield of the 1938 era; very British and very good. Coming back to the American Gassie design, John Watkins, the F/F Director, has scaled up the drawing and has had several copies printed, which along with the photostat instructions and entry fee to the contest, are available at 15p. This is but one example of the way the interest within the club have diversified from the almost wholly C/L origins. Now everything goes, from Chuck Glider to Multi R/C. But life away from the C/L circles can be rugged. Members, and not all of them in the heart pill age group, have been complaining about the rough country on the Chase at Glacier Boulder. You are more likely to find a courting couple than your A/2.

In a bid to seek new bookings for C/L displays the **Three Kings Aeromodellers** put on a special demonstration on the tarmac at Croydon and invited along no less than 50 representatives of sports grounds in the area. No news of the attendance or the response, but the club already has a couple of firm display bookings. Clubs these days are wide ranging and members highly mobile, so the fact that international Stunt man, Mick Harvey, has moved to Southampton may not mean that he is lost to the triple crown mob for ever. Models of the month event very closely contested. There was Bernard Sexton's *Cassutt II*, silver with red trimmings, and complete with spatted wheels, tip fins and pilot, and there was Pete Mason's 22 in. span SE5A in khaki, roundels and rudder markings, plus a number of equally likely contenders. But it was Bernard's day. Realism plus, too, in the Mick Charles film show. He was involved in the making of all those spectacular model sequences in the *Battle of Britain* film, and was able to give first-hand information on how it was done.

The **Flying Dutchman Club** of New York is a junior group which seems highly resistant to the electronic, pre-fab goodies which pervade the American scene. They stick to the good old stick models and chuck gliders, and seem to find a lot of instructive fun in so doing. Their newsletter, *Star Skippers*, is always full of contest news, and in the credits for the *Thanksgiving Mini Postal Event* appears the name of Jonathon Walker, of Sutton Coldfield, who came second in rubber-powered Stick with a three-flight total of 209.7. A quite remarkable score, since Jonathon's age is given as only 6½.

I suppose in a large country like Canada, where weather conditions are more predictable than in these turbulent islands, you can choose your flying site according to the wind strength that operates over it. To this end, the **Toronto F.A.I. Group** are benefiting from a book on Climatic Normals which tells you just what weather to expect wherever you may elect to fly. The nearest we have in this country is *Old Moore's Almanack*. The report here goes back to Midwinter, '72, when the free-flighters turned out in snowy conditions to put in a very enthusiastic day's flying. Entries were quite high for a winter event: 13 in Power and 24 in Chuck.

World Wide, the free-flight model seems to be on the up and up, for from *Flight Lines*, the newsletter of the **Hamilton M.A.C.** (New Zealand), comes news of 1971 being hailed as a bumper F/F year. At the Waikato Champs there were 47 entries in the Glider event, even in the face of an offputting stiff breeze. Not that C/L is doing all that badly in N.Z. either. There were, for instance, 29 entries in Combat at the same Waikato event. Ecstatic report here on one of expensive soaring R/C kits. Only regret is the price: equivalent to two weeks' wages. All very nice, but to me, there's nothing like your own machine, knocked out the hard way for a couple of quid.

★ ★ ★

In his letter, in the May issue, Mr. George J. Bushell quotes this column as saying that the final arbiter in the question of noise complaint is the council. This is not strictly correct; the term I used was authority, and I had in mind the recent eviction of a club from an R.A.F. base because of complaints from local residents.

I do, however, welcome his letter as a helpful elucidation of the legalities of the noise issue. Councils all too readily become the final arbiters in these matters in spite of the protective laws the model flyers may have. It is true that they often do supply alternative flying sites, but as the site upon which the flying is banned is the only one suitable for power flying in the district, the alternative is usually a control-line patch which no one wants anyway.

Clubman

CONTEST CALENDAR

May 27/29th — **BRITISH NATIONALS:** R/C, C/L, F/F, Scale at R.A.F. Hullavington, Wilts. F/F & R/C Thermal Soaring at R.A.F. Strubby, Lincs.

June 4th — **ELLIOTT ANNUAL CONTROL LINE GALA.** Stunt, Combat, Goodyear at Elliott Bros., Airport Works, Rochester, Kent.

June 4th — **S. MIDLANDS AREA THERMAL SOARING.** Venue Bassingbourn – provisional. Details C. D. Dallimer, 10 Angle Way, Stevenage, Herts.

June 10th — **CROYDON D.M.A.C. EVENING F.A.I. COMP.** Rubber, Glider and Power from 18.00. No rounds. Venue Chobham Common.

June 11th — **WESTERN AREA C/L RALLY.** F.A.I., Goodyear, A-Rat (to Western Area rules), F.A.I. Combat. Entries close 12.00. Venue R.A.N.S., Wroughton, Nr. Swindon. Report to Guard Room with S.M.A.E. card.

June 11th — **S.M.A.E. 3rd AREA CENTRALISED MEET.** Open G/P, F.A.I., Rubber. Area Venues.

June 11th — **S.M.A.E. R/C MEET.** Aerobatics (F.A.I.) at R.A.F. Cottesmore, Rutland.

June 17th — **CROYDON D.M.A.C. EVENING F.A.I. COMP.** Rubber, Glider and Power from 18.00. No rounds. Venue Chobham Common.

June 18th — **AEROMODELLER/SCALE MODELS/R.C.M. &E. ALL SCALE RALLY** at Old Warden, Biggleswade, Beds.

June 18th — **SOUTHAMPTON M.A.C.'s F/F GALA.** Open R/G/P, Chuck, Combined mini-comp. Venue Beaulieu Airfield, 10.30 a.m. start.

June 18th — **FINCHLEY C/L GALA.** Aerobatics, A & B Combat, 10 a.m. start at the Glebeland, Summers Lane, Finchley, N.12. Pre-entry 20p to J. Goodwin, 77 Gallants Farm Road, East Barnet, Herts.

June 18th — **CLWYD SLOPE SOARING.** F/F Snr. & Jnr., R/C Multi Aerobatics, Pylon, plus single surface and intermediate. Pre-entry for R/C events by June 4th, 25p, to C. R. Filtness, 26 Raymond Street, Chester. Venue: Moel Ffamau, nr. Mold.

June 25th — **LONDON AREA GALA.** F/F, F.A.I. R/G/P, Open P., A/1 Cd'H, Chuck. C/L: Combat, F.A.I. T/R, Goodyear, Stunt, Scale, Speed. Venue: U.S.A.F. Weathersfield, Braintree, Essex.

June 25th — **TEAM TRIALS FOR SCALE WORLD CHAMPS.** R/C & C/L at R.A.F. Cottesmore, Rutland.

July 1st — **CROYDON D.M.A.C. EVENING F.A.I. COMP.** R/G/P from 18.00 hrs. No rounds. Venue: Chobham Common.

July 2nd — **F.A.I. INTERNATIONAL TEAM TRIALS.** F.A.I. & F.1 Pylon Racing, Nth. Luffenham.

July 8th — **CROYDON D.M.A.C. EVENING F.A.I. COMP.** R/G/P from 18.00 hrs. No rounds. Venue: Chobham Common.

July 9th — **S.M.A.E. SCALE MEETING.** R/C Class II plus C/L & F/F at Nth. Luffenham.

July 9th — **LONDON AREA 2nd ROUND C/L CHAMPS.** Goodyear F.A.I. T/R, ½A T/R, Combat at Charville Lane, Hayes.

July 9th — **S.M.A.E. R/C MEET.** F.A.I. Aerobatics at R.A.F. Little Rissington.

July 9th — **S.M.A.E. 4th AREA CENTRALISED MEET.** Team Glider, F.A.I. Power, Cd'H, Area Venues.

July 16th — **N.E. AREA GALA.** Open R/P/G, Chuck, F.A.I. T/R, Goodyear, Half-A T/R Combat, R/C F.A.I. Pylon, Open Pylon, and Pos. F.1 Pylon. Pre-entry for F.A.I. and F.1 to T. Bailey, 9 Aberdeen Tower, Gilleylaw, Sunderland, Co. Durham. S.M.A.E. members only. At RAF Ouston.

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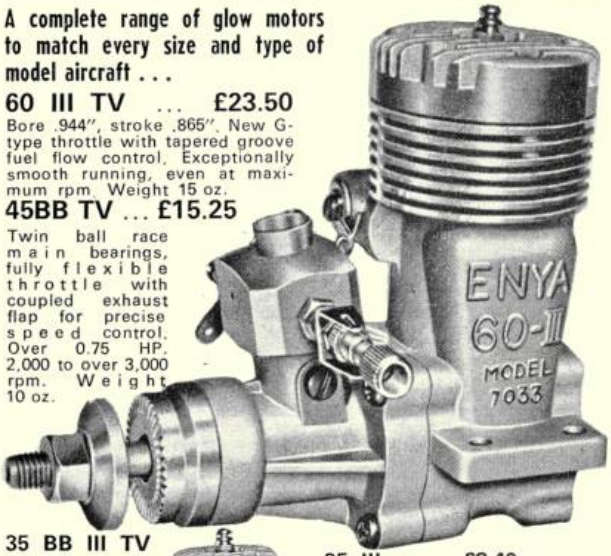

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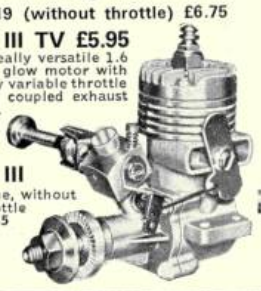

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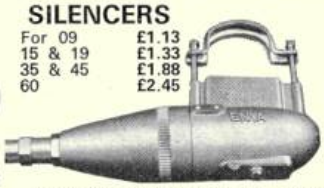

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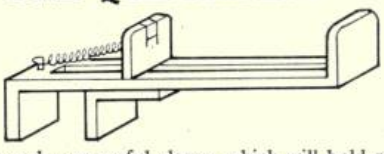

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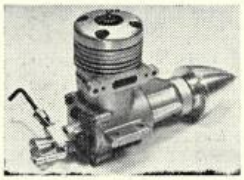

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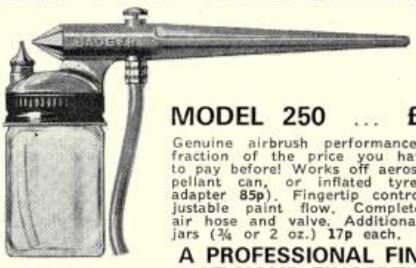

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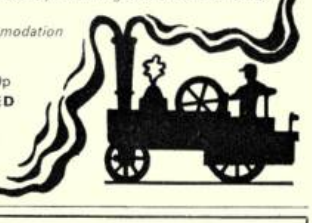

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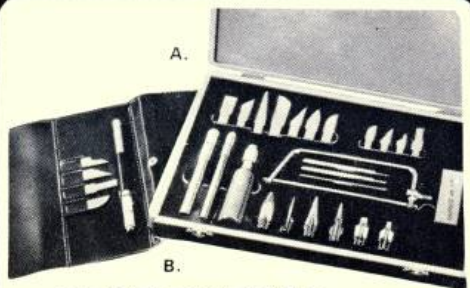

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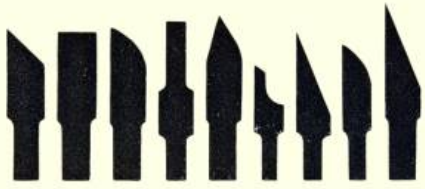

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