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MAY 1966

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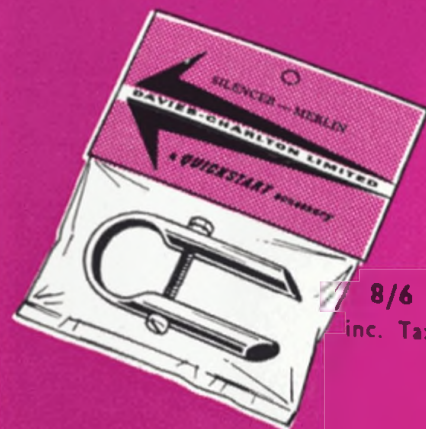
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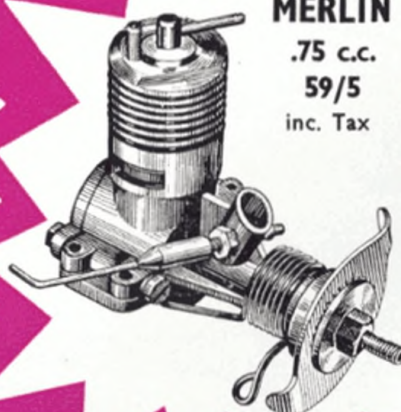


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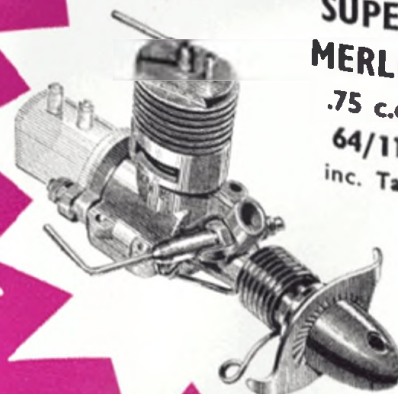
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# Aero Modeller

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## MODEL AIRCRAFT

### May 1966

VOLUME XXXI No 364

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AN  HOBBY MAGAZINE

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## COMMENT

Planned your trip to the "Nats" yet? The annual Whitsun Jamboree of Aeromodelling moves for the first time to the Western Area, in Wiltshire, thanks to the kind co-operation of the Officer Commanding R.A.F. Hullavington. Situated within easy reach of all major centres of population, this location with its large airfield and picturesque surroundings will be the focal point for keen enthusiasts on May 29th and 30th.

Organised by the Council of the S.M.A.E. Ltd., with contests for all types of model, the National Championships become the major spectacle of the year and an inspiration to the non-competitive onlooker.

One is apt to overlook the amount of work involved behind the scenes. Cost of the operation is high. Sanitation for the large camp site, public address systems, paper work and hire of tents are some of the "hidden" items which the visitor may well take for granted.

Without self-help such a meeting could never be held. Clubs and Areas take on the duty of running specific contests. S.M.A.E. members take their turn at timekeeping and flying. It is a sight that confuses the uninitiated and never fails to amaze the visitor from overseas.

Don't miss it this year! Admission will be by programme priced at a mere 2/- plus car park fee.

## cover

A Veteran D.H.84 Dragon, now operated by Chrisair from Northampton and Luton for club charters, local joyrides and sight seeing trips. Used by 24 Sqn RAF and Vickers Armstrong in war years, it is one of the few remaining of its type, originally created for the Hillman Airways Abridge-Le Bourget cheap fare airline. Capt. Chris Roberts would be only too pleased to quote for any model club air outing. Since '63 it has flown 19,000 passengers, dropped 1,640 parachutists and visited 67 European airports.

## next month

Bumper full size plans (as usual!) Chris Foss's nimble 18j "Skybolt" for .5- .8 engines is an easy to make aerobatic sports control-line model and on the reverse side Martin Dilly's successful and highly developed A/1 glider "Cue-dot" with sheet covered wing upper surface fills the bill for contest fans. Revolutionary new covering material from the U.S.A. "MonoKote" is detailed in a "how-to-do" pictorial. Rubber motors are explained. A novel little all-sheet rubber driven Fletcher Defender forms an unusual cover subject as well as an attractive plan. Plus all regular features, out on May 20th.

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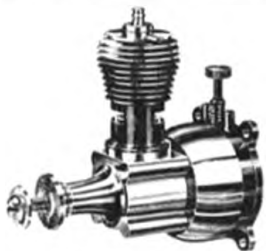
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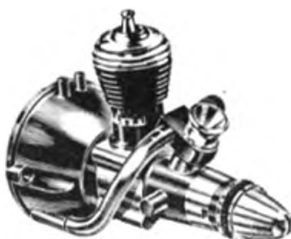
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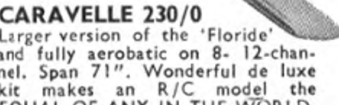


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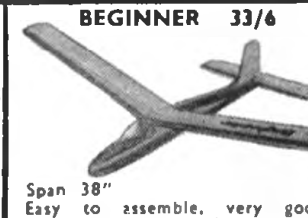
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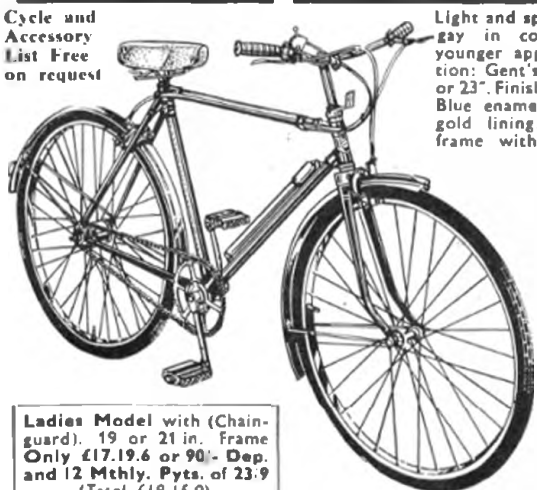
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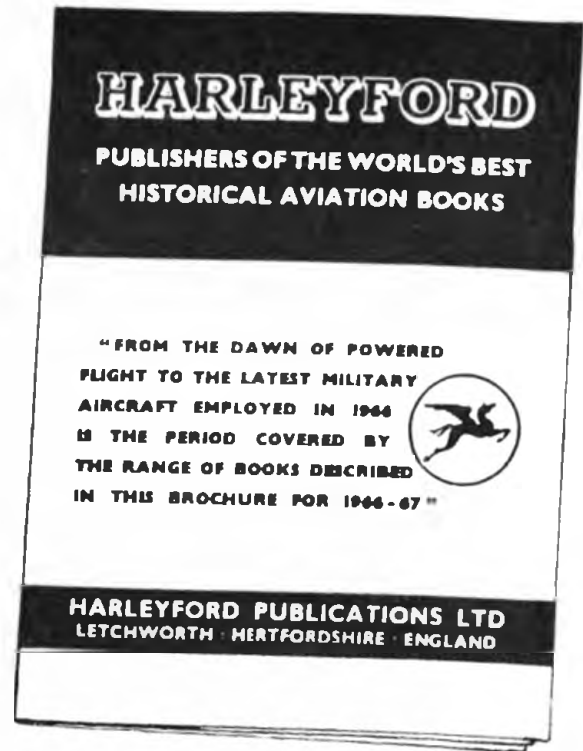
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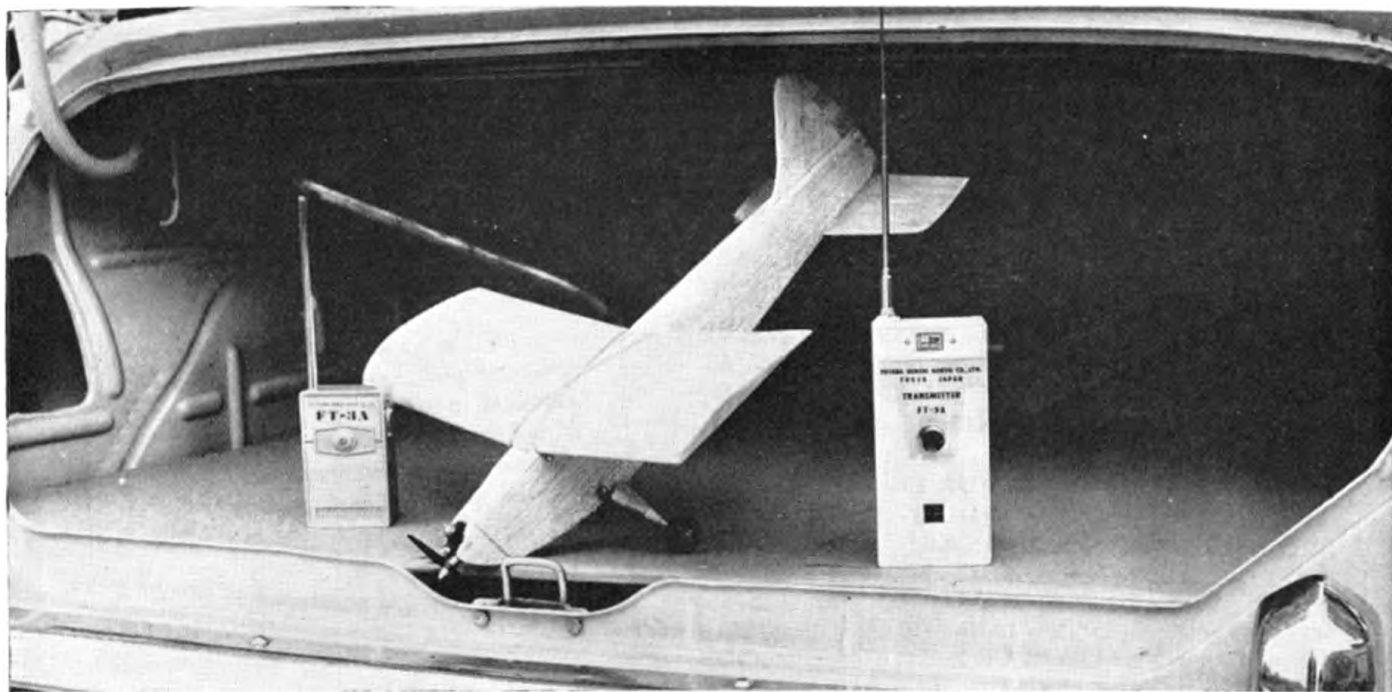
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2715 Fiat G.91 A & J  
2863 Macchi MB 326 A & J

## 2742 VI Racer

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2317 Seamew A & J  
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2686 Snipe A & J  
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**FRANCE** abandons metric scales? Never! But the Societe Heller, who have produced some of the most involved and finger baffling plastic kits for scale aircraft models from their French factories, launch into a new series of historic aircraft of L'Armee de L'Air with what they call the international scale of 1/72nd. Hang out the Union Jack lads—our 1/6th inch equals one foot plans, originated by A. J. Halliday "Skybird" pre-shaped wooden kits more than 30 years ago, popularised by M.A.P. and Harborough scale plans and adopted by Frog, Airfix and Revell has become the international standard scale. Japanese & U.S.A. kit manufacturers have also turned to this scale. Heller's "Museum" series starts with the Bloch 152 followed by Dewoitine 520, Amiot 143, Curtiss H 75, Morane Saulnier 406, Breguet 693, Leo 45 and Bloch 174. We hope they'll add that characteristic Farman 420 or 221 bomber and one of the sleek Caudron fighters eventually.



Beautiful Schneider racers in Italy, Nudi's Curtiss CR3 and Taberna's Gloster IV.

**SEAPLANE SCHNEIDER** scale models have their annual International event over July 30/31st at Gavirate on lake Varese, Italy. Won last year by S. Taberna and his Gloster IV biplane with diesel power, the event matches speed and scale with piloting skills over water, an exciting and challenging contest which we commend to all scale enthusiasts. Rules are precise and details can be supplied from E. Bizzozero, Corso XXV April N. 39, Gavirate, Varese, Italy.

**BIRD SCARING** by R/C is no novelty we now learn, thanks to Bill Moffat of New Zealand who sent us a cutting from the Auckland Weekly. Flown by K. E. Saul, an ornithologist with the N.Z. Department of Internal Affairs, and built by A. R.



Truman the model has a bird like tail shape, appears to be 6 channel and thanks to a deep belly in the fuselage and vivid paint scheme, might be confused with a hawk if only its .49 size engine were silent. Purpose was to scatter the seagulls at Mangere airport.

**CHANGE OF DATE** for the Northern Models Exhibition, created by British political upheaval meant a 4 week postponement to April 28th/29th/30th. Same Venue, Victoria Hall, Shipley, as announced in March issue.

**NOW OPEN** for its 1966 season is the Fleet Air Arm Museum at R.N.A.S. Yeovilton, Somerset. Situated on the A.303, a popular holiday route to the West Country, this collection of fine aero exhibits now includes the ex-Cranfield Westland Wyvern with R R Eagle (above) and arriving later will be the first Sea Vampire, ever to make a carrier landing by jet propelled aircraft (on H.M.S. Ocean). Yeovilton's loss of the Sopwith Triplane to the RAF and Cranfield's gain of a TSR 2 seems also to have profited the Navy! Opening hours are Weekdays 10.30 a.m., Sunday 2 p.m., closing at 5 p.m. each day. Other Air Museums will have 1966 additions on show. As mentioned last month, there is the Mosquito at the Imperial War Museum, the De H 88 Comet Racer and a Bristol Boxkite have joined the Shuttleworth collection and Sky-fame at Staverton have a Miles Hawk

Trainer joining their ranks. Additionally the preservation groups have exciting news. N.A.P.S. may produce a surprise which could be a Sabre, Catalina, Fortress or even a Mig 15 at the Biggin Hill Air Fair, May 12th to 15th, and the collection of Fleas continue to increase to quite itchy proportions in the N.A.P.S. in the Manchester Area. This being the Royal Aeronautical Society centenary year, with displays at: Southend, May 18th Wisley June 4th, Staverton June 11th, Cranfield June 19th, Woodford (Manchester) on July 9th, Bembridge July 16th, August 28/29th Luton. 1966 is beginning to shape up as the year of aviation reminiscence—maybe our cover this month is topical after all! Shuttleworth open days are June 26th, July 31, August 28th and September 25th.

**MINI EARLY BIRD** which is this months free full size plan introduces another 1/4A control line combat model this issue designed by Richard Wilkens. Simple to construct, tough and rugged it embraces all that is best in a typical club type fly for fun model. Just as aerobatic as its larger brother "Early Bird" (from which it was scaled down by 1/3rd) it should give many hours of fun to those interested in the unofficial 1.5 cc combat class. Richard poses with the prototype P.A.W. 1.49 powered Mini Early Bird on his 17th Birthday in the photo opposite. Full size plans of his now well-known Early

## COUPE D'HIVER POSTAL CONTEST RESULTS

NAME	CLUB	MODEL	1	2	3
1 J. O'Donnell	Whitfield	"Halband"	111	120	120
2 F. Monte					351
(Proxy- O'Donnell)	U.S.A.	"Aunt Freeze"	105	120	91
3 J. Allen	Brighton	Own	91	104	120
4 H. French	Avon M.A.C.	Own	120	106	85
5 R. Bailey	Surbiton	Own	120	86	120
6 B. Donn	San Diego	"Dinky Bear"	63	120	120
7 W. Wetzel	Oberhausen	"W 66"	67	108	109
8 D. Linstrom	U.S.A.	"Baron Knight"	63	71	120
9 L. Burrows	Blackhoth	Own	120	68	58
9 C. Baucke, Jr	Dallas	Own	120	67	59
11 A. Gunnott	San Diego	Own	87	51	107
12 V. Wilson	Crawley M.A.C.	"Orbiter"	87	101	34
13 R. Ruysink	Nymegen M.A.C.	Own	72	70	57
14 N. Wilkins	Weston	"Baron Knight"	72	52	62
14 C. Bedwell	Illinois M.A.C.	Own	53	66	87
16 J. Burke	Norwich	"Sky d'Hiver"	16	36	120
17 G. Kent	Watford	"Rififi"	50	73	42
18 W. Thieme	Wayfarers	Own	54	59	39
19 C. Solih	Illinois M.A.C.	"Dwarf Dip"	55	51	42
20 C. Burger	Amsterdam	Own	64	61	21
21 J. Blount	Croydon	Own	44	60	41
21 E. Oakamp	Amsterdam	Own	58	51	36
23 R. Kieft	Amsterdam	Own	4	64	73
24 T. French	Watford	"Mentor"	32	56	41
25 J. de Vos	Wayfarers	Own	32	44	57
26 F. Telegi	San Diego	Own	26	50	56
27 B. Van Wolde	Hilversum M.A.C.	Own	20	23	56
28 K. Eikelboom	Nymegen M.A.C.	Own	11	23	61
29 H. Schweinsberg	Hague Air Scouts	Own	32	35	24
29 A. Franken	Hilversum M.A.C.	Own	24	32	35
31 A. Beonham	Lynham R.A.F.	"Baron Knight"	50	38	—
32 W. Hanan	Amsterdam	Own	32	29	25
33 J. Sonneborn	Amsterdam	Own	34	3	48
34 C. Braeman	Hague Air Scouts	Own	24	36	24
35 R. Firth	Sheffield S.A.	"Garler Knight"	6	9	54
36 J.T. Chambers	Lynham R.A.F.	Own	40	28	—
37 E. de Keizer	M.A.C. Haarlem	Own	30	30	—
38 V. de Bode	M.A.C. Haarlem	Own	21	13	—
39 J. Darby	Crawley M.A.C.	"Orbiter"	19	5	—



Bird for 2.5 cc are available from A.P.S. price 2/6d plus 6d postage on a limited offer only. Don't delay—send today, and be ready for this seasons combat events.



**YOUNGER GENERATION** of Zambia are receiving healthy encouragement for this hobby via Television. Don Sweetenham of Kitwe started a series of aero-modelling programmes on T.V. Zambia on March 12th. Produced fortnightly as the "T.V. Wings Club", it will include interviews with experienced aeromodellers, discussions and demonstrations of techniques and new modelling goods plus films and shots of modelling activity. Club members, like those in our own "Golden Wings" Club, are under 16 years of age. They will receive newsletters and as the series progresses will have contests for T.V. Zambia prizes. Don offers open house to any individual, club, trader or manufacturer to co-operate with this most worthy project. An Accountant by profession, he is devoting an enormous amount of his own spare time to the project and would specially welcome 35 mm slides & 16 mm film to use on the programme. All would be returned by Air. The address is simply c/o. T.V. Wings Club, Box 1100, Kitwe, Zambia.

**CHANGE OF OWNERSHIP** for the U.S. magazine *American Modeler* is announced. Bill Winter is the new editor-publisher of this journal which has been taken over by

Potomac Aviation Publications from Conde Nast. Bill intends to return to monthly publications in 1967 and the A.M.A. have announced that members will receive copies as part of their membership benefits. Now in his 33rd year of Hobby magazine editing, Bill's modelling connections are bound to introduce a new appearance and content in an already popular journal. He takes over from Albert Lewis, another long-serving hobby journalist who has guided the path of U.S. modelling progress for many years than we bet he cares to remember. Soon, Al pushes his *Air Progress* magazine to a monthly issue, good news indeed for scale fans. Time now to wish both all success in new ventures and not to forget Walt Schroeder of *Model Airplane News* and Don McGovern of *Flying Models*, who complete the quartet of East Coast editors engaged in battle with increasing slot racing interests.

**OUCH!** Ol' man weather piled on the agony everywhere except at Chavenay on the dates set for our Coupe d'Hiver postal event. Of almost 250 entrants only the relative few listed above left, were able to return results. As if to rub it in, March 27 for the SMAE first ever CH contest was worse! Stand by for a Coupe d'Ete.

—the Editor



1



2

TOP FOUR (1) Oskar Ehmann with recently made "Nikolina", his very successful CH design as issued with December '64 issue. (reprints at 3/6d. plan D 873) (2) John O'Donnell and "Hatband" off from a clean R.O.G. launch. (3) Georges Matherat uses low aspect ratio surfaces, leading Frenchman and (4) Shirley (Garlic cheeks) Horton with CH version of her "Tyra", a most worthy combination to challenge the male experts.

## COUPE D'HIVER

CHAVENAY,  
FRANCE  
February 27th



4



3

Five Nation contest organised by F.N.A. modellers of the Ile de France zone attracts greatest ever entry for Modele Reduit d'Avion and

**Aeromodelleur**  
challenge trophies

**A**EROMODELLER'S 27 strong party of CH enthusiasts descended (if that is the proper word) on Paris in time for "Bif stek'n frites" at mid-day on Saturday, February 26. After seeing some of the sights they returned to further gourmandise for the evening at what has now become the recognised centre of gastronomic fortification for each of our annual CH teams. Thus despatched by the grateful proprietor of "Au Savoyard" with his specially potent brand of schnapps fresh upon our palate, we were

ready for almost anything that Chavenay could present on the morrow.

First, this small grass field 14 miles west of the City chose to trap our coach in glutinous mud. However, such incidentals are made for one to show presence of mind, and the vehicle was soon despatched at the sufferance of some decidedly bent corrugated iron sheets. By the time the day was out, that wasn't the only thing that was bent either!

Forty-one models were in the British boxes. Each

**FAMILY PARTICIPATION** is always a CH feature. Left to right, Maureen and Graham Head from Portsmouth (Lee Bees), Kliever and Werner Wetzel from Oberhausen, Germany, and French couple Josianne with Andre Meritte (who placed fifth).



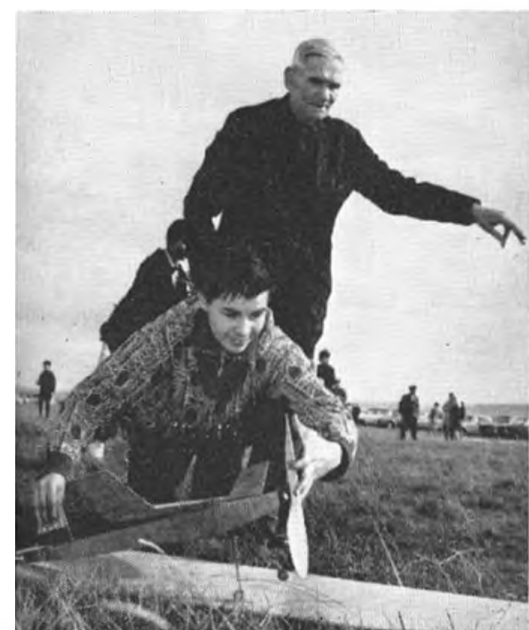
Right: Dick Johnson sights up Fudo Takagi's model which arrived in pieces from San Diego via Xmas Mail. New wing and tail were supplied, then the rolled 1/32 in. sheet fuselage started to break up in trimming. Eventually, placed 95th. Next is Phillip Lepage who started well with 2 maxes but finished 15th. Third down is Laurie Burrows who suffered from poor glide with his black and orange reserve, better model having been lost.

had to be entered and processed, there were also 167 others needing the same treatment and perhaps three times that number of 10 gramme motors to be weighed on an elderly lab balance. This mighty task, undertaken by the newly re-constituted *Federation Nationale Aeronautique* Modelling section under the industrious guidance of J. Ganier, and about 12 helpers was the only time-wasting element in an otherwise very hectic seven-hour contest. The calls for timekeepers and the queue to verify motor weight never seemed to diminish.

Bathed in spring-like sunshine with obvious thermal activity under the clouds, Chavenay offered better flying conditions than reported from anywhere else by our postal competitors, but still it had its hazards. A steep escarpment, falling to the level of the village three quarters of a mile down wind gave rise to severe turbulence at just the point where most props were flicking back to folded position for the glide. This could bring one down from an apparently "safe" height as on Shirley Horton's third flight and Dave Burton's first (and only!) and added to the usual problem of propeller folding which seems to dog too many CH flights. Wind strength varied from 10 to 20 mph, tapering off at the close of the contest but to little advantage as in fact all the better flight scores had been recorded in the first four hours. This is by no means unusual at this venue.

Added to the excitement of earlier years was the entry of models from the USA (arranged by the enthusiastic Dave Linstrum) proxy flown by British and French modellers plus groups from the Netherlands and Germany to complete an International atmosphere. One wonders if the French might feel hurt that their traditionally "exclusive" class of model has become a reason for so much intrusion. Results certainly went against them this time, and their hold on the Anglo-French Challenge was only narrowly maintained. We feel that they were most pleased indeed to see so many adopting Coupe

**TAKE OFF.** 70-year-old Bolek Degler from Perpignon has youthful helper to make his launch. Centre is Frenchman Piav, releasing Ed. Dolby's model with spirit and right is unlucky Jack Allen of Brighton before losing "The Knave" in the top of a Poplar tree.





## OFFICIAL RESULTS

Place	Name	Club	1	2	3	Total
1	Oskar Ehmann	Reutlingen (D)	120	120	115	355
2	John O'Donnell	Whitefield (G.B.)	111	120	120	351
3	Georges Matherat	Dauphine (F)	112	120	117	349
4	Shirley Horton	Crawley (G.B.)	120	120	99	339
5	André Morille	A.M.A. (F)	97	120	120	337
6	Jean-Pierre Templier	P.A.M. (F)	88	117	120	325
7	Charles Lulsic	Paul Andriillon (F)	120	120	83	323
8	F. Monta (Proxy-O'Donnell)	Kansas (U.S.A.)	105	120	61	316
9	Jack Allen	Brighton (G.B.)	91	104	120	315
10	Jean-Pierre Templier	P.A.M. (F)	120	112	82	314
11	David Tipper	St Albans (G.B.)	120	107	85	312
11	Alain Landeau	P.A.M. (F)	120	97	95	312
13	Henry Tubbs	Baldon (G.B.)	90	120	99	309
14	Richard Bailey	Surbiton (G.B.)	120	86	120	306
15	Philippe Lepage	P.A.M. (F)	120	120	62	302
16	L. Y. Sonneborn	Amsterdam (N)	120	110	69	299

### OTHER BRITISH AND PROXY-FLOWN PLACINGS FOR U.S.A. IN FIRST 75

22	Bruce Rowe	St. Albans (G.B.)	120	88	73	281
24	Bill Horton	Crawley (G.B.)	87	120	65	272
36	Vince Taylor	St. Albans (G.B.)	120	85	66	251
40	Laurie Burrows	Blackheath (G.B.)	120	68	58	246
41	J. Fluehr (Proxy-Rowe)	U.S.A.	80	95	69	244
43	D. Linsrum (Proxy-Cameron)	U.S.A.	58	88	97	243
46	Jack Allen	Brighton (G.B.)	120	120	—	240
48	Graham Head	Lee Bees (G.B.)	59	120	56	235
49	Dick Johnson	St. Albans (G.B.)	48	120	63	231
52	E. Dolby (Proxy-Piav)	U.S.A.	54	70	101	225
53	R. Schroder (Proxy-Horton)	U.S.A.	108	58	58	224
57	John Mabey	Lee Bees (G.B.)	120	30	60	210
57	Peter Cameron	Crawley (G.B.)	58	81	77	216
59	R. Taylor (Proxy-Tipper)	U.S.A.	82	69	64	215
60	C. Sollich (Proxy-Taylor)	U.S.A.	51	91	68	210
61	Graham Head	Lee Bees (G.B.)	96	70	43	209
65	John Mabey	Lee Bees (G.B.)	55	39	105	199
67	H. Struck (Proxy-Pierrard)	U.S.A.	112	48	35	195
71	Gordon Cornell	Croydon (G.B.)	42	72	73	187
71	John Dumble	Richmond (G.B.)	42	79	66	187

208 entries. 130 of which made 344 official flights  
(F) France. (D) Germany. (N) Netherlands. (G.B.) Great Britain.  
(U.S.A.) United States of America

**LES PROXIES.** Back, left to right: B. Rowe, R. Johnson, V. Taylor, Standard bearer, Maurice Bayet of "Modele Reduit d'Avion," Piav, J. Allen. Front row: W. Horton, P. Cameron, M. Pierrard, J. O'Donnell and D. Tipper with some of the models from the U.S.A.

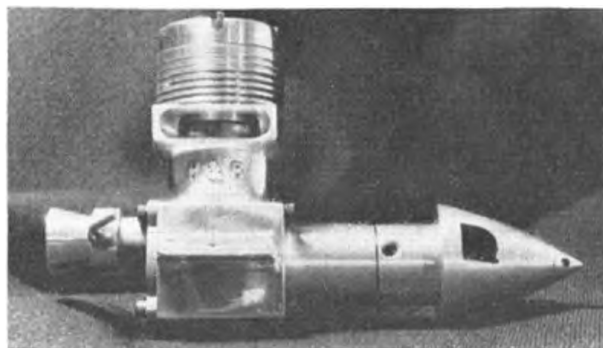
d'Hiver, and if perhaps some of the French aces did not maintain form this time, their enthusiasm has been challenged for a greater effort in '67.

Any endeavour to prepare a chronological report on a meeting involving almost 350 flights from a dispersed area would be neither accurate nor necessarily interesting. We shall, therefore, give notes in a special CH Newsletter available to anyone who sends stamps for returned post.

On tactics, previous Champion Alain Landeau made five entries, operating them as in a strategic game, playing only those which maxed first time. Didn't work! Low wings and low aspects are the new trend in France. On technicalities, the single blade folding prop is not universal by any means and more attention is being paid to this part of the model than any other part.

**LOW WING** entries many of which were seen, all with exceptional stability in wind. Left, Jaques Valery and "Titaffe" and right, Marc Cheulot holds for Rene Jossien, all expert Wakefield class fliers too.





The H&R "Rattler" .29 engine currently the world's most powerful 5 cc. motor, with which the Husted-Roy team hold the US record and have unofficially exceeded 180 mph.



Winfried Holle, of Enschede, Holland and the Rossi 60 engined model with which he established a new Dutch record of 178 mph.

Peter Chinn's

## Latest Engine News

OUR comments in the February "Latest Engine News" on racing 29's and on Super-Tigre/K & B hybrids in particular, brought an interesting letter from Winfried Holle of Enschede in the Netherlands. Holle, who, as previously reported in Aeromodeller, holds the Dutch 10 c.c. speed record at a highly respectable 178 m.p.h., also enjoys the distinction of being the proud possessor of an H & R "Rattler" 29—the most successful and also the most original of the aforesaid hybrids.

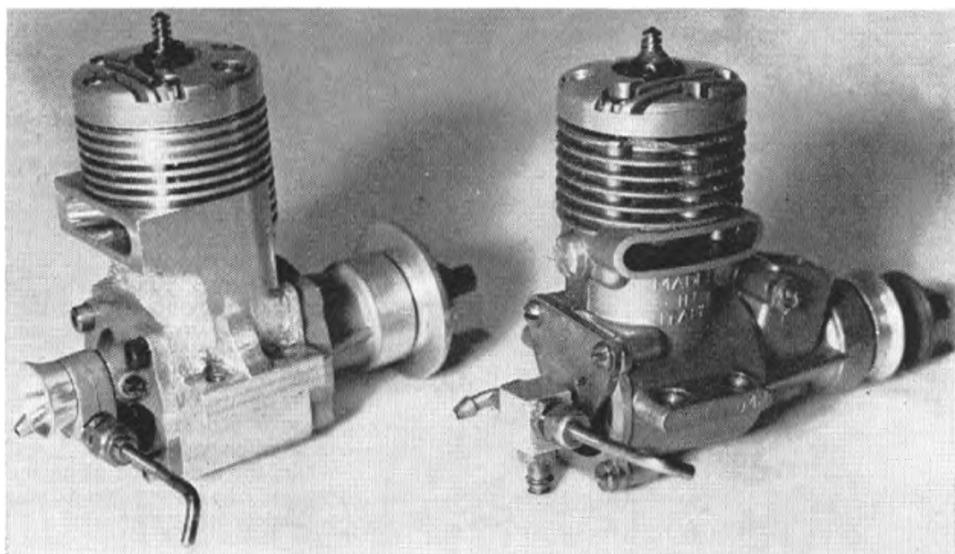
The Rattler, brainchild of the American Husted and Roy speed team, has shot to the forefront during the past few months, currently holding all three U.S. 5 c.c. records (junior, senior and open, the latter by Husted and Roy at over 172 m.p.h.) and is reported to be now exceeding 180, repeat 180, m.p.h. on the regulation AMA 22 thou. line. Rattlers are strictly custom-built specials and Holle's example was one of the eight, only, that had been made, up to the end of last year.

Basically, the Rattler is a twin ball-bearing, lapped piston, rotary disc valve engine, built up from a mixture

of original K & B and Super-Tigre parts. The crankcase/cylinder block is original, has a very large transfer passage and, sand-cast in a special aluminium alloy, is very robust. The bearing housing is machined from bar stock and contains a K & B 29R/64 shaft on which is mounted an extended prop. driver and integral spinner assembly. The backplate and rotor are also K & B but the rotary-valve timing is modified.

The cylinder liner and piston are selected Super-Tigre G.21/29 parts with the ports re-timed. The cylinder head is machined from bar stock and has a large annular squish area like the Super-Tigre, but features a trumpet shaped combustion chamber. Head shapes generally have less effect on performance than used to be commonly supposed, but our guess is that this one really does contribute something to the engine's performance. Previous experience with trumpet heads and the high compression that the squish-band and trumpet shape render practical in an engine of this size, suggest that plug life is likely to be limited but this, almost inevitably, must be the price of performance.

Apparently using some Super Tigre G.15 and K&B parts, the rear exhaust 2.5 cc. racing special at the left was evolved by US speed flier Glenn Lee. Modified G.15, shown for comparison, has needle-valve at rear instead of an intake.





German Mini-Vox silencer for Super Tigre engines, by Hans Winkler, largest of the European Super Tigre distributors. Silencer is the simple expansion chamber type and uses an "expanding curtain wire" retainer.

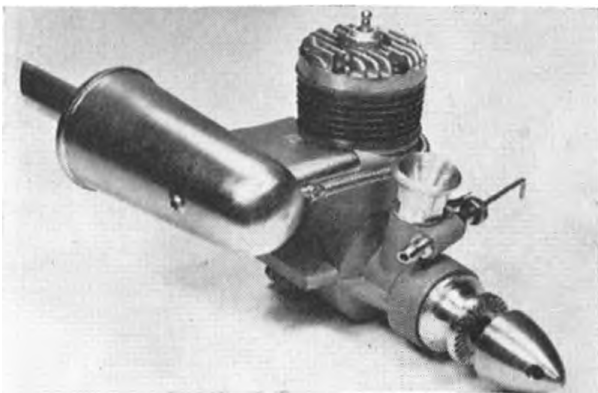
■ The Rattler is no lightweight and turns the scales at a healthy 10½ oz, but claimed output, running on an orthodox high nitro content fuel, is an equally healthy 1.25 bhp at 22,500 rpm. Having regard to the fact that the Super-Tigre factory rates the G.21/29-RV at 1.10 bhp at the same speed, and that we have recorded on test just over 1.00 bhp with a Series 64 K & B 29R, on similar fuel, the claim for the Rattler does not seem to be excessive. Actually, the recent very high performances by Husted and Roy have been with a somewhat more potent fuel mixture, the nature of which is unknown other than that it contains no methanol or other alcohol.

Commenting on his experience with the Rattler, Winfried Holle writes: "My own Rattler is still very green. However, the static running (which includes throwing the blades of a Rossi 7 x 10 prop) is terribly good. I flew it twice under "polar" conditions (36 deg. F and 95 per cent. relative humidity) and got over 150 m.p.h. This was on standard F.A.I. fuel (75/25) and Rev-up 7 x 11 prop. Comment from H & R: 'Take care of that engine as it will wind you up like an alarm clock under warmer conditions!' So now I am waiting for warmer weather!"

### 'Ware Prop!

Our correspondent's experiences with blade throwing repeat a problem (first encountered with the K & B 29R/64) that we, too, have experienced with the very high peaking speeds (20,000 or so) of the latest 29's. Especially when one is aiming to achieve static rpm at, or above, the bhp peaking speed, it becomes increasingly difficult to find a standard prop. that will not disintegrate

Another example of the Winkler Mini-Vox silencer, this time for the Webra Glo-Star cc. twin ball-bearing glow motor.



at such revs. Even when propped two or three thousand rpm below the peak (to allow for unloading in the air) there is now sufficient risk of blade shedding to move us to repeat, with added emphasis, the old warning about standing in the line of fire.

For static test purposes, it is probably better to try to find a reasonably club-like 10 x 4 (for plenty of blade and hub strength) and to crop this to 8 in. diameter or whatever is needed to get the engine turning at the required speed. Light blades, admittedly, reduce the centrifugal force acting at the root but, with wood props (nylon and plastic are 'out' of course) it is the aerodynamic twisting and bending of the blade that we are concerned with. It is better to have a heavier, but more rigid, blade that will not twist and split under extreme conditions.

The plastic props of the late forties and early fifties, of course, used to jettison their blades from the hub, mainly because the material used had insufficient tensile strength to stand up to the centrifugal force generated above certain rpm. The material was often weakened, too, by the heat transferred to the hub from the engine crankshaft. Nylon props are less likely to shed their blades in this manner, but, nevertheless, tend always to be weak at the blade root. With a nylon prop one does have warning, sometimes, (if it is being run just beyond its safe rpm limit) by the appearance of small cracks at the blade root. At this point, needless to say, one consigns the prop to the scrapbox.

### Plea for long shafts and rear induction

R. Hayes of West Hythe, Kent, raises a point that comes up from time to time; to wit, why don't manufacturers use longer crankshafts, so as to aid cowling? This would also give a safer clearance between the prop and needle-valve. Better still, says this reader, let us also enter a plea for more rear intake engines. With the merits of this (for many applications at least) one cannot argue, of course, except to say that a less compact engine will invariably mean some slight increase in weight.

One answer to the long shaft question is for the makers to offer optional extension drive units. This has been done from time to time in the past, notably by American manufacturers, and Veco, in fact, still make such an accessory in two types, one size adaptable to Veco's and other engines with the standard American ½ in. shaft, and a larger size suitable for the Veco 45. This is something that might well be copied by other manufacturers. In most cases, all that is required is a machined, spool-shaped prop driver, between ½ in. and 1 in. long, and a suitable sleeve nut and washer. The most widely known example is, of course, the standard prop drive assembly on the McCoy 60 engine.

On the question of rear induction, however, we are doubtful whether a wholesale switch to this layout would be universally popular. A few years ago, when there were rather more rear intake (reed valve as well as rear rotary-valve) engines than at present, we had just as many complaints about these: "Too much overhang... makes bearers weak... difficult to choke in cowed installations... no good for power-duration, must have radial mount for easy thrustline adjustment..."

The poor old manufacturer just can't win, you see! We do think though, that a bit more of an effort could be made to locate the needle-valve control at a safer distance from the prop on some engines, or to use flexible, raked back or, at least, easy to adjust needles. If you have ever tried adjusting the small, stiff needle of a Fox 40-BB while, three-quarters of an inch away, it is putting best part of one horsepower through a screaming prop, you will know what we mean!



## CALLING ALL SCALE FANS

The ultimate in modelling is recognised to be the building of a flying scale model, whether free-flight, control-line, or radio-control. But until recently good-quality scale kits have been rare and enthusiasts who have built and flown scale models successfully have been limited to those capable of developing their own designs or building from existing plans. Now we can offer kits worthy of the attention of the most meticulous scale connoisseurs. Many of them are not cheap, but the high degree of pre-fabrication together with the necessarily limited numbers in which they are manufactured, makes this inevitable. Below are details of some scale and semi scale kits we feel we can recommend with confidence.

## R/C SCALE KITS

## VK CHEROKEE



A line semi-scale model that has proved to be easy to build and a cinch to fly. Fully pre-fabricated kit with accurately die-cut parts. 65in. span. 754 sq. ins. wing area. For multi-channel or proportional. Motors 49-61. £12.19.0.

## DENIGHT SPECIAL



This Sterling kit of Joe Martin's sensational 50in. pylon racing winner makes a fast contest model with a terrific performance. Fully die-cut parts, plastic cheeks and pants, sprung alum, landing gear etc. Motors 29-40. £9.8.6.

We are continually being asked for a complete catalogue of all the kits, engines, accessories and radio-control gear that we sell. Unhappily, despite all our efforts, we have not found it possible to produce one. What we can offer you, however, are reprints of any of our previous adverts as the next best thing. Just send a S.A.E.

## AIRLMA TIPSY JUNIOR



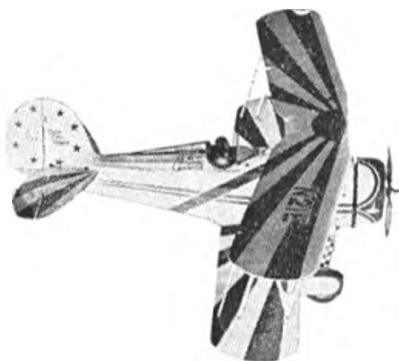
This completely pre-fabricated kit from a new French manufacturer, Robert Lestourneaud, is a master production of great merit. True 1/5th scale model for 6-10 channel or proportional. All parts custom cut and sounded. 52in. span. For motors 29-35. £15.3.6.

## GOLDBERG CESSNA SKYLANE



This semi-scale model for the popular 049 glowmotors has proved the best selling kit we have ever handled and is the ideal model for the beginner to scale modelling. Recommended from every point of view. Span 42in. Area 244 sq. ins. For single channel rudder only R/C. £3.1.9.

## GT. LAKES TRAINER BIPLANE



A very complete kit for this famous aerobatic aircraft which even contains silk and airwheels. An American Nationals Scale R/C winner. 2in. scale, 57in. span 872 sq. ins. wing area. For motors 45-61. £25.5.0.

## Other R/C Scale and Semi-Scale kits

Midwest L-19 Bird Dog. 46in. 320 sq. ins.	
049-074.	57/6
Midwest Aeronca Sedan. 46½ in. 308 sq. ins.	
049-099.	82/6
Sterling Piper Cub J.3. 54in. 0.15-29	96/3
Sterling Cessna 180. 45 in. 09-15	87/6
Sterling Spitfire 66 in. 49-61.	£15.11.0.
Sterling Mustang 66 in. 49-61.	£15.11.0.
Sterling King Cobra 70 in. 49-61.	£15.11.0.

## Control-line Scale and Semi-Scale kits.

Sterling Spitfire semi-sc. 52½ in.	99/6.
Veco Hurricane semi-scale 35's	107/6
Toplite Mustang P51D 29-35	179/6
Toplite Thunderbolt 15-29	86/-
Frog SE5a 22in. span 06-09	33/-

## Accessories for the Scale Modeller

Williams W.W.1. wheels: 1.7/8in. 12/6; 2½in. 19/6; 3½in. 29/6; 3½in. 39/6; 4½in. 49/6 per pair. Williams smooth contour wheels for light aircraft: 2½in. 14/6; 2½in. 22/6; 3½in. 29/6 per pair.

Williams pilots: Civil and Military types: 1in. scale 5/9; 1½in. 7/9; 2in. 8/9. Pylon Racing pilot 2½in. scale 11/-.

Tornado props: 3-bladed; 8 x 6 11/6; 9 x 6 13/6; 10 x 6 13/6. Tornado pusher props 8 x 6 7/9; 9 x 6 9/-.

Williams Nylon spinners. Universal fitting. 1½in. 7/9; 1½in. 8/9; 2in. 11/9; 2½in. 15/9.

Blind nuts and bolts. set of 4; 2/9.

J. bolts per packet 3/-

Undercarriage clamps per packet 6/6

Veco semi-pneumatic wheels spoked hubs 2in. 14/-; 2½in. 16/-; 3in. 18/6 pr.

Veco inflatable pneumatic wheels 3½in. 49/6; 4½in. 59/6.

U-REELY handle with 100 ft. cables 89/6

Roberts Flight Control 3-line handle 66/3

Roberts bellcrank control unit 28/9

Veco Aluminium spinners:—1½in., 1½in. & 1½in. needle nose 9/6; 2in. std. 9/11; 2½in. std. 11/6; 2½in. std. 13/-; 2½in. std. 15/-.

Veco spinner adaptor nut 2/6 and Extension shaft 7/6.

## Recommended R/C equipment for the Scale enthusiast.

FLIGHT LINK Control system. The ideal set for the scale sport and competition flier. The reliable proportional.

Superregen with 3 servos £89.0.0.

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Superhet with 3 servos £109.0.0.

Superhet 3 + 1 with 4 servos £127.0.0.

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# TOPICAL TWISTS

by 'Pylonius'

illustrated by 'Sherry'

## The Moor We Are Together

At one time all you had to do to become a model flyer was to get kitted out for an expedition to the local flying ground—it was the easiest thing in the world. But now the hardest thing in the world is to find a bit of that world to operate on. What is left of England's green and pleasant land, which isn't much, is mainly debarred to the would be model flyer, and that goes for the rest of Britain, too.

Get wedged into that human sardine tin they call the South East of England and you can hardly set foot on a piece of greenery without questions being asked in the House, whilst up in Scotland, where once the Golden Eagle was lord of the air before it became a pleasure steamer, there is hardly room to toss a caber, let alone a space hungry model plane.

The answer seems to be to domicile yourself near a Moor, and before you ask if a Pakistani will do instead, let me explain that I mean one of those wild expanses of land where the deer and the conservators roam. So far the only means modern man has found of despoiling these last natural habitats is to festoon them with grid lines and criss cross them with motorways. Nevertheless, many such territories remain eminently flyable, and we must envy our less urbanised brethren their freedom of the rolling plains (planes).

## A Race Apart

As the F.A.I., official said to the Team Race Dummy, "Let us to fresh fields and postures new . . ."

This issue of posture, which has assumed greater importance than the celebrated one East of Suez, has everyone sitting up and taking notice, except the dummy itself, who is so confused that it doesn't know which side up is breakfast time. And it's all so pointless, too, for the whole matter of where to put the pilot was solved some years ago by European expert, Hans Kneezan, in his famous Team Race model, "*Boompse*". Having observed a number of hair raising, line tangling events, he asked himself the simple question, "*If I were a pilot where would I prefer to sit?*" The answer came to him in a flash, "*In the handle, of course*".

With this in mind we opened up the canopy to speak to veteran Team Race pilot, T. Remble. We asked him how long he had been a Team Race Pilot.

"About two inches. I was twice the man I am when I sat in the cockpit of a Tiger Moth".

"So you're not really worried about your posture?"

"You could hardly say I have one to worry about".

"But you agree you should have a clear view of where you're going".

"What! With old Whippy Willy on the handle, You must be joking! Why, if it wasn't for the oil smear on the

canopy I'd be a nervous wreck".

"What do you think of the idea of sitting in the handle?"

"I think you're trying to do me out of a job. I'd rather take up one of the many offers I've had as a pop art centrepiece".

## Groovy Movie

"*Films With Nancy*" has nothing to do with excerpts from "*Oliver Twist*" (which has nothing to do with engine starting!) as you might suspect, but concerns the European itinerary of a red headed young lady from California.

On the face of it the young lady would appear to be some sort of aeromodelling evangelist, bringing the message of the higher things of life to the heathen groundlings on this side of the pond. Main part of her conversion technique is to show a colour film of the silent delights of R/C Glider flight, modern American style. However, it is not necessarily true that the strange bird which features in a long stretch of the film, and which has been christened (surely baptised!) "*Pig Tail Otto*" is, in fact, an old, non-plastic, balsa and tissue model plane, although it is possible that such an anachronism still exists somewhere in the States, but it might well explain why this strange fowl of the air had not been identified.

## For Heaven's Sake

Still in somewhat religious vein comes a mention of a new club bulletin called '*The Message*', which, we trust, will not be mistaken by anyone for a Physiotherapist's Handbook. Anyway, the religious aspect becomes even more pronounced by the Editorial opening with a line so full of grace as "*For what we are about to receive . . .*", although it is doubtful if even the most modern minded Bishop would endorse the idea that we are presided over by a character named McClave.

Apparently this is all part of what is called a breezy style; a characteristic to which so many club bulletins are fatally addicted, although you might imagine that the deadly serious business of flying, a delicately poised piece of fragility in the face of all the elemental forces which endeavour to bring about its violent decimation would call for a calmer attitude. I, myself, favour the calmer approach, and though I put on a brave but sickly smile now and again I always try to keep my nervousness from breaking into breezy hysteria.

The trouble with most club bulletins, I find, is that they are too eager to give the impression that model flying is one jolly big romp for the kiddies, and that, to be anything of a success, a club meeting must outdo the local Rag Week in gigantic japes. Usually after a couple of such issues we get a rather sobered down editorial asking why the senior membership has dropped to two, a figure which includes an octogenarian Chairman, who made his last model flight in 1911.

## Potted Version

"Pots" in connection with R/C flying usually refer either to the wealth therein of the operators or the anatomical development they acquire through their sedentary pursuit, but now critical attention is drawn to the steam age pots that protrude so incongruously through the sleek engine cowlings. Why, it is asked, does the otherwise perfectionist radio flyer continue to violate all the canons of aesthetics in this curious, obsolescent way? If he is so adept at inverting his model, it is argued, why cannot he invert his engine with the same facility.

Now, I don't know the answer to this, but I can't help confessing that I regard the old protuberent pot with secret delight. It seems to me such an admirable send up on the whole pointless, abject business of producing miniscule imitations of full-size machines. I am sure that once the perfidious pot is retracted into the all embracing gloss of the plastic facsimile then the art of controlled model flying will have lost the last trace of that rugged individuality that bespeaks the hobbyist rather than the affluent playboy, and the Gliding Clubs will have even more reason to exhort us to give up playing with toys and join a man's hobby.

If I have one source of pride in this hobby which makes it wholly unlike any kindred hobby, it is that the characteristic machines it produces are quite unique in design and configuration. Model boats look like boats, model

trains look like trains, but model planes look only like model planes. And the funny thing about most of our top model flyers is that they have not the faintest interest in the full-size stuff.

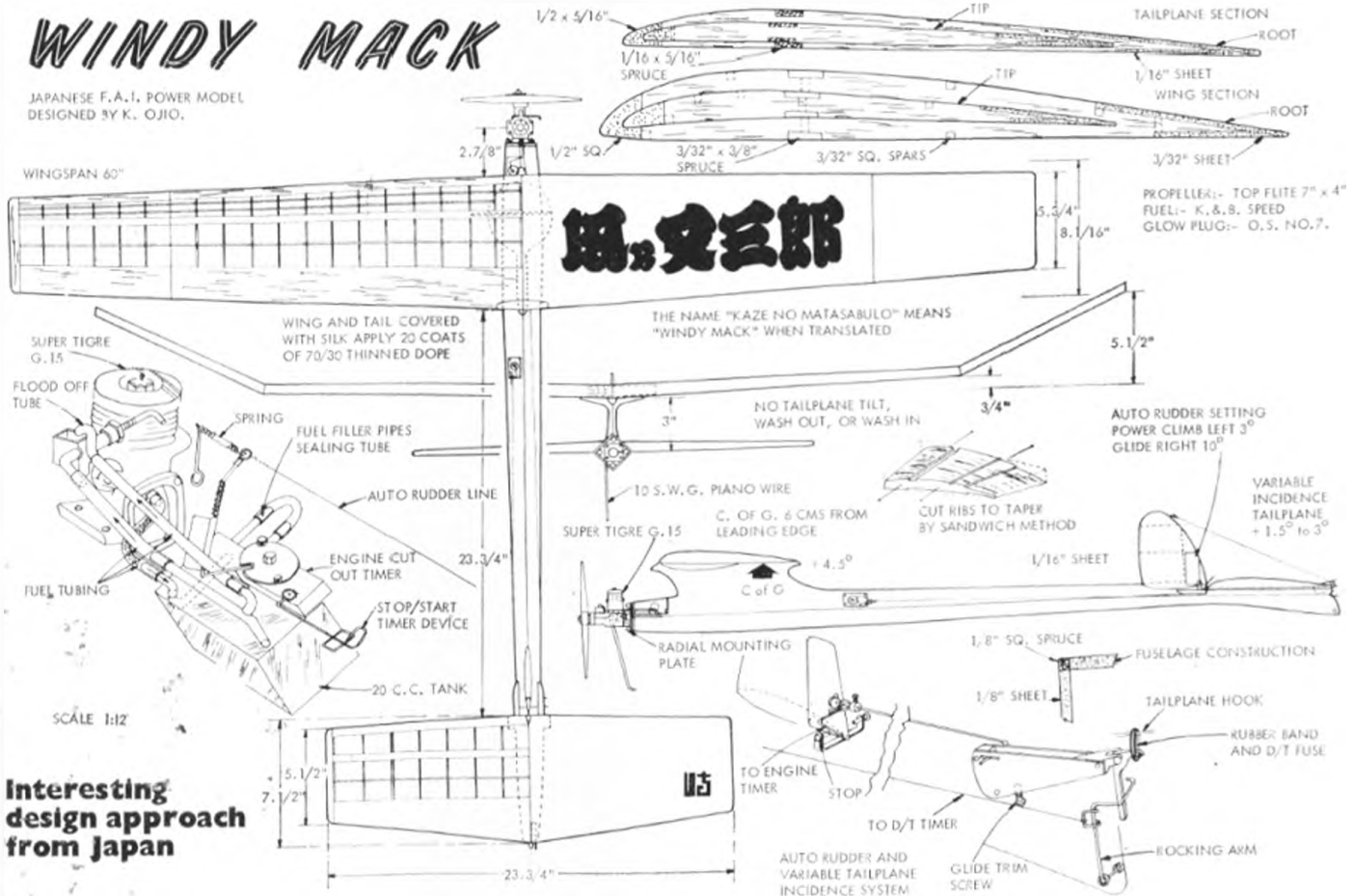
It is not my intention, of course, to cause any offence to Scale modellers—only to make them flaming mad.



"I believe in making 'em look like the real thing".

## WINDY MACK

JAPANESE F.A.I. POWER MODEL  
DESIGNED BY K. OJIO.



Interesting  
design approach  
from Japan



## MEMBERS' PAGE

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

### Fairchild Packet

Dear Sir,

In the March '66 edition of Aero-modeller you review the 20th Century Fox Film "The Flight of the Phoenix". The twin boom aircraft from which the Phoenix was made you name as a Fairchild C-119 Packet. In fact the picture shows the Skytruck is a Fairchild C-82 Packet.

There are several differences between the two, the most obvious being the position of the cockpit. The C-119 Packet has the cockpit mounted in the nose of the fuselage in the style of airliners (Comet etc.), while the C-82 Packet has the cockpit fitted on top of the fuselage as in the pictures. Other differences are in the performance, the C-119 having more powerful engines fitted.

Pinner, Middlesex.

J. Reynolds.

Yes we boobed on this one, your points are all correct, just goes to show we all make mistakes sometimes.

### Firebird

Dear Sir,

I have a Keil Kraft "Firebird" which is powered by a P.A.W. 19 B.R. The C.G. is correct, but the Firebird is only designed for a 2.5 c.c. motor. Will the extra power of the 19B.R. have any bad effects on the flight of the model?

Heston, Middlesex.

A. Page.

As you have pointed out, the engine is technically too large for the kit as intended but with the Centre of Gravity in the correct place it should fly just as well as a 2.5 c.c. although faster. To slow it down if you find you can't keep up with it all the time, fit a larger diameter propeller such as a 10in. by 4in.

### Monoline Control

Dear Sir,

Could you please explain the operation of mono-line control for speed models etc., as this has puzzled my friends and I for some time?

Also I would like your advice on how to start a modelling club here in Larne as the original disbanded about six years ago. There are quite a lot of us who are anxious to do so and we would be most grateful if you could help us.

Larne, Co. Durham.

S. Whiteside.

Mono line control although very popular in the U.S.A. has never 'caught on' in Great Britain, as most modellers seem to think it beholds mystic secrets that can never be overcome. The control handle has gears or a direct drive to rotate the single control line. The turns run along the line to a worm gear in the model that rotates and moves a cam i.e. the bell crank in the normal manner but by pushing or pulling on one side only. This is fully illustrated in 'Control Line Manual' by R. G. Moulton under 'Basic Monoline'. Details of

### How to join our new club

To join, fill in the handy membership coupon and send with a postal order/ money order, or cheque to the value of 2/6d. made payable to "Aeromodeller". Post to Golden Wings Club, Aeromodeller, 13-35, Bridge Street, Hemel Hempstead, Herts. Each member will receive his own badge—depicting 'Golden Wings', a membership card, and two transfers to decorate his model or model box. Unfortunately due to circumstances beyond our control there is a delay in supply of the badges so members will have to wait a while until they are ready. Don't delay your membership on this account though, each member will receive acknowledgement of his membership fee and will help to make it the largest modelling club of all time.

John Bridge

how to start and run a club were given in July 1962 Aeromodeller and contains all the gen you need to know, officers, duties, meeting places etc. . .

### National Contests

Dear Sir,

I have enclosed the following and would also like to put forward a question about the Nationals. I would like to know how to enter them, I myself do not wish to enter as I don't think I am skilled enough yet but all the same I would like to know how they are bought together, different age classes and groups of models which are raced, how big the models have to be and what dates they

are generally assembled. I hope you will oblige me with this knowledge.

Leytonstone, E.11.

G. Hale.

The National Championships run by the S.M.A.E. Ltd., are to be held at R.A.F. Hullavington, Wiltshire, on May 29th and 30th. Events start at 10 a.m. each day and each event is "all in" i.e. juniors, intermediate, and seniors all in the same event competing for one first place. There is however a special prize for the best junior of the whole Nationals i.e. the Junior National Champion worked out on a points system. Entries have to be sent to a Competition Secretary. Models of all sizes are flown and further information on rules, membership etc. can be obtained from The S.M.A.E. Ltd., 15a, Low Ousegate, York.

### Fuel Booster

Dear Sir,

I am a model enthusiast and I would like to know if there is a recipe for making glow plug fuel and if there is any way you can give it a booster. I have heard that extra performance.

Kenwyn, Truro.

R. M. Andrews.

Glow plug fuel can be made from two basic ingredients. Oil and Methanol, Castor Oil can be used, also Castrol 'M' or 'R' are quite suitable. Methanol can be purchased at racing motor cycle shops in most large towns. If they do not stock it they should be able to put you onto a local source of supply. For general sport flying use 25% oil and 75% methanol. For high revving engines such as Cox a booster is needed. This is called Nitromethane and should be added in 5% steps until the best performance is realised from your engine. Nitromethane is available from Henry J. Nicholls Model Shop, 308 Holloway Rd., London.

Dear John Bridge.

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

NAME IN FULL .....

ADDRESS .....

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

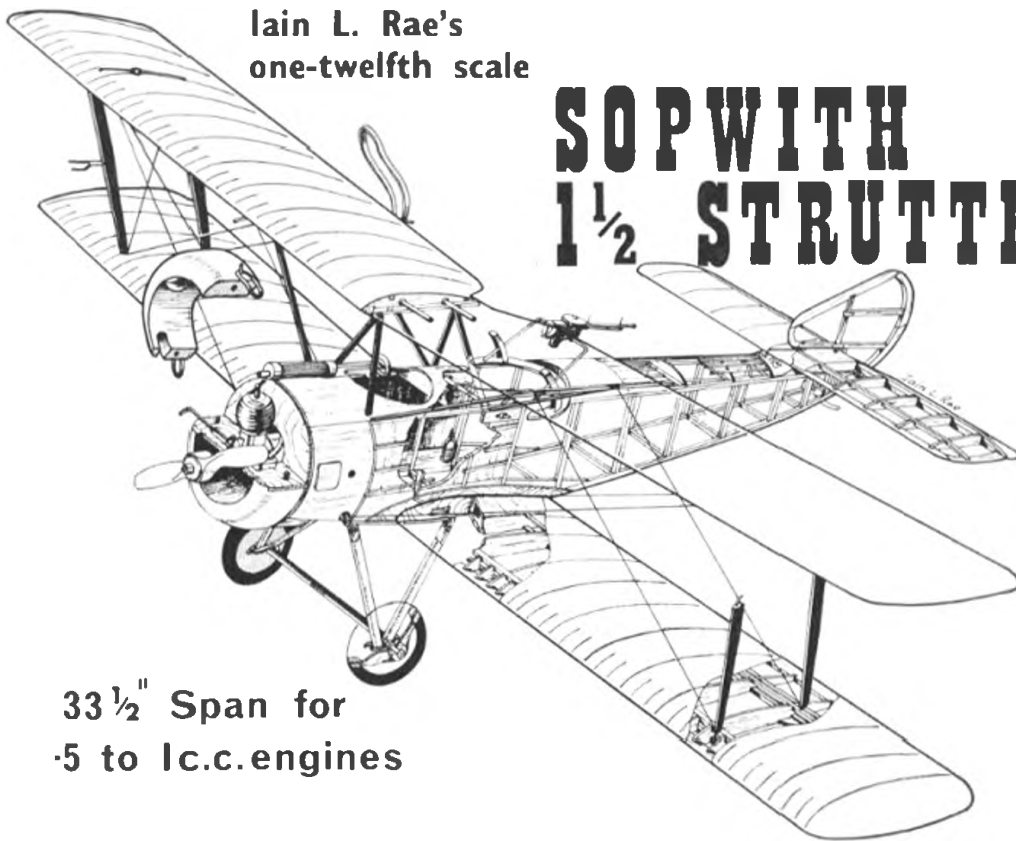
NAME OF ANY OTHER CLUB OR CLUBS TO

WHICH I BELONG (if any) .....

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

Iain L. Rae's  
one-twelfth scale

# SOPWITH 1½ STRUTTER



33½" Span for  
·5 to 1c.c.engines

THESE days of the super high-power performance blowlamp type jet jobs influence a reminiscent approach by modellers who turn back into the past for W.W.1 or W.W.2 propeller driven subjects. The first World War aircraft attract the greater proportion of interest for free flight power, with those from the Sopwith Co. at the top of the popularity list.

The Sopwith 1½ Strutter is a natural selection for free flight power with its generous tail area and slim fuselage, but surprisingly few models have been seen to date. One exception is Brian Sichi's control line model in our Plans Range. It should also be noted that both Brian Sichi and Iain Rae hail from Scotland, obviously the 1½ Strutter has extra attraction north of the border! Extra detail for scale

can be gleaned from the 1/72nd and 1/48th A.P.S. scale drawings, plan pack 2779, price 2s. 6d. plus 6d. postage. No less than eight flying Sopwiths are included in our current plans range, these being:— Pup FSP/305, Triplane FSP/545, Swallow FSP/625, Pup FSP/750, Tabloid FSP/810 and Camel FSP/441 all for Free Flight. The Triplane CL/361 and 1½ Strutter CL/651 are also available as control line models. Scale "Plan Pack" drawings at 3s. 0d. including postage are available as follows:— Triplane 2741, Buffalo 2320, Snipe 2686, Camel 2699, Tabloid 2751, Dolphin 2754 and, of course, the 1½ Strutter 2779.

Structural design of this 1/12th scale model embodies all the proven "fail safe" and crash proof features. The lower

*Continued on next page*



Looking for all the World exactly like the real thing, Iain Rae's Sopwith nestles in short Scottish grassland ready for action. As seen in the author's own sketch above, the prototype has a D.C. "Quick-start" Dart .5 cc. diesel, ample power for the handy sized model.

Structural view taken prior to tissue covering reveals the near scale arrangement of ribs and spacers. The little quarter ribs at the leading edges represent those on the full size aircraft. A pendulum controlled elevator dampens out any stall tendency.



### SOPWITH 1 1/2 STRUTTER (Continued)

wing panels are retained by plywood tongues slotting into the fuselage, whilst the upper wing is constructed in two panels for ease of transport and storage. Panels are joined with a 1/8 in. dia. dowel inside a paper tube and the whole wing retained on cabane struts by elastic bands. Undercarriage is clipped into a fuselage tube at the rear end and the front retained by elastic bands passed through a fuselage tube and offer shock mounting. The axle is sprung also by elastic bands inside the main framework.

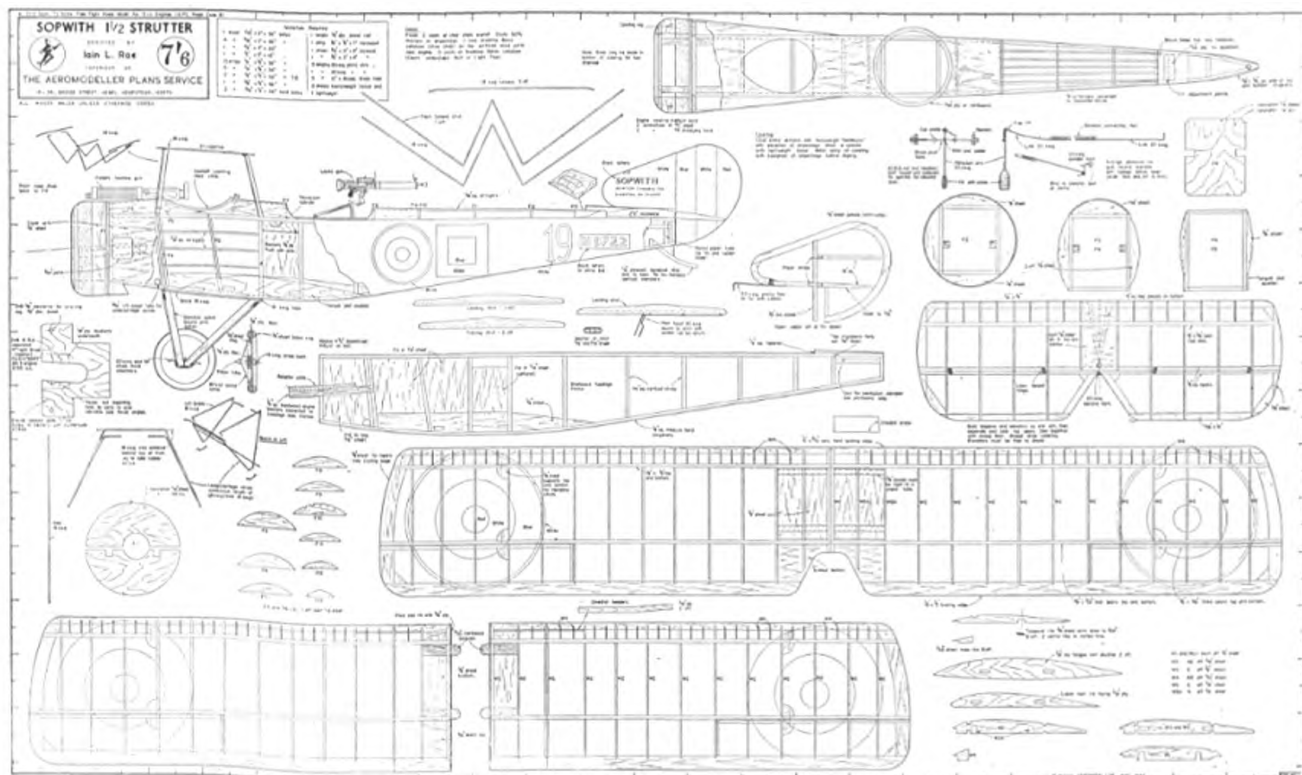
A pendulum controlled elevator stabilises the model in the event of gust effect and is another safety factor. The prototype used a 5cc D.C. Dart that provided ample

power for all conditions. Top weight should be 14 ounces and most modellers ought to be able to come out well below that figure!

Commence construction by laying the fuselage side frames over the plan and then fill in the front three bays with 1/8 in. and 1/16 in. sheet together with the very hard balsa 1/8 in. sheet keel pieces with slots for lower wing tongues. The 1/8 in. sq. hardwood engine bearers are then cemented to the side frames. Particular care must be taken to ensure that the bearers are cemented at the correct downthrust angle. Laminate formers 1 and 4 from 1/16 in. balsa and 1/16 in. ply.

(Continued on next page)

Full size copies of this 1/8th scale reproduction are available through Aeromodeller Plans Service, Plan FSP 907. Price 8/0d. inc. post. Border scale represents 1 inch divisions.



Former 4 is then notched, cemented over bearers and trued to side frames while the crosspieces are being added. Screw  $\frac{1}{8}$  in. ply mounting plate to bearers with counter sunk screws, cementing well before. Cement pendulum spindle bearers in place, now assemble pendulum and instal it in the fuselage, the 20 S.W.G. elevator link should be bound only to bamboo connecting rod at this stage and adjusted for fore and aft permanently cementing when the airframe is complete. Before covering top of fuselage with  $1/16$  in. sheet, bind and cement longerons and crosspiece struts in place, fit wing runners and spreaders which should be bound with fuse wire and soldered. The addition of formers centre section struts, stringers, undercarriage tube and sheet balsa fairings completes the fuselage. The fin is constructed around a  $\frac{1}{8}$  in. diameter dowel which plugs into a rolled paper tube cemented in front of fuselage sternpost.

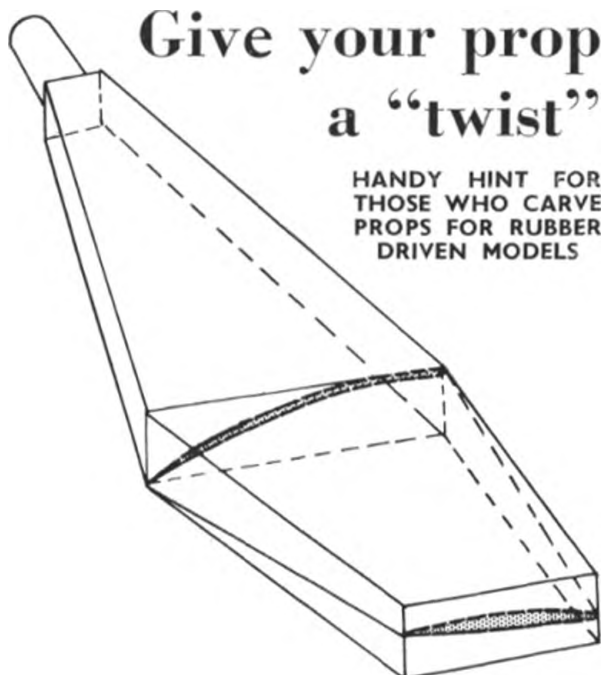
The mainplanes are quite orthodox but hard balsa must be used for the leading edges and the front main spars of the lower and upper wings. Upper wings are first constructed as a single unit and paper tubes cemented in centre section to tube wing dowels. When upper wings are complete they are separated along the centre line and are connected by the dowels. The prototype model was designed to break down into a number of small components for ease of transport and it will last a lot longer if carefully stored away after flying, but it is left to the individual builder to decide how much of his model can be dismantled. Wing panels are attached with rubber bands to wing runners, and lower wing halves plug into fuselage with hardwood tongues, and slots in fuselage. Particular care should be taken when soldering the undercarriage. The wheels are built up on  $1/16$  in. plywood discs, hard balsa being used for the tyres. Keep the tail unit as light as possible, making it integral with the elevators. These are separated after assembly and secured to the tailplane with linen thread after covering.

Designer Iain Rae and his model, showing a size comparison to reveal the compactness of the  $1/12$ th scale model.



The colour scheme is that of No. 3 Wing R.N.A.S. Fuselage plus upper surface of wings and tailplane are in Khaki (or Olive Drab), underneath is Buff or Light Fawn, cowling in silver or aluminium. A White "19" and White-on-Blue panel appear on the sides of fuselage. Use heavyweight tissue on the wings—two coats of clear dope and one of each of the colours. The remainder of the fuselage centre covered with lightweight tissue.

Trim for the glide, noting it is very responsive to any rudder adjustment. Proceed carefully with low power "glides" ensuring that the model always turns to the left. A certain amount of positive bias may be used on the elevators by moving the pendulum spindle forward in its slots and this will assist in preventing a stall under power. Before attempting full power it is advisable to become well conversant with the pendulum control as the model is sensitive to fore and aft trim. Well trimmed, the model has all the agility, and grace, of its full size counterpart.



BLANK FROM  $1/2$ " SHEET, SHOWING METHOD OF SETTING OUT TIP SECTION. THE TIP CAN BE ROUNDED OFF AFTER BLANK HAS BEEN ROUGHLY CARVED TO SHAPE.

## Give your prop a "twist"

HANDY HINT FOR THOSE WHO CARVE PROPS FOR RUBBER DRIVEN MODELS

THE popular term 'propeller' seems to mislead many young modellers into believing the airscrew, to give it its correct name, to be some sort of revolving paddle. Or, at least, this seems to be the impression given by the number of twistless propellers to be seen flapping helplessly at near deck level. Much of the trouble arises when, for reasons of quickness and economy, the blades are carved from thick sheet rather than block.

However, quite an efficient prop blade can be carved from  $\frac{1}{2}$  in. sheet if some attention is given to the simpler aspects of airscrew theory. If you bear in mind the fact that the blade screws its way through the air, then you will readily understand that the pitch is the distance the airscrew travels forward in one complete revolution. Now, as the blade root is revolving at a slower speed than the tip its pitch angle will be relatively coarse, while the fast moving tip will need to have a fine pitch angle in order to move the same distance forward in one cycle. In a truly accurate blade all parts are correctly angled to give a smooth constant motion.

The commonest fault in prop carving is to overpitch the tip section by carving along the blank diagonal without variation. Usually the taper at the root ensures some sort of helical twist up to the half way station, but, unless at this point, the carving line is altered, the pitch angle tends to increase, rather than decrease, at the tip.

As a rough guide, the diagram of a typical sheet prop blank gives the carving lines to be followed for propellers up to 16 in. diameter (block balsa is recommended for larger sizes). The resulting blade is by no means exact, and would rightly make any expert wince, but might serve to keep your models flying until you have mugged up your airscrew theory.

# STRICTLY SIMPLE

David Boddington  
advises on vital  
first choices for  
radio control

Two of the author's 32" wingspan radio control designs are illustrated on these pages. Both are rudder-only, D-C "Quickstart" Dart .5cc. diesel powered, and use the simplest form of equipment as recommended in this feature.



## The Model

Many experienced modellers have spent hours on the drawing board, in the workroom and on the flying field to produce models that are as good for their particular purpose as possible and that experience is yours to benefit from. By selecting carefully, and with good advice you may not be automatically assured of 100% success, but the odds are much greater in your favour than if you make a random choice of the prettiest design you can see that probably requires an expert to fly it. Anyway here's a brief specification:-

**Wing Span** 35 in. - 50 in., i.e. large enough to allow easy installation of radio gear, be large enough to fly in more than just the ideal weather conditions and yet not be too expensive to repair or replace.

**Construction** must be rugged and the model able to take hard knocks. **Simplicity** of construction depends on the amount of aeromodelling experience you have previously had; a newcomer to R/C may have built untold numbers of sports F/F, contest models, etc. Types of construction may vary a lot, don't reject the built up fuselage (from strip balsa as opposed to sheet) as inferior in strength, it can often take more punishment without damage due to its flexibility. **Nylon covering** is virtually a must as this increases the overall strength tremendously and is far more 'hole resistant'. Silk and heavyweight tissue covering is a very poor second and should only be used where weight is of extreme importance, not a beginners model.

**Design features** should include good natural stability, to know that the model will fly itself without continually pressing the button is a great help in moments of indecision and near panic.

This stability is more normally found in shoulder and high wing designs (5°-8° dihedral) and couple this with a fairly thick (12-15%) wing section, symmetrical section tailplane with a generous moment arm, sizeable fin and rudder and we should end up with a 'plane that is easy to fly and free from any vicious characteristics.

These features are to be found in a number of the AM plan range, e.g. Bill Winter's 'Pal Joey', Ron Moulton's 'Workmaster' and G.L. Harber's, 'Lumpers' and for those who prefer building from kits there are available on the home market:- The Keil Kraft 'Mini Super', Veron 'Robot', Top Flite 'Schoolmaster', Goldberg 'Jr. Falcon', Graupner 'Consul', etc. This is not intended to be a comprehensive list but includes models that can be personally recommended, if you know someone that has had continuously successful flying with a particular model that fulfils the requirements -good enough-go ahead and build it. There are many others I have not tested.

## Engine

Choice of engine will depend of course on the size of model selected but regardless of this it should have the qualities of easy starting and reliability. Whether it should be a diesel or Glow-plug motor doesn't matter very much. My own preference is for diesels in the smaller motors as this eliminates one more possibility of failure, namely the starting batteries used for Glow-motors being low. I long for the day when more manufacturers produce small engines with integral fuel tanks, of sensible size, with radial mounting it simplifies building and installation and also saves weight. One engine that has in the past, and is unfortunately no longer produced, typified the ideal beginners engine is the Mills 1.3 cc diesel; ours is now well over 10 years old and has been used regularly over the whole of this period without letting us down once. For someone contemplating buying their first engine it would be well worth their while purchasing a secondhand Mills from a reputable hobby shop and there are still a few new ones available if you search around. Other engines that could be considered suitable are:- D-C "Quick Start" Sabre 1.5 cc., M.E. Heron 1 cc. and Snipe 1.5 cc. Frog 100 1 cc. all diesels and Cox 'Babe Bee' .8 cc Glow-motor.

## Radio Equipment

It must be most bewildering to the prospective R/C enthusiast to thumb through an aeromodelling magazine and be confronted with so many different commercial radio outfits available. What is he to do? there's everything from single channel to 12 channel equipment not to mention sophisticated proportional outfits (how many experienced radio modellers fully understand such terms as Analog or Digital systems, upward modulation, closed loop, servos, etc., etc. anyway, very few I would guess!)

For the beginner two things are of paramount importance 1. *Reliability*, and 2. *Simplicity*, without the first, a crash or a fly away will eventually occur and without the second, the chance of him completing the initial installation correctly and efficiently is severely reduced. I am assuming that cost is of importance and therefore single channel equipment will be purchased even if multi channel flying is the ultimate goal. Many modern receivers are of the all transistorised relayless tone type and the virtue of these is that only one source of tuning is needed and this can be carried out by mechanical means, i.e. without resource to the use of meters.

Choose a receiver that will operate from 3-4.5 volts so that the same battery source can be used for both the receiver and actuator as this too makes for simplicity and saving in weight. You may wish to buy the receiver in kit form, dependent on your ability with a soldering iron, or

ready constructed. For those that consider themselves absolutely hopeless at wielding a soldering iron it is possible to obtain completely pre-wired units with switches, battery box, escapement/s receiver ready to fix into the model but perhaps anyway, you have an understanding model shop proprietor to help you.

It is not intended here to go into long explanations on the technicalities and working of the various items of equipment but merely to a tempt to put the beginner on the right path, in the light of personal experience, to successful R/C flying. For this reason I should point out that where commercial items are mentioned these are not put forward as the only available ones that would be suitable, but those we have actually tried and have satisfied our requirements. It is difficult to be critical or constructive about equipment that one has not used. Receivers that should be suitable, and give good service, to those about to start include the McGregor *Terrytone* (Kit) and *Minimac* and the Raven Single Channel Rx in both cases the matching transmitters should also be purchased.

### Actuators and Ancillaries

Recent development in the field of single channel motorised servos suggests that this form of actuator is going to become increasingly popular for the single channel operator. However, at the moment there is a limited number of this type of servo that will operate from a transistorised relayless receiver and utilise the same battery source without complicating the wiring installation. Rubber driven escapements, although crude in their concept, have the big advantage of the electrical side being simple with little to go wrong. In the event of a crash it is more likely that any damage will be caused to the mechanical side and this can either be put right by the owner or returned to the manufacturer for repair, at any rate the cause of the trouble is usually obvious. With a motorised servo the cause of any fault may be more difficult to trace. Again, to take things to its lowest level of simplicity, the sequential self neutralising escapement for operation of rudder only cannot be bettered. One line of argument put forward against the use of this type of escapement by a beginner is that the 'pilot' has to remember what command he is giving next but if he has chosen the right model this should not be critical even if he does give the wrong rudder. Most 'pilots' experience some difficulties in having to decide whether left or right rudder is needed when the model is coming towards them, i.e. the difficulty in orientating oneself with the 'plane, and in this respect the sequential escapement is better as you do not think necessarily in terms of left and right but in turns opposite or the same as the one before.

Of the *simple* escapements on the market at present it is

difficult to better two of the earliest available units namely the Elmic 'Conquest' and the Bonner S/N escapement, these units are well tried and tested and, are about as fool-proof as you can obtain.

### Batteries

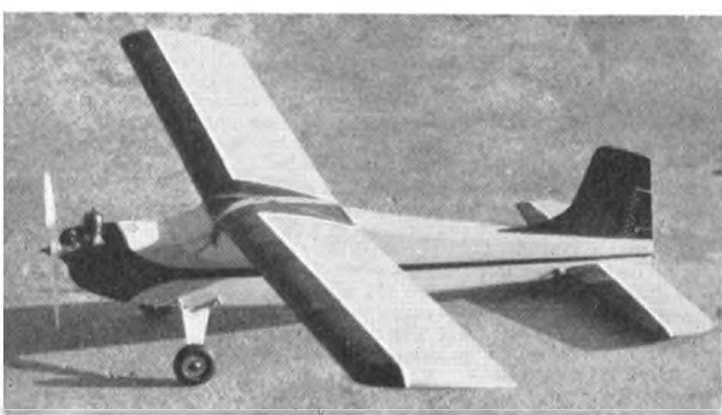
Assuming that the potential R/C flyer is eventually going to be bitten by the bug then the economics of purchasing batteries, the life expected from them and the reliability they will give becomes an important and long term policy. To my mind undoubtedly the best answer to supplying the electrical power for both receiver and escapement is by using DEAC rechargeable button cells which we shall have to explain in detail in a later article. Although initially more expensive and also entailing the purchase of a charger the over-all advantages of long life, 'fit and forget' and recharging facilities after each flying session far outweigh the original cost. Naturally when using DEAC cells it is essential to fit a charging socket to the installation and this should wherever possible, be fitted to the fuselage in a way that recharging can be undertaken without removing the wings. Miniature jack plug sockets are readily available from Radio or model shops.

The final piece of equipment we need is the on/off switch for the receiver/escapement and this, like the charging socket, should be mounted in an accessible position but away from the exhaust discharges of the engine. Many radio failures have been attributed to the malfunctioning of the switches and it is therefore wise to investigate the pros and cons of the different types. Briefly the miniature toggle switches usually have contacts that make with the two surfaces pressing against each other aided by the action of a spring. These contacts can become dirty and lose electrical efficiency. Slide switches normally rely on a 'knife' action with one contact sliding and clipping into the opposite contact. The same criticism of dirty contacts can be levelled at this switch as with the toggle switch but it is possible to obtain slide switches with two sets of contacts and if both of these are 'wired in' the chances of failure are greatly reduced. Such a type is "RC83 midget Slide switch" obtainable from RipMax Ltd.

That about ties up the 'plane and equipment side of it, but there's quite a lot more to it in the building and flying side. Don't expect too much from that first model, very few things that are worth doing come too easily and its probably the challenge involved that makes this hobby so pleasurable. One thing that can help you along those first steps a lot is by joining a club or getting help from some individual, you know the one's that actually do the flying, not those that come 'planeless every weekend but know all the answers. I hope the tips will help some of you to get airborne in the R/C flying sport with less birth pains and for those of you who are still undecided whether or not you want to have a go, let me quote from an article in 'Grid Leaks'—yes, an American magazine—dealing with Multi versus single channel Flying . . .

*"Or that pasture, alone in the evening, with swallows chasing the droning little ship in the still air —this is a job for a Mills Diesels and not Superman, —the rudder-only plane is absolute king. The multi is about as serene as the next door farmer's noisy tractor. There's poetry to Night. And machinery that shatters the peace, and the mood is the wrong weapon, in the wrong place, at the wrong time."*

Next month I hope to help both beginner and regular flyer by presenting a 'unitised' receiver/escapement pack for quick transference from one 'plane to another. Few modellers can afford a separate radio installation for each model but seldom are able to change from one model to another on the flying field—this unit solves the problem.



# CONTROL LINE DEVELOPMENTS

from  
Canada  
G.B., Germany,  
Italy, U.S.A. and Sweden

1966 is of course the big year for control line flying in Great Britain with the World Control Line Championships hosted by the S.M.A.E. and R.A.F.M.A.A. in this country during the August bank holiday period. The standard of flying by the top men and the fact that approximately twenty Nations should be sending their best modellers and models will make this an event one not to be missed by any C/L fan worthy of his lines.

Most of our latest news contributed centres around the F.A.I. Classes with team racing the most popular, and the team trials circumstances the most raved over, we have already stated our thoughts on this matter, so let's away to the news and constructive ideas.

## F.A.I. Team Racing

"Big" Dick Edmonds (High Wycombe) is coming back in full force with a new model incorporating a silencer and sporting a pod and boom fuselage side profile! Of course he is using a Reguflo tank and a modified Eta Elite. The plan is home made and Dick relates that after playing with his three sizes of screw in venturii the smallest gives far too many laps at reduced speed, so new ones will have to be designed to compensate for the silencer's tricks. A straight-through cylinder cooling system is used with a rearward facing single outlet exhaust manifold that is fixed into the engine cowl. This is linked to an internal silencer so the lower cowl has to be made removable. By moving it forward, the manifold can be pushed into the front of the silencer and secured by a locating screw. Unfortunately there will probably be a drag penalty with the fuselage shape but there may be a slight thrust from the outlet.

Tony French with sleek red and black 'Hank DIX' Eta Elite powered F.A.I. racer. Has internal extractor silencer from Eta manifold.



## International round up of Latest News

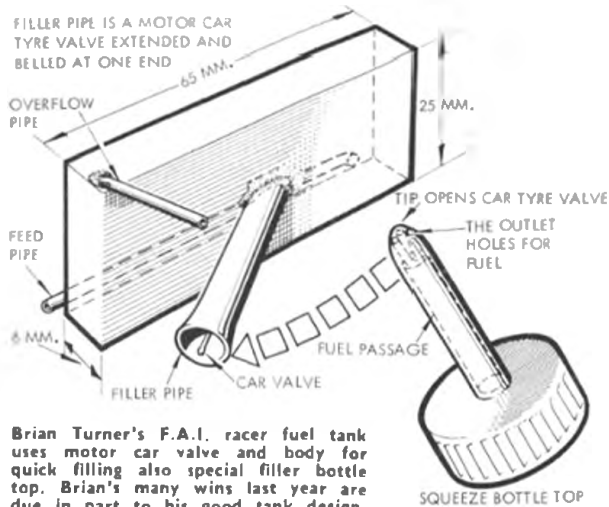


Heading at top left, Hans Svedling (Sweden) holds fast Super Tigre G21/29 class 'B' racer 'Vostok' recorded 5:59 final. Above two views of the Tony French 'Hank DIX' sharp end. Note the balsa fairing bulges that cover outlet extension pipes fitted to Eta manifold. Above right, Eicker/Lenzen 'B' racer nose detail shows thumb contact from battery strapped to pit man's back.

Tony French (Walford Wayfarers) has constructed an internal silenced model that is the most ambitious we have yet seen. His 'Hank DIX' is Eta Elite powered, (mounted on two steel plates screwed to the bearers) with a removable top front cowl incorporating the cockpit canopy. By studying the photographs you will note the two "power" bulges on the nose which contain exhaust pipes. Basically a straight-through air cooling duct is used with a slight venturi section. An Eta manifold with an exhaust pipe on each side directs the exhaust gases backwards down two channels positioned in the fuselage sides, between the outside face and the inside air cooling duct.

The exhaust is extracted from these two small channels by the central engine cooling air duct venturi section with small holes in its wall where the duct and channels merge, this of course being the point of maximum suction effect. The manifold assembly is a loose fit inside the cowl so the engine can be bolted in place and then the manifold bolted to the engine from underneath. A very hard model to construct Tony has expounded a lot of thought and time on it, let's hope it pays off this season.

Brian Turner (Cambridge) constructed his team trials model without a silencer working on the assumption that the silencer rule was to be lifted, as can now be seen, an assumption of this nature can have its hazards! Nearly the same as last years' models Brian relates his most successful fuel formula is 28% Oil, 28% Ether, 40% Paraffin, and 4% Amyl Nitrate. A stock of Tornado Plasticote 7 x 8 propellers still exist in Brian's workshop so these will be used this season. His tank is most



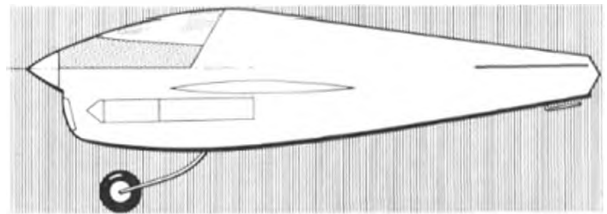
Brian Turner's F.A.I. racer fuel tank uses motor car valve and body for quick filling also special filler bottle top. Brian's many wins last year are due in part to his good tank design.

interesting in that a motor car tyre valve, and body is used as a filler and valve pipe, together with a multiple nozzle fuel filling bottle top, having a solid centre point to depress the tyre valve for filling. Its main virtue is quick filling that allows for filling the tank with the right hand whilst the model is being arrested with the left hand for a pit stop. The belled end on the filling valve makes sure there is no missing it at a hectic pit stop.

Ken Goddard and Eric Gillhespy (St. Albans) have constructed a Russian type automatic team racer filling system as November 65 Aeromodeller and hope to reduce their pit stop time. Main problem encountered was machining and making the valves. Also some trouble was experienced in trying to get a suitable syringe for the reservoir. No news yet of practical tests but knowing this team, they should be in the results more this season if they get a good engine.



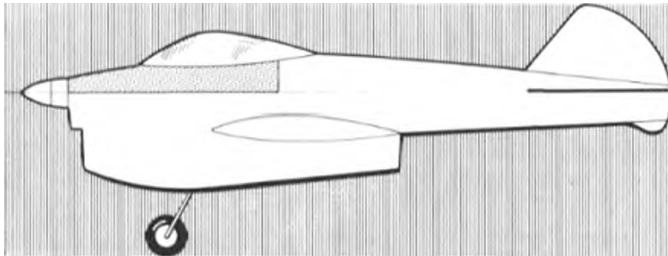
1966 Canadian World Championships team race team left to right W. Patton (pit man), J. Eastman (pilot), D. Kelly (pilot), K. Parent (pit man). Cuffed root propeller just visible on Patton/Eastman racer.



Sidney Peart's F.A.I. team racer profile 1966.

Sidney Peart (Novocastria) has now faired in the cockpit of his latest model and the silencer will be his 1965 type external twin expansion chamber. They still use the French "Challenger" propellers and find with a good deal of modification they are nearly as good as an equivalent Tornado, and are going to try the glass fibre propellers this season to compare performances. A Tigress type tank is still used but with the addition of a ball valve filling arrangement. Breaking away from the traditional British triangular bellcrank they are now employing pulley control with flexible leadouts and central through cooling duct. Their trusty Oliver Tiger that recorded under five minutes at the last Northern Gala is coming on well and shows great promise for the coming season, also a new manifold with less restriction will be fitted.

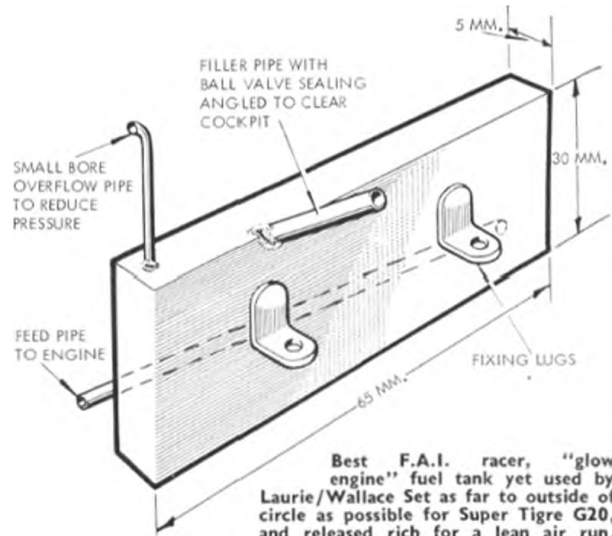
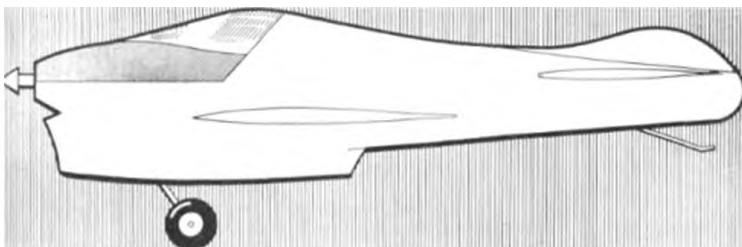
Alan Laurie, one half of the Laurie/Wallace (Novocastria) team noted for their last Eta 29 powered class B T/R relate they are still experimenting with a Super Tigre G.20 glow engine model but this will not be entered in the trials unless the fuel



Dick Edmonds' F.A.I. team racer profile 1966.

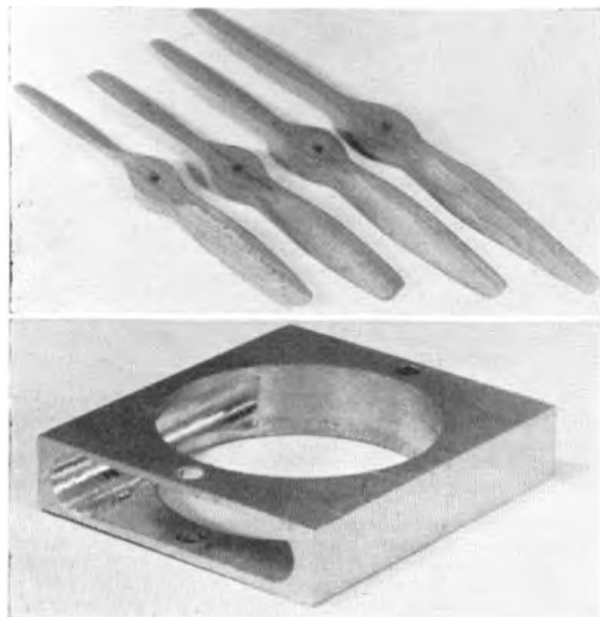
From Canada W. G. Patton sends details of his latest team racer the "Alteration V" Eta 15, powered with what looks like an Edmonds carb on the plan, it has the inboard wing panel nearly 20 sq. inches larger than the outboard. How this fits with the semi-scale rule is rather hard to see and it would depend on the contest directors' interpretation of the rules. A dural undercarriage was used but its rigid nature lead to premature airframe failures in heavy landings, so a 10 s.w.g. mono leg has now replaced this. Best time to date is 9:02 for 200 laps at the team trials where they qualified to visit G.B. for the World Champs. Swept forward wing leading edge, and a bolt-on undercarriage clamped by two 1/8 in. Dural plates, are used.

W. G. Patton F.A.I. team racer profile 1966.



Best F.A.I. racer, "glow engine" fuel tank yet used by Laurie/Wallace Set as far to outside of circle as possible for Super Tigre G20, and released rich for a lean air run.

system can be sorted out. A different tank is needed with the glow engine set-up as opposed to a diesel. Speed without a silencer is touching 105 m.p.h. but drops to 95 m.p.h. when a silencer is fitted. At present an Enya small size silencer is fitted and no success has been found with different length exhaust pipes. Up to 65 laps/tank have been extracted but on average approximately 45 laps result. This is achieved using a 7 x 8 Tornado and the following fuel formula. 15% Castor Oil, 10-30% Nitromethane and the balance Cumane (Iso Propyl Benzene). They are also tuning a few Oliver Tigers to get 50 laps in reserve as they feel the Oliver is more reliable than the Eta.

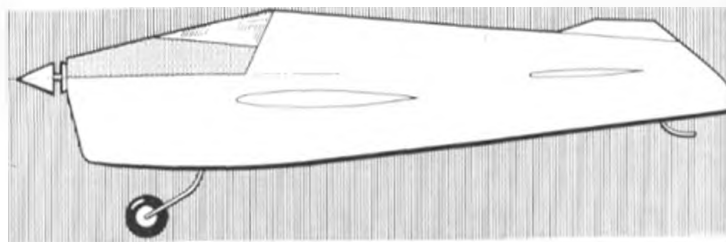


Four sizes of the new Stant propellers as above available at 2/11d. each, only need slight thinning and balancing. Below: Dick Edmonds' rear facing single outlet exhaust manifold machined from solid attaches with two bolts to Eta crankcase.

## Speed

Things don't seem too bright for speed flying in Great Britain but one likely source of an improvement is the chance of some more practice with two private speed rallies this season, notably the East Midland and Hall/Rofley meetings. John Hall has the ex Ron Lucas Carter 5 c.c. built from scratch by Fred Carter including the crankcase for class B team racing. One notable difference from most other 5 c.c. glows is the very small exhaust port windows and extra solid construction. Ivor Rofley who seems to be graced with a little more success these days after many years of troubles in and out of the pylon has purchased the Ray Gibbs—Carter Dooling 10c.c., Carter overhauled, and now being equipped with a tuned length exhaust pipe. Both are at the moment unflown but if ground r.p.m. are used as a guide they should really go.

Just right for a canard—Richard Hall's gold plated exhaust pipe/needle valve/tank—model at the U.S.A. trials, has national insignia inverted on wing! Did 132 m.p.h. with hybrid Super Tigre G15.



Alan Laurie's F.A.I. team racer profile 1966.

From the U.S.A. Richard W. Hall sends details of his F.A.I. model that has such exotic additions as gold plating on the fuel tank, needle valve and exhaust stack. By blowing up his best three engines in practice his best official flight at the U.S.A. team trials was 132 m.p.h. made with an engine assembled from parts of the other three. The piston head is hard chrome plated and a special head is used. A metal pressure tank is filled by an external filling valve (seen on top of the wing behind the cowl). The valve allows fuel to go in, also vent air and excess fuel out. It has a Teflon seat for sealing and fuel resistance. A megaphone exhaust system which appears to improve the performance seems to make the engine very quiet if you stand beside it but it almost deafens one if you happen to get behind it. He thinks it an helpful idea for British speed fliers as long as they fly towards the noise! Total weight is 13 ounces, painted in Cub (Piper) orange dope.



Frank Warburton Snr's, latest stunter a semi scale Spitfire 24, spans 55 ins. has dihedral and Merco 35.

Gerhard Ziegler of West Germany sends detail of his two latest mono line handles, one on the push-pull principle with the control drive at right angles to the control line. Moving parts are supported on four ball races and one plain bearing. The other is of the type principally known as Uniline which was really developed in Great Britain after the original U.S.A. inspiration. The overall ratios are 100:1 on the gear box to give 50 line turns with 180 degree movement. Six ball races are used in its construction and this is definitely the easiest type of handle to learn mono line on if accustomed to two line control.

Full details of construction, operation and where to get the parts as well as cost were given for the G.B. Uniline in 'Model Aircraft' May 1964. A full size working drawing makes this a relatively simple project providing you have access to some engineering workshop equipment.

## Class B Team Racing

Latest news from Sweden indicates they only seem to have one team in the class B team race field where they fly 160 lap finals (9.94 miles). This is Hans Svedling and Anders Eklund, who have won the last eleven contests, run for this class of model in Sweden. They used to use a Dooling and O.S. Max 29 and collected several top places, then they changed to Super Tigre and so did their results! Times around the 7:16 mark were first recorded and they then whittled this down to a fantastic 5:59 still using the Super Tigre G21/29. The model 'Vostok' is reported to be rather rough, but who cares if it turns in these sort of times! A metal engine pan, flat tailplane and no fin are used. Compare this time with our own British record of 6:08 for 140 laps (10 miles).

5 c.c. team racing is still comparatively new to German fliers and as such times are in the 7:30 region from the winners at a Gellenkirchen meeting, where incidentally a very good control line flying site has been constructed and many British R.A.F. modellers have seen this as there is also an aerodrome there. 1, Eiker/Lenzen 7:34 (Eta 29) and, Bishofs/Wamper 7:34 (Super Tigre). 3, Miebach/Breitwisch 7:55 (Enya 29). are the top three and reflect the differing choice of engines until one make proves its eventual superiority, as the Eta 29 did in this country.

### Stunt

From the Warburton residence we hear that Frank Senior is busy making the dust fly with scale and stunt models, so naturally the latest stunter also has a strong scale influence, namely that of the "Spitfire 24". Depicting one based at Sth. Marston, it incorporates differential wing flaps slight dihedral spanning 55 ins., a Merco .35 pulls its 50 ounces weight around. Construction is similar to Frank Lee Warburton's "Tony" and Frank still thinks the smaller airframe with a .35 is much superior to the larger .49 jobs. Frank Lee although actively engaged in the motor racing game will be seen around the flying circles this year. Contrasting with the smaller engine view Mick Reeves (Wanstead Warhawks) is flying a Merco 61 in a Mercury "Crusader", *phew*. Using a large diameter fine pitch propeller Mick assures us a small model with plenty of power improves his standard, as the speed is not much higher than that of a .35 powered Crusader. For this season a new "Mow Gull" is being constructed around the Merco .61.

### Combat

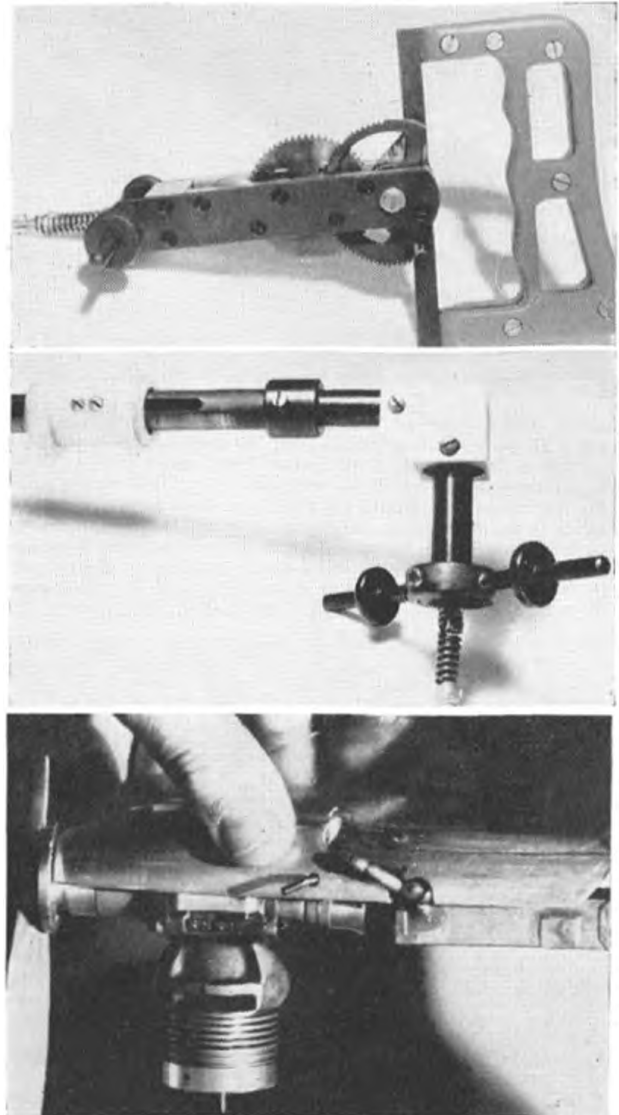
Recently we were invited along to a testing session with Kevin Lindsey, Mike Larcombe, Dave Balch and Richard (Early Bird) Wilkens to see tuned length exhaust pipes in action. Richard flew his Super Tigre G.20 powered lightweight combat job for us and the results were astonishing! Running on a Frog 7 x 6 Nylon propeller, yes that's right a 7 x 6! A mechanical starter was used and several flights were made with Kevins wire wool packed silencer, then one of Kevins speed model exhaust pipes tuned to 23,000 r.p.m. was fitted and, *wowee*, it was doing 104 m.p.h. checked over two flights, so if you can REALLY fly a fast combat job without it running away from you, a glow racing 15 and exhaust pipe should help you to win. The only apparent disadvantages present are that the motor has to be run on a small propeller to get the B.H.P. and this dictates a lightweight model, which in turn means a less crash proof structure, also the silencer is vulnerable in a crash and Richard says the weight is a problem.

### Propellers

Starting with G.B. first, Stant propellers are back in production and should soon be available from your model shops at 2/11d. each. Nicely carved but with rather thick blades they are good value for money and should be capable of accepting a re-working. For speed, the sizes available are 7-8-9 in. diameter x 9-10-11 in. pitch. Team Race 7 x 9 only. Pusher 7 x 4.

From Germany, Karl Ilg Manager of "Intermodels" well known for his *Glassflugel* or "Bartels" propellers comes a new type for team racing. These are basically a better shaped and finished version of his original air tested in our October 1965

Danny Jones and Bernie Tautz F.A.I. racer from the U.S.A. will be seen in action at the World Championships, note narrow rear fuselage and large tail area.



Top, Gerhard Ziegler mono line handles show external gear wheels on top Uniline type and right angle joint on bobbin type push-pull handle. Bottom, the K & B "Wart" experimental diesel team race motor, performance is said to be disappointing.

issue. These are now sold in Great Britain by Henry J. Nicholls of Holloway Road, at 15/11d. They had a 100 m.p.h. performance for 35 laps on our last season model that is in no way exceptional so most modellers should be able to achieve this. Quite a bit of moulding flash has to be removed and this is where one may come unstuck. So note the following points. 1, File the tip "blobs" down to blade section with a *fine* metal work file. 2, Trim the flash off the hub and blade edges with a sharp knife, cutting *only* downwards ACROSS the grain of the fibre that runs from tip to tip, if you do cut upwards across the grain, the chances are the knife blade will slip and cut into the blade section. 3, Rub all the edges down with fine, sharp wet and dry paper, used dry. 4, Saw the excess lengths of the tip with a razor saw, do not attempt to cut them with a knife or the blades will split lengthwise. 5, Rub the entire propeller down and balance. 6, Seal all the rubbed down areas with glass fibre resin to stop the fuel being drawn up glass strands by capillary action. 7, Finally check for balance and your finished. Last season we flew with one propeller the whole season (you have to at 15/11d.) and made one first, one second and three thirds in National Contests. So summing up these seem good value for money and well worth a try. Karl Ilg also produces glass fibre propellers for Speed, Free Flight, and Radio Control.



No sooner had we printed David Boddington's notes of surprise on p.206 last month than the postman brought us a sample of the new *Keil Kraft Gyron*. Photo above shows the all-sheet airframe on which we shall carry a full test report soon. For the moment, suffice to say that if you want something that is quick to build (the plan for the wing is printed on the die cut panels!) this is it for 0.8 cc and single channel control. Wing and tail are angled so that a nose-down attitude in flight gives incorporated downthrust, and the only fault we can find, apart from having to ease some of the die-cutting, is that the sheet

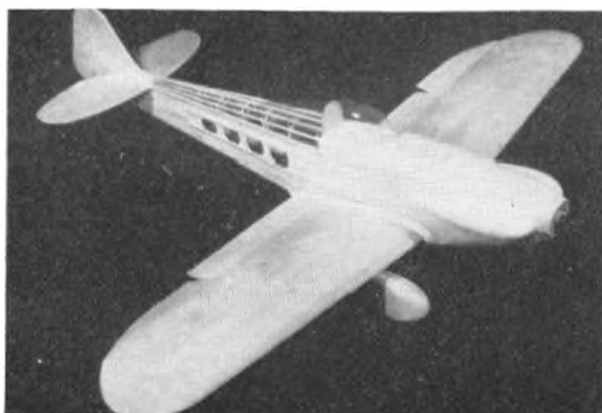


Badger Air Brush—complete with Aerosol.

tail is not amenable to central heating! Stiffeners can be added above and below. Span is 36 ins and the kit costs £3. 9s. 8d.

Max Coote demonstrated the neatest little spray unit yet during a recent visit. Operated from an aerosol, the finger controlled air brush will carry all the dopes, paints or other finishes when suitably thinned. Great advantage is the neat compactness, dispensing with a compressor and ideal for aeromodelling from plastics to quite large stuff. Price of the "Badger" spray is £2. 10s. 0d. and extra aerosol are 5/6d. Also through Ripmax is the *Sterling Fokker D VII* which has been test

Denight racer weighs 3 lb. 2 oz. including O.S. H 40.



## TRADE NOTES

### NEW KITS ON TEST FOR REVIEW

flown in colours of Ernst Udet as at top right. This simple Kit needs cocktail sticks to replace the struts and aviates well in calm on the small Cox engines. Cost is 24/6d.

Radio Control pylon racing will soon be with us. Tony Dowdeswell has MonoKote covered the *Sterling Denight* special (supplied via *Roland Scott*) and this 50 in racer is looking like a coloured mirror in red and black waiting its first race. Our other contender is the Sig "Buster" with 48 in span but greater bulk. Mick Charles has finished this in authentic Red with yellow lettering and it looks almost too good to fly! Both are fitted with

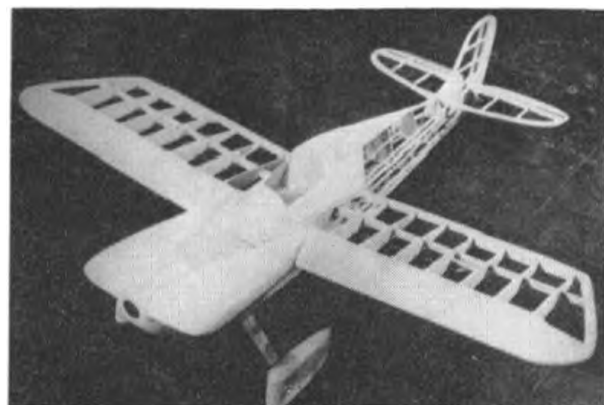


B-29 from Airfix made by Tony Silver.

powerful O.S. H 40 R/C.

A real whopper, that just about sums up Airfix's 1/72nd scale *Boeing B-29 Superfortress*. Spanning nearly 24 in, the large box crammed with over 200 parts presents an awesome sight to the novice, but a feast to the ardent fan. Very well detailed, with movable control surfaces, retracting undercarriage and gun turrets, it's a shame the undercarriage doors are fixed and not hinged for greater realism. Bomb bay doors open to reveal the crew communication tunnel and bomb racks complete with bombs. Altogether quite remarkable value for 7/6d.

Buster was 3½ lbs. covered and doped but without engine.





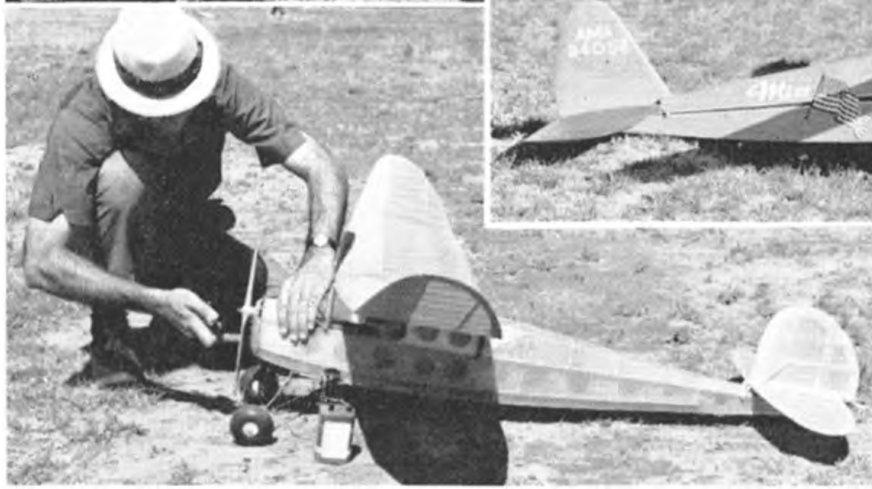
Revival of early power model designs at a contest held in Denver U.S.A.

# old timers

Photographed by 'Doc' Nichol



Top: Tim Dannels with beautiful Wasp twin powered "Power House". Tim edits "Engine Collectors Journal" and was contest director, placed 3rd with a "Valkyrie" in pylon class. Left is Ralph Schellenbaum with gull winged Garami "Skylark" having Bantam engine with petrol ignition. Below is one of the "Miss America" models by Jerry Slack with O & R 60.



Left is Wendell Browning, a Denver School Principal, starting the petrol/ignition O & R 60 engine in his 1938 Carl Goldberg "Clipper". Below: the 114" Custom Cavalier entered by Keith Shields and powered by an Anderson Spitfire.

The outstanding event of the day, was the Antique Class. These are aircraft designed prior to 1940, with a seven foot minimum wing span. The "old birds" had to rise off ground and were timed for the longest single flight with an unlimited engine run. Most popular design was the "Miss America", of which there were four examples. There were two Super Buccaneers, two Power-houses, a Valkyrie, and a nine foot-six inch Custom Cavalier. The Antique event seemed to be the most pleasing to the flyers, and spectators alike. Much applause was heard when one of the "old birds" took off!

There were entries from all over the States including: Colorado, Wyoming, New Mexico, and Mr. John Pond (Mr. Old Timer himself!), of San Francisco, Calif., who flew in for the event with his 1938 Super Cyclone powered Scram.



# BASIC Aeromodelling

## PART FIVE

### ..... adhesives

ONE of the great attractions of Balsa is that it is more readily 'glueable' than any other wood. Using balsa cement, joints can be glued up and set in a matter of minutes; the fit of the joint does not have to be all that accurate for balsa cement is 'gap filling'; and the joint is usually stronger than the wood itself. Also, of course, balsa is soft enough to take pins through it, without splitting, to hold parts together until glued joints have set; and, unlike many modern adhesives, balsa cement is 'sticky' enough when initially applied to hold many parts in place when simply pressed together.

Balsa cement is one of those types of adhesives made, basically, by dissolving a plastic material in a suitable volatile solvent. These are known generally as 'cements' rather than 'glues', although balsa cement is unique in its properties. The majority of 'cements' will act as glues only for that particular plastic from which they are made. Thus polystyrene cement, formed by dissolving polystyrene or styrene in carbon tetrachloride, is effective only for gluing together polystyrene plastic. Because virtually all plastic model kits employ polystyrene mouldings, the polystyrene cement which goes with the material is popularly called 'plastic cement'. No other adhesive will do this job as well. For sticking 'Perspex', on the other hand, you would need 'Perspex' cement ('Perspex' dissolved in chloroform). For sticking cellulose plastic (acetate mouldings, or acetate sheet or celluloid) you would need a cellulose cement (celluloses dissolved in acetone).

Virtually all cements are rapid drying since they are made with a highly volatile solvent. Drying time can, in fact, be adjusted by choice of solvent. A true cement works on the principle of softening and eating into the material they are intended to join. The volatile solvent then evaporates off, leaving in effect a true 'cemented' joint—or virtually a 'cold-welded' joint. In many cases you can get the same result using just the *solvent*. This is painted onto the two surfaces of the plastic to be jointed until they are sufficiently softened. The joint faces are then pressed together and held together until the solvent has evaporated off. Pressing together 'fuses' or welds the softened plastic surfaces to one another; and the plastic hardens again once the solvent has evaporated off.

Most cements will impregnate or soften only the one particular plastic from which they are compounded. They will, therefore, not act as glues for other materials. Equally, normal glues (or other cements) will not stick those particular plastics. If you work with different plastic materials you must have the right adhesives for those materials—see *Table XV*.

It so happens, however, that cellulose cement, as well as producing a true cemented joint with cellulose plastic, also has the property of impregnating and sticking

strongly to most porous materials and drying with a high film strength. It therefore makes a good adhesive for jointing all sorts of porous materials, including woods, whilst retaining all the quick drying properties of a cement. It does have certain limitations as a general purpose adhesive, however.

Rapid drying characteristics with a reinforced cellulose cement are often accompanied by marked shrinkage on drying. This is seldom a particular problem where the wood sizes involved are generous, but can make such cements unsuitable for gluing up fragile structures. Thus a 'strong' balsa cement may warp 1/32 in. wing ribs in assembling a wing frame, pull very light frameworks out of line, or set up locked-in stresses in a complete assembly so that it springs out of true when removed from the building board. The strong contraction of such cements can often be noticed on heavier components where the joints itself is badly fitted—e.g. an oversize rib slot allowing the cement to pull the rib out of true on setting and contracting—*Fig. 21*.

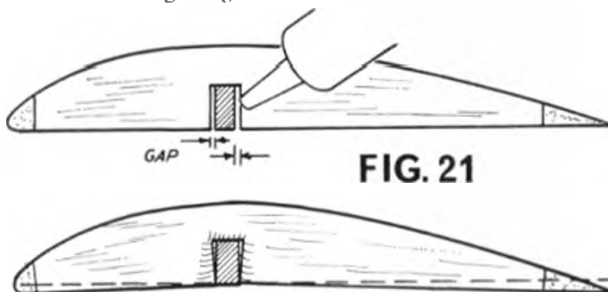


FIG. 21

The strength of a cement joint in woods can nearly always be improved by 'double cementing'. This means coating each joint face thinly with cement and allowing to dry (but not completely set). The joint surfaces are then recoated with cement and the joint closed—*Fig. 22*. Basically this ensures better initial penetration of the cement and good initial adhesion to the surfaces. The second application of cement then produces a more or less true 'cemented' joint between the two surfaces.

Double-cementing used to be employed fairly regularly for critical joints but is less used—and less necessary—with 'strong' cement, although still desirable on end grain faces. A perfectly satisfactory joint is normally produced with one application of 'strong' cement, provided the joint is not closed with excess pressure so that virtually all the cement is squeezed out of the joint line. This can happen when assembling fuselage side frames or other tight-fitting assemblies. A satisfactory safeguard against 'dry' joints is usually to apply cement to *both* joint surfaces before closing the joint, and follow the method of fitting up the spacers as shown in *Fig. 23*.

Balsa cement has few limitations as the first choice adhesive for all balsa frameworks. Its main disadvantages are that excess cement will set in hard knobs which may be difficult to remove, and it can also smear wood. Balsa cement is also often too quick-drying to make the fitting up of a large area of sheet covering easy—the job often has to be rushed more than is desirable. It also sticks tenaciously to fingers and clothing! You can always avoid the former if you do not like peeling and biting off

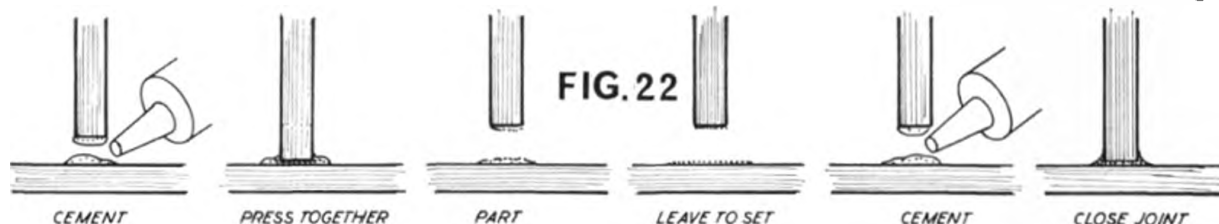


FIG. 22

TABLE  
XIV

	BALSA CEMENTS				PVA	UF RESINS	CASEIN	IMPACT ADHESIVES	EPOXY RESIN	RUBBER CEMENTS
	1/2 FAST DRYING	STRAIGHT	STRONG FAST DRYING	STRONG SLOW DRYING						
BALSA	●	●	●	●	●	○	○			
OBECHE		○	●	●	●	○	○			
HARDWOODS			●	●	●	○				
PLY			●	●	●	○				
EXPANDED POLYSTYRENE					●					○
ALUMINIUM									●	○

● MOST SUITABLE ○ SUITABLE

CHOICE OF ADHESIVES FOR OBECHE, SPRUCE, BIRCH AND PLYWOOD

the cement skin by using a barrier cream; and thinners can be used as a cleaning fluid in the latter case, although not always satisfactorily.

About the only functional limitations of balsa cement for modelling construction are that it is not waterproof, and the harder and smoother the surface of the wood the less satisfactory adhesion is likely to be. Lack of resistance to water is not a problem with aeromodelling structures; and the adhesion achieved on ply and hardwoods (e.g. bearers) with 'strong' balsa cement is usually satisfactory. Balsa cement is quite useless, however, for gluing on ply skin panels on a model boat. The joints would fail after a period of immersion. Cellulose acetate cement is somewhat more water resistant than cellulose nitrate cements. Balsa cements are normally compounded on a cellulose nitrate base.

The one modern adhesive which has rivalled balsa cement as a general purpose glue for aeromodelling structures is PVA (polyvinylacetate). This is a white, non-tacky substance usually with the consistency of a thin paste. It dries much more slowly than balsa cement but produces an absolutely clean joint with a strength at least comparable to, and generally better than, balsa cement. It also has no contraction on drying so that it cannot produce warps in structures. It is a much more satisfactory adhesive than balsa cement for gluing up large areas of sheeting, although the assembly needs to be left pinned down overnight to ensure complete setting. It is equally suitable for hardwoods and ply as well as balsa and many experienced aeromodellers now use it exclusively for all structural joints instead of balsa cement, particularly for larger sizes of models. Balsa cement is still much handier for use on small models, or for rapid assembly work.

PVA is also one of the most suitable adhesives for gluing expanded polystyrene mouldings. Balsa cement has little or no adhesion to this material; polystyrene (plastic)

cement has a strong dissolving action. It can be used both for gluing up expanded polystyrene panels or assemblies or gluing on ply or other wood parts.

### Covering

For attaching covering material to conventional airframes a variety of adhesives may be used. For applying tissue covering many modellers prefer to use a tissue cement (which is really a thinned down 'straight' balsa cement). Others prefer tissue paste, photographic paste or office white paste (e.g. Bondfix or Griplix). These are really all the same thing—dextrin adhesive. Paste is less critical in use than cement since it dries more slowly and also does not run. It can also be thinned down with a little water, if necessary, to make it flow easily. It is most readily applied with a small *stiff* brush rather than the spatula now normally supplied with tins of office paste.

Dope is sometimes used for attaching tissue covering, although the technique is somewhat different. With experience and skill this is capable of producing the neatest covering. Dope or tissue cement *must* be used for attaching covering to undercambered surfaces. Paste will not hold in such cases, allowing the covering to pull free when tautened by water spraying.

TABLE XV  
GLUING PLASTIC.

PLASTIC	ADHESIVE	REMARKS
Polystyrene	Polystyrene Cement	Also solvent welding with carbon tetrachloride
Expanded Polystyrene	(i) PVA (ii) Rubber Latex	As supplied for fixing ceiling tiles.
Acetate	Balsa Cement	e.g. Acetate sheet and mouldings.
Celluloid	Balsa Cement	—
CAB (Cellulose Acetate Butyrate)	Balsa Cement	Cockpit canopies
PVC	PVC adhesive or impact adhesives	Difficult to glue—joint satisfactorily.
Polythene	—	Virtually "unglueable"—best heat welded to join.
Nylon Mouldings	Special nylon adhesives	Difficult to glue satisfactorily.
Nylon Cloth	Tissue cement or Dextrin paste	—
Polyacrial	—	Difficult to glue at all.
Thermoset plastic (Hard rigid mouldings)	(i) impact adhesives (ii) epoxy resin	Not always satisfactory. High, permanent joint strength.
Glass Fibre Mouldings	Polyester resin	Preferably with tape

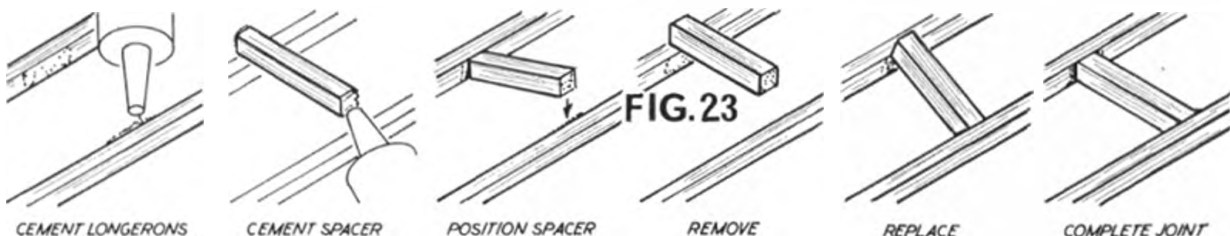


TABLE XVI

		BALSA CEMENTS				PVA	UF RESINS	CASEIN	IMPACT ADHESIVES
		V. FAST DRYING	STRAIGHT	STRONG FAST DRYING	STRONG SLOW DRYING				
FIELD REPAIRS	TISSUE	●	○						
	BALSA	●	○	○					
FUSELAGE FRAMES	1/16 SQ.	●	○	●	○				
	1/8-3/16	○	●	●	●				
	1/4 SQ.	○	●	●	●				
WING FRAMES	V. LIGHT	●		○	○				
	LIGHT	●	○	●	●				
	STRONG	○	●	●	●				
WING SHEETING	UP TO 1/20	●		○	●				
	1/16 UP	○	●	●	●				
FUSELAGE SHEETING	1/16	○	●	●	●				○
	3/32 & UP	○	●	●	●				○
JOINING BLOCKS	UP TO 1/2	○	○	●	●	●	○		
	OVER 1/2	○	●	●	●	●	○		
LAMINATING SHEET	1/32	○		●	●			○	
	1/16	○	○	●	●	●	○	○	
	1/8 & UP	○	●	●	●	○	○	○	
LAMINATING STRIP	UP TO 1/20	○	○	●	●	●	●		
	1/16 & UP	○	●	●	●	●	○		
HARDWOOD TO BALSA				●	●	●	○		

● MOST SUITABLE ○ SUITABLE  
CHOICE OF ADHESIVES FOR BALSA CONSTRUCTION

The same range of adhesives—tissue cement, paste or dope—can also be used for applying nylon or silk covering. Choice is largely a matter of individual preference.

For attaching metallised covering—e.g. thin metallic foil or metallised paper—a thin rubber solution is usually best. Such covering is normally applied over a sheet or 'solid' surface and needs to be stuck down all over. Contact adhesives are a possibility, but can produce lumps. Again PVA is an alternative in the case of paper-backed metallised coverings.

### Contact glues

Contact adhesives have a wide 'general' application, but are of limited use for aeromodelling. These are normally rubber-base adhesives capable of producing a strong but slightly flexible joint. Some modellers use contact adhesives for attaching sheet covering. This is generally satisfactory provided the sheeting is subsequently bound in place, e.g. with a tissue covering. Under stress, contact adhesive joints can fail at edges



Just the job for vibration proof nuts and bolts Loctite sealant comes in a squeeze tube for easy application.

TABLE XVII

		BALSA CEMENTS				PVA	UF RESINS	CASEIN	IMPACT ADHESIVES
		V. FAST DRYING	STRAIGHT	STRONG FAST DRYING	STRONG SLOW DRYING				
BEARERS	TO BALSA			●	●	●	○		
	TO PLY			●	○	●	○	○	
PLY FORMERS	TO BALSA		○	●	●	●	○		
	TO H'WOOD			●	●	●	○	○	
OBECHÉ BLOCK	TO BALSA		○	●	●	●	○	○	
	TO OBECHÉ			●	●	●	○	○	
OBECHÉ SHEET	TO BALSA		○	●	●	●	○	○	
	TO OBECHÉ			●	●	●	○	○	
HARDWOOD SPARS			○	●	●	●			
PLY SHEETING	TO BALSA			●	●	●	○		○
	TO H'WOOD			●	●	●	○	○	
HARDWOOD LAMINATIONS				●	●	●	○	○	
TO EXPANDED POLYSTYRENE						●			

● MOST SUITABLE ○ SUITABLE  
GENERAL APPLICATIONS OF ADHESIVES TO DIFFERENT AEROMODELLING MATERIALS.

TABLE XVIII  
GLUING MISCELLANEOUS MATERIALS

MATERIAL	TO BE GLUED TO	RECOMMENDED ADHESIVE(S)
Paper	Wood or Paper	(i) Balsa Cement (permanent) (ii) "Cow" Gum (strippable) (iii) Rubber Solutions (permanent)
Paper	Doped surfaces	Clear dope
Tissue	Wood	Tissue cements or Dextrin plastic
Tissue	Tissue	Dextrin pastes or "Cow" Gum.
Metal	Wood	Epoxy Resin.
Metal	Metal	Epoxy Resin.
Non-porous surfaces*	Non-porous surfaces*	(i) impact adhesive (ii) contact adhesive (iii) Epoxy resin.
Flexible porous surfaces	Non-porous surfaces	(i) Contact adhesives. (ii) Rubber cements
Rubber & sponge rubber	Any surfaces*	(i) Impact adhesives (ii) Rubber cements
Metal or Wood	Glass fibre	Polyester resin.

\* Must be clean, dry and non-greasy.

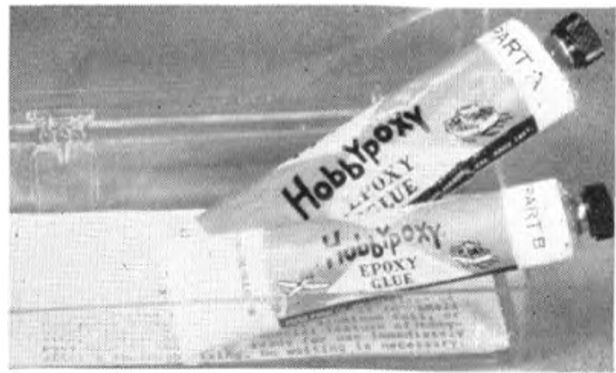
The only real advantage offered by the contact adhesives over PVA is that a joint can be completed immediately—although it will still need several hours of setting time before reaching maximum bond strength—and they can be used to bond non-porous materials.

## Epoxies

Cold-curing two-part epoxy resin adhesives have unique properties in that they can produce extremely strong and completely durable bonds between almost any non-porous surfaces which are clean and grease free. The two parts consist of an epoxy resin and catalyst which, when mixed, cure or set to a hard, permanent solid. As well as adhering to almost any surface the resulting solid glue line has exceptional strength. Thus if two pieces of aluminium are glued together with this type of adhesive the resulting bond is stronger than the metal itself.

Properly used, in fact, these adhesives can produce metal to metal joints stronger than soldering (as well as joining metals which cannot be soldered), fasten metal fittings to wood, etc., with the strength of a bolted assembly; and generally 'weld' together materials which would normally be considered 'unglueable' such as thermoset plastics. They are not generally a suitable adhesive for *thermoplastic* materials, however.

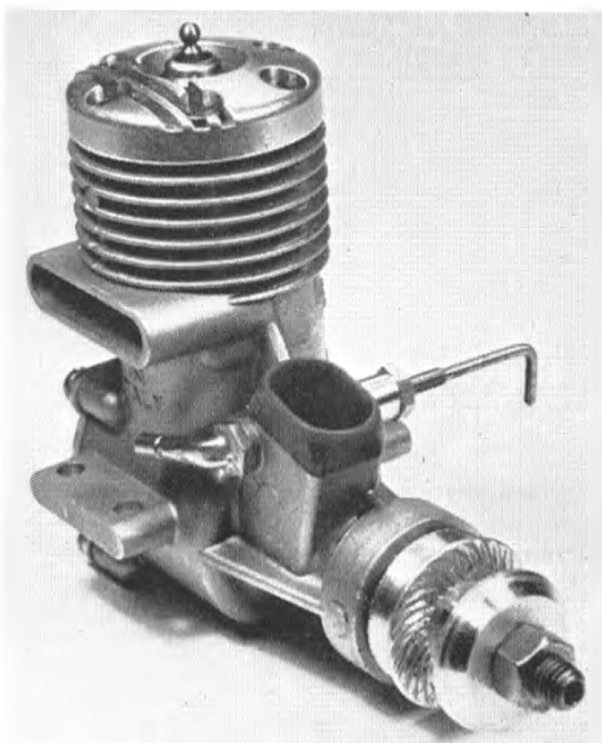
Ordinary water soluble glues and gums, spirit gums, office glues, etc., find no place in aeromodelling. If you need to stick paper to paper, such as an address label on a model, it is better to use balsa cement than to rely on the adhesion of a gummed label or an ordinary glue, although self-adhesive labels are usually 'permanent'. For pasting down a pattern onto wood, cement again is better than a water-soluble gum which can cause expansion of the paper; or use 'Cow' rubber gum if you want to be able to peel the pattern off again. 'Cow' gum has a variety of uses in this respect, and surplus adhesive is readily removed by rubbing. NEXT MONTH: Rubber Motors



Hobbyoxy Epoxy Glue imported from the U.S.A. by Ripmax is two part and faster drying than most other epoxy glues, costs 10/6d. for 34 c.c.

TABLE XIX  
MISCELLANEOUS APPLICATIONS OF ADHESIVES

ALTERNATIVE TO	ADHESIVE	REMARKS
Soldering or Brazing	Epoxy resin	Ideal for aluminium and light alloys. Less satisfactory for small section steel (e.g. wires)
Welding or spot welding	Epoxy resin	Ideal for aluminium and light alloys.
	Plastic metal (i.e. epoxy resin plus metal powder)	Considerable scope for repairs to damaged castings etc.
Lock nuts	Thread locking cement	Threads must be clean and grease free.
	Epoxy resin	Epoxy resin gives permanent assembly.
'J' bolts and metal straps	Epoxy resin	Method of fastening wire under-carriage to ply bulk-head
Bolting or riveting	Epoxy resin	For permanent joints in all metals or metal to non-metal combinations
	Self-vulcanising rubber cements	Metal to non-metal assemblies with shock-resistant bond.
Pinning or nailing (large areas)	'Cow' gum	For temporary 'strippable' joint
	Impact adhesives or rubber cements	For permanent assemblies
Screwing (hard-woods)	UF resins	Screwing as well adds strength and also clamps joint whilst setting
Screws (self-tapping)	Epoxy resins	Joint is a permanent bond and cannot be disassembled



**T**HERE can be no doubt that the Italian Super-Tigre G.15, introduced just two years ago, is the most successful 2.5 cc competition engine produced anywhere in the world today. Performance-wise, it is approached, or equalled, by the latest Moki S-3 from Hungary and Czech MVVS 2.5-RL and also by the American K & B 15R Series 64, but the G.15 is more widely used, internationally, than any of these engines and its contest successes in C/L speed and FAI free-flight, on both sides of the Atlantic, clearly outnumber those of any other 2.5 cc motor.

We first tested the G.15 just prior to its general release in 1964 and recorded a peak output of 0.60 bhp at

## ENGINE TEST

by Peter Chinn

### Super Tigre G15

... performance has not been exceeded by any engine ...

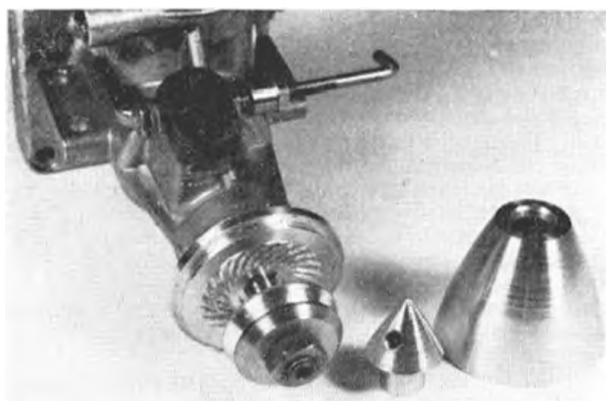
22,500 rpm using a full 50 per cent pure nitromethane content fuel. (The manufacturer subsequently rated the engine at 0.62 bhp at the same speed.) This performance has not been exceeded by any engine we have tried since. In fact, on a specific output basis, the G.15 has the highest bhp/litre (240) of any model engine tested to date. So far as unsupercharged internal combustion engines are concerned, this appears to be exceeded only by some of the current Japanese racing motor-cycles.

Our present test report, however, deals with the performance obtainable on regulation FAI fuel—i.e. straight methanol/castor-oil—in view of the recently amended C.I.A.M. regulations which now require the use of such fuel for both the recognised World Championship classes, namely, FAI free-flight power-duration as well as 2.5 cc speed.

No silencer was fitted for the tests, for a number of reasons. Firstly, although the manufacturer, Micro-meccanica Saturno of Bologna, Italy, has just announced a range of five types of silencers, this does not include a model for the G.15. A possible explanation for this might be that it is the manufacturer's intention to offer a silencer of a type designed to improve, rather than reduce, power output of the G.15—such as a tuned length expansion chamber. Again, since the use of silencers is not yet obligatory in FAI World Championship contests, it is reasonable to assess performance "un-silenced" until such time as silencers are made compulsory for such international events.



Parts of the G.15 display distinctive Super Tigre transfer ports, flat-top piston, squish-band cylinder-head and large valve-port in this photo.



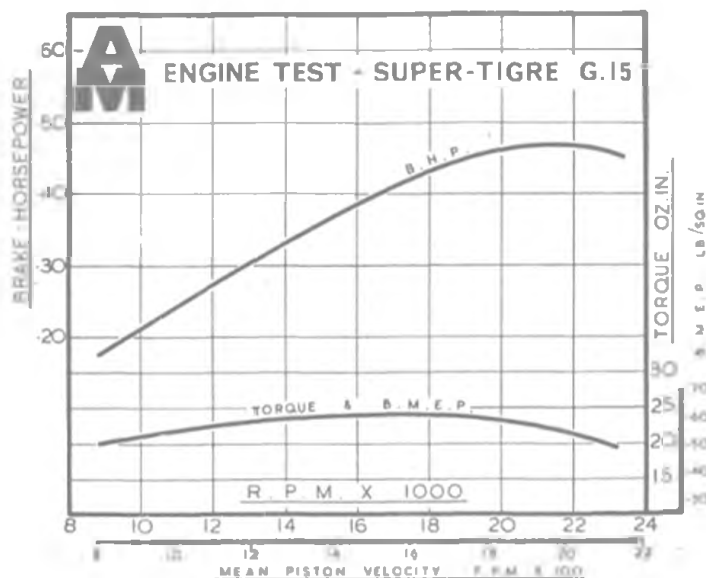
Optional on the Super Tigre G.15 is this special spinner assembly. Spinner backplate also forms prop driver, replacing regular components.

### Distinctive Design Features

The G.15 is supplementary to the older 2.5 cc G.20 series and does not replace it. The G.20 is continued in both glow and diesel versions and in 3.2 cc and 3.6 cc models and in R/C versions of these latter. The G.15 is made in only one other version (the recently introduced 3.2 cc G.15/19) and, although it inherits one or two features of the G.20 and is still basically similar in that it is a ball-bearing, shaft rotary-valve, loop-scavenged engine, it is really an entirely new design intended purely and simply as a racing engine.

The most obvious features inherited from the original 1960 "Jubilee" Series G.20, are the deflectorless piston and unique transfer porting. From the current front rotary-valve G.21 series, the G.15 takes its offset intake and squish-band cylinder head.

Examining the G.15 for the first time, the feature that immediately strikes one is the large rectangular intake. With the optional venturi restrictor removed, the parallel sided intake measures 11.2 x 7.4 mm and is fully offset in the direction of rotation—i.e. its left side being immediately above the crankshaft axis, while its outer wall curves inward to meet the rectangular aperture in the main bearing. This aperture occupies approximately 90 degrees of the periphery and gas flow from the car-

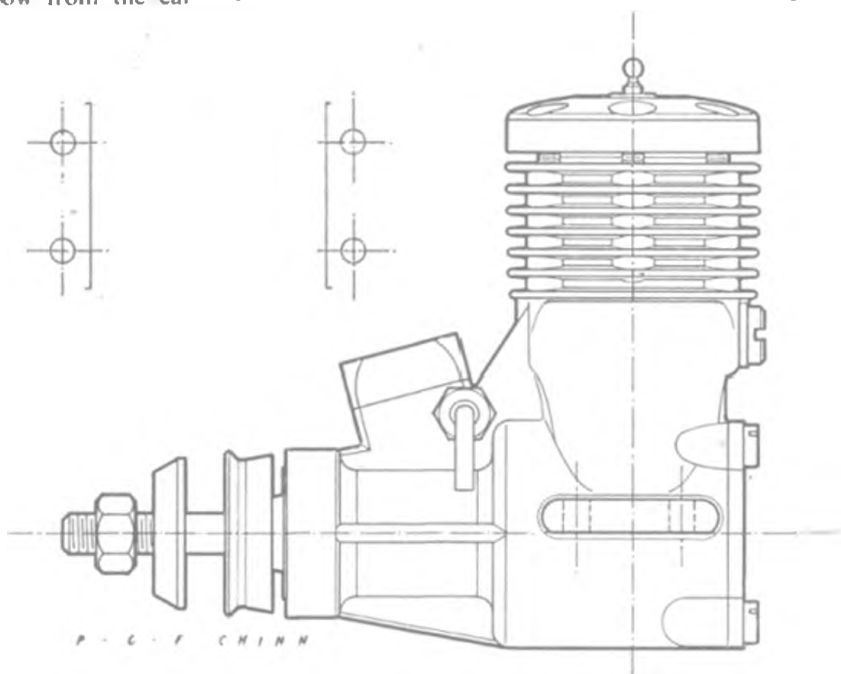


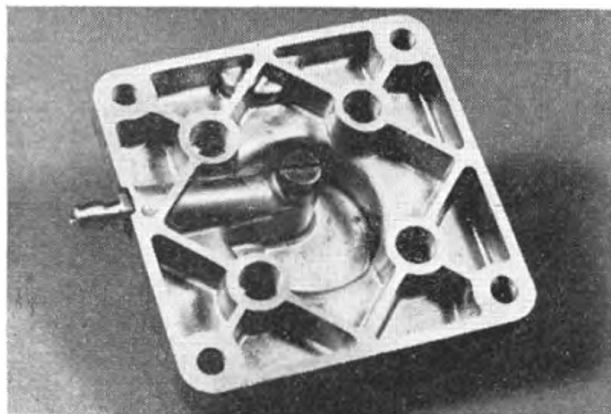
burettor therefore enters the shaft tangentially and with the direction of rotation. Due to the completely rectangular shape of both the crankshaft port and bearing port, very rapid opening and closing of the large rotary-valve occurs, so that maximum use is made of the induction period. The induction timing is, itself, very generous, the valve opening at 30 deg. ABDC and closing at 55 deg. ATDC.

Super-Tigre's highly original cylinder porting has, in recent years, "inspired" such respected names as MOKI and MVVS, who have produced their own slight variations on this theme. On the G.15, the exhaust and transfer ports are both slightly deeper than those of the earlier Jubilee model, but, as is continued in the very latest rear rotary-valve G.21/29RV, exhaust lead is entirely eliminated and the exhaust and transfer ports open simultaneously and close simultaneously, yet no baffle is used on the piston, which has a completely flat crown. Actual measured port timings as checked on our test sample, are 67 deg. BBDC to 67 deg. ABDC for both ports.

*Continued on next page*

FULL SIZE  
DRAWING





Another optional feature for the Super-Tigre G.15 is this diecast radial mount backplate for free-flight work. Note provision for crankcase pressurized fuel system.

Rather more than 50 per cent of the piston area is covered by the cylinder-head squish band, leaving a 10 mm. dia. hemispherical combustion space with central ignition plug. The piston itself is a little heavier than the original Jubilee component, due to the incorporation of an annular stiffening rib below the gudgeon-pin. This latter has presumably been added to reduce the risk of piston ovality developing during the finishing stages of manufacture. The piston diameter is relieved 0.05 mm at the bottom of the skirt for a depth of 3 mm. The piston skirt is also cut away front and rear to clear the crankshaft counterbalance and crankcase backplate at BDC.

An unusual feature of the piston, is that only the rear aluminium end pad of the gudgeon-pin is domed and free to make contact with the cylinder wall. At the front end, the pad is flat and is prevented from moving by a circlip in the piston boss. The machined aluminium alloy connecting-rod is unbrushed, but has two lubrication holes at the lower end. Incidentally, although the rear of the main casting contains a screw-in aluminium plug which might appear to be intended for extracting the gudgeon-pin, this is not, in fact, necessary: the conrod, complete with piston, can be easily lifted off the crankpin after cylinder liner removal.

As supplied, the G.15 is fitted with a venturi insert. This does not unduly restrict the intake since it is quite large (.360 in. x .220 in.), but the engine will run on suction feed with it installed. Provision is also made for a crankcase pressurised fuel supply. In contrast to the rotary-valve timed high-pressure system of the G.20, however, this is of the low-pressure type with the outlet in the backplate. A brass nipple is supplied which replaces the screw that otherwise seals the backplate. The carburettor spraybar, incidentally, is installed in the back wall of the intake and as, even with the venturi insert removed, only half its diameter is exposed, the intake area remains very large at all times.

## Performance

As received, our test engine had obviously had little running, but was extremely free running right from the start and showed no tendency to tighten up. It was, nevertheless, given the courtesy of a nominal "break-in" of one hour, consisting of numerous short fast runs, starting off rich and ending with steady runs at about 16,000 rpm on the optimum needle setting. This was followed by a further hour accumulated in making prop/rpm checks. All these runs were made with the venturi insert installed and running on suction feed with, of course, straight fuel.

A most noticeable lack of urge characterised all running on props larger than 8 x 5, for example: 10,900 rpm on an 8 x 6 Top-Flite, 10,200 on a 9 x 4 Top-Flite and 8,600 on a 10 x 4 Tornado. Not until we had got down to a fast 8 x 4 (16,500 on a Power-Prop 8 x 4) did the G.15 really begin to show its paces. At 21,500 on a 7 x 3 Top-Flite, the Super-Tigre sounded wonderful, with a really crisp and steady exhaust note.

At this point we removed the venturi insert and converted to pressure feed before embarking on torque tests. As expected, torque, poor at speeds below 12-14,000 rpm, reached its maximum at very high revolutions, i.e. approximately 17,000 and, beyond this speed, declined quite slowly so that maximum bhp was realised at between 21 and 22 thousand, with an output of 0.47 bhp. This figure has not been exceeded on straight fuel by any 2.5 cc engine that has passed through our hands to date.

Once upon a time, hot performance used to be accompanied by vicious and tricky handling. This is no longer true of most high performance engines and the G.15 is a particularly outstanding example of docile handling in a powerful motor. Starting is very easy using orthodox techniques. The needle-valve was a little indefinite on suction feed but was very positive, yet non-critical, on pressure feed. Glowplug life appears to be reasonable: only when the engine was repeatedly run at speeds around 22,000 did frequent replacement become necessary.

Unquestionably, the G.15 is one of the outstanding commercially-built competition engines of the present decade. It can be recommended to the expert, or, equally so, to the newcomer who is out to make a name for himself in the FAI free-flight power or C/L speed classes.

**Power/Weight Ratio** (as tested): 1.42 bhp/lb.

**Specific Output** (as tested): 190 bhp/litre.

## SPECIFICATION

**Type:** Single-cylinder, air-cooled, loop-scavenged two-stroke cycle glowplug ignition with ball-bearing crankshaft. Shaft type rotary-valve induction.

**Bore:** 15 mm. (0.5905 in.) **Stroke:** 14.0 mm. (0.5512 in.)

**Swept Volume:** 2.474 cc (0.1510 cu. in.)

**Stroke/Bore Ratio:** 0.933 : 1

**Weight:** 5.3 oz.

## General Structural Data

Pressure diecast aluminium alloy crankcase/cylinder/main bearing unit with drop-in steel cylinder liner. Detachable rear crankcase cover secured with four screws. Hardened nickel-chrome steel counterbalanced crankshaft with 10 mm. dia. journal, 7.5 mm. bore gas passage and 5 mm. dia. crankpin, supported in 10 x 24 mm. rear and 5 x 16 mm. front ball journal bearings. Flat-crown, lapped piston with internal stiffening ribs below gudgeon-pin bosses. 4 mm. dia. hardened gudgeon-pin with aluminium pads and located by single circlip in piston. Machined aluminium alloy connecting rod. Pressure diecast aluminium alloy cylinder head secured to main casting with six screws. Annealed copper 0.2 mm. head gasket. Detachable nylon venturi insert retained by needle-valve assembly in rear wall of intake boss. Machined aluminium alloy prop driver mounted on shaft via aluminium split taper collet. Provision for crankcase-pressurized fuel supply via screw-in brass nipple in backplate. Beam mounting lugs.

## TEST CONDITIONS

**Running time prior to test:** 2 hours

**Fuel used:** 75 per cent I.C.I. Methanol, 25 per cent Duckhams Racing Castor Oil.

**Glowplugs used:** Maker's 1.5 volt platinum filament as supplied.

**Air temperature:** 68 deg. F.

**Barometer:** 29.8 in. Hg.

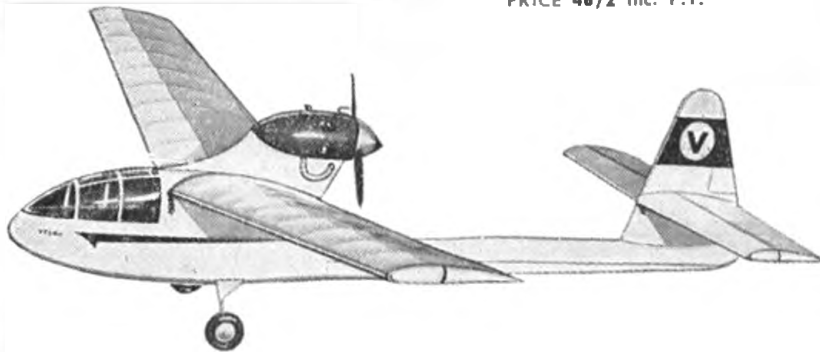
**Silencer Type:** Nil (see text)

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Marine Version 124/1  
R/C Marine Version 135/10



RECORD

### WINNER

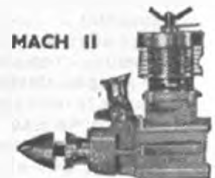
2.46 cc. 95/4  
R/C Version 106/2  
Marine Version 137/5  
R/C Marine Version 148/10



WINNER

### MACH II

2.47 cc. 141/8  
R/C Version 175/11  
Marine Version 216/4  
R/C Marine Version 231/11



MACH II

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3.44 cc. 133/10  
R/C Version 148/8  
Marine Version 183/1  
R/C Marine Version 200/7



BULLY II

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R/C Marine Version 186/8



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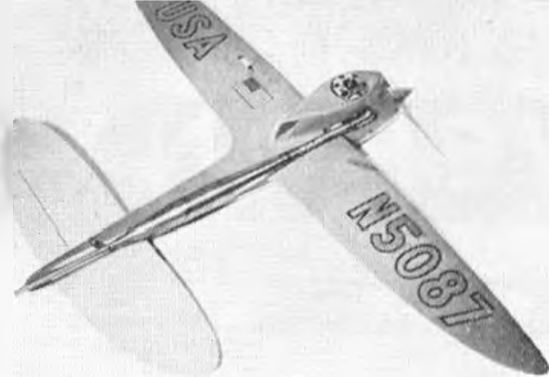
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# The SILENCER CONTROVERSY

Glenn Lee's "The Tube" features a tuned expansion chamber exhaust on a G.15 powered FAI speed model. Lee, who placed third, behind Wisniewski and Krizma, at the last World Championships, reports no conclusive results as yet.



## "Come off it Kevin"

Dear Sir,

On behalf of the members of the Novocastrian Club I would like to protest against the use of silencers at the World Championship Trials.

We do not object to use of silencers at British Competitions but when the competition is to select participants for an un-silenced event we feel the conditions should be the same for both Trials and World Championships.

Our members think it is ludicrous to suggest that silenced models will run on the same parallel to un-silenced models in performance, as we have already proved.

On reading Mr. Lindsey's letter in the last Aeromodeller I must say that I agree with him that a properly designed silencer will improve the performance of an engine but what he does not appear to consider is that everyone does not have the facilities to make and experiment with silencers as he appears to have. Are we to assume then that the British Team is not to comprise of modellers who can make good and consistent times with F.A.I. models or is this to be a metal working team.

Come off it Kevin: You have only speed to consider when making silencers. The Team Race contestants have both speed and range to worry about. Do you think it fair that those less fortunate than yourself should be penalised with silencers. If you can use silencers to 'up' your performance then by all means use them but do not force those who have to rely on commercial units to use them in the Trials.

Therefore, as this is a non-spectator event and on an airfield away from habitation we ask that this rule be rescinded until such times as the World Championships become silenced.

Annfield Plain,

Co. Durham.

N. D. Kilton P.R.O.

## "Strongest Objections"

Dear Sir,

I feel I must forward my strongest objections to using silencers at the British Team Trials.

Just how we can be expected to compete with the rest of the World when our rules are completely different, is beyond me.

I consider areas should be allocated for practise without silencers by people proposing to enter the trials and that the teams be selected under the conditions they will meet at the World Championships.

No-one has spent more money on silencers than I, so let us stop this silly nonsense and give Britain a fair chance. Watford, Herts.

K. Bedford.

## "Alice in Wonderland"

Dear Sir,

Kevin Lindsey's reply to your editorial re silencers for the team trials leaves me cold. Apart from failing to even attempt to answer any point that you raised, his letter shows clearly a dogmatic narrow-mindedness in favour of silencers anywhere and at any time.

In conversation, Kevin has told me that he respects the opposite opinion while yet disagreeing with it. This popular phrase is invariably trotted out at times like this in order to give the impression of fair mindedness, and the suggestion implied is that one's ideas have been formed after balanced thought has been given to all aspects of a question.

Whilst it may be, and probably is, true that a general silencer rule is a good thing as far as local flying fields are concerned, their value at a national competition situated in a vast airfield is open to great doubt if not ridicule. As for silencers at a FAI Team Trials, the rule is simply Alice in Wonderland. London S.E. 4.

D. Platt.

Many readers have written to air their views on the decision to require silencers on all engines used in the trials to select British Teams for World Championships. This is a brief selection

## "Tuned Exhaust System"

Dear Sir,

I have been reading the comments on silencing which have appeared in Aeromodeller for the past few months. I should like to make a few comments of my own without making out I know it answers.

This problem of more power for less noise is many and varied and not very easily sorted out. I have tried my hand at this in other fields e.g. motor-cycles and Karts having built my own Kart and tuned a number of 2 stroke engines and been an ardent motor-cyclist for many years.

The ideal tuned exhaust system is one which will increase the power over the whole range, but this is not very successful, therefore a compromise is called for. Most tuners settle for a system that works over a limited range of about 2-3000 rpm, this means you select the power band you wish to use, be it high peak power or high torque, lower down the rev scale. Even when you have achieved this on one engine it doesn't mean this exhaust will work on all engines, probably it won't even work satisfactorily on another engine of the same make and type as the original. This is why manufacturers cannot mass produce a tuned exhaust system which will give peak power AND all the other requirements. Therefore it would seem each individual will have to

tune his own exhaust, to his engine to his own requirements.

Now the exhaust itself, on motor cycles and Karts using 2 strokes, it usually consists of an expansion chamber with a restricted outlet and a tail pipe the bore of which is considerably smaller than the actual exhaust port. It has also got to be strong enough to stand up to the resonance of the exhaust, which in practise is not as easy as it seems. All this makes for quite a bulky exhaust system that is out in the airstream, and would surely defeat the object of having it, causing a great deal of "drag" on a speed model.

All this is supposing you can make a tuned exhaust system which is appreciably quieter than the normal open exhaust, without having all the resources and equipment that most of the large racing engine manufacturers have. I'll be interested to read what other modellers have to say in future editions.

Chadwell Heath.

R. J. Munden.

## "I have one . . ."

Dear Sir,

Kevin Lindsey may well state that tuned exhaust systems give more power and he is willing to sell tuned pipes to people he thinks deserve them. He assumes everybody has the equipment to make the tuned exhaust systems. I have one of his pipes and am lucky in that I have facilities for machining various parts. I have in fact managed to extract more power from a G.15 motor using one of the Lindsey pipes. I wonder whether or not the drag of the pipe will overcome the extra power. It will probably make the model do the same speed as without it. As you may have guessed I have not tried the model yet. I have not finished it as I am trying to find a practical way of taking it apart to get at the motor etc., and still use a silencer or exhaust system. Brockley, London S.E.4.

I. Roffey.

(This is a small part of the letter, extracted because of particular relevance, the balance being in the same vein as other views expressed concerning the F.A.I. team selection Trials.—Ed.)

## Free-flight view

Dear Sir,

The imposition of the silencer rule at an F.A.I. Trial is nothing short of criminal—a stab in the back of the G.B. Teams by their own Parent body, their guardian. It appears obvious to me that this decision was taken under the influence of the silencer mania which is so much in evidence in S.M.A.E. sponsored literature at the moment, a most unhealthy trend which is alienating many formerly loyal members. The Society is a body of aeromodellers, whose element is the air above the flying-field; what happens there is of paramount importance and I

can assure you there is much legitimate discontent on the flying-field at the moment because of this latest silencer decision, taken, it is worth noting, without previous notice.

It is heart-breaking to me to see usually madly keen F.A.I. F/F. modellers, living just for the day when they could fly their latest world-beater in the Trials, now reduced to flabbergasted and frustrated individuals whose main concern is no longer a model, an engine, and perfection in trimming but how best to fit which silencer. The choice now is between preparing a model best suited to S.M.A.E. rules in force at the Trials, and therefore

not ideally suited to the F.A.I. rules in force at the World Champs, or vice versa. Ridiculous? of course it is. And totally unnecessary.

To see another of your correspondent's efforts to justify this silencer rule by asserting that silencers will "up" the power of the engines would be laughable if the implication was not so serious. Whether or not this assertion is correct, it is not the slightest justification for enforcing the "benefit" on those who do not want it. It would be no more ridiculous to demand the use of a particular make of engine because it gives more power! Laidon, Essex.

Margaret French.

## and the view of the S.M.A.E.

Dear Sir,

Mr. Kilton—you will notice I said in the letter in March '66 *Aeromodeller* that we had been developing *performance-enhancing* silencers, not power-upping necessarily. What I meant by this was that we appreciate that for team race, power was not everything. The other two members of the Felt-Ham/Hayes group are both T/R men and have been principally concerned with devices for T/R; for instance, we have one hybrid tuned-exhaust system which gives neutral power (or not more than 1 or 2 per cent increase) from 12,000 to 30,000 r.p.m. per 2.5 cc motors, yet drops fuel consumption considerably and is very quiet. It is very easy for practically anyone to make and is not particularly large or bulky. In the last S.M.A.E. Newsheet (Model Flying No. 23) I offered T/R men all design and construction details free. I also offered the speed-men pure tuned-exhaust systems at cost of £1 each. Most have now got them and are getting considerable power increases. There seems little point in giving information etc. to anyone who publicly states he doesn't believe the devices work, though.

Getting off details and back to the general picture the S.M.A.E. has to be forward thinking in its administration. The loss of flying facilities due to noise troubles has to be nipped in the bud, before the flying fields are lost as once lost naturally that's it. This has meant the silencer rule being brought in fast, before it's too late. Nothing but a completely general rule is going to work; it only takes one or two fliers in a large area to feel themselves exempt from such a rule, to ruin the amenities for all the others. Last year we had complaints from fliers about a small number of potential British Team members flying without silencers on sites only kept because of the silencer rule. So I have been working all the hours of the day to develop advanced silencer systems for the fliers without any facili-

ties etc., so that there would be no performance objection to G.B. being *all* silenced.

I feel sure that the majority of aeromodellers in the country, who want to keep their flying fields to continue to enjoy this great hobby of ours, will back the Society in its efforts to do just this, and will not be swayed by the writings of people not in a position to view the overall, natural picture of the situation.

Surbiton.

K. Lindsey.

Sir,

My attention has been drawn to Editorial comments and correspondence in the *Aeromodeller*, concerning the SMAE Council's decision that models flown at the Team Selection Trials should be equipped with silencers. Our Public Relations Officer has answered many of the points, but the basic reason behind this decision does seem to have been overlooked. I had assumed that all your correspondents were (a) members; and (b) take the hobby seriously enough to attend Area meetings and hear from their delegate the reasons behind decisions, making it unnecessary to ask you to print these. However, this does not seem to be the case, so I would like to set the reasoning out so that readers can consider all aspects.

1. The SMAE is indeed concerned that the best possible teams only, are selected to represent us, but if this means potential hardship in the way of noise complaints, to the majority of members, then a compromise must be reached. To this end, the relaxation of the silencer rule under controlled conditions, to specified persons, is quite acceptable. But, and it is a big but, there is no point in holding unsilenced trials unless adequate provision is made for unsilenced practice. The F.A.I. are unlikely to adopt a

silencer rule for some time, but we are faced with at least two "power" trials for World Championships each year, plus other international contests. If the rule is relaxed for one, logically it must be relaxed for all. Therefore, to all intents and purposes, anyone claiming to be practising for an F.A.I. trial need never fit a silencer.

This would doubtless delight the irresponsible and not one of your correspondents, nor yourself, has made any suggestion as to how the SMAE is to ensure "practising" fliers do not cause complaints.

2. I, in conjunction with other Officers, including yourself, have been closely concerned with negotiations to prevent the total banning of power model flying in certain areas because of noise. To take only two examples—Wanstead Flats and Epsom Downs—it was only the Society's adoption of a total silencer rule at all times, which even opened the door for negotiations to start. Surely I do not need to elaborate on the untenable position we are in if we start to make general exceptions?

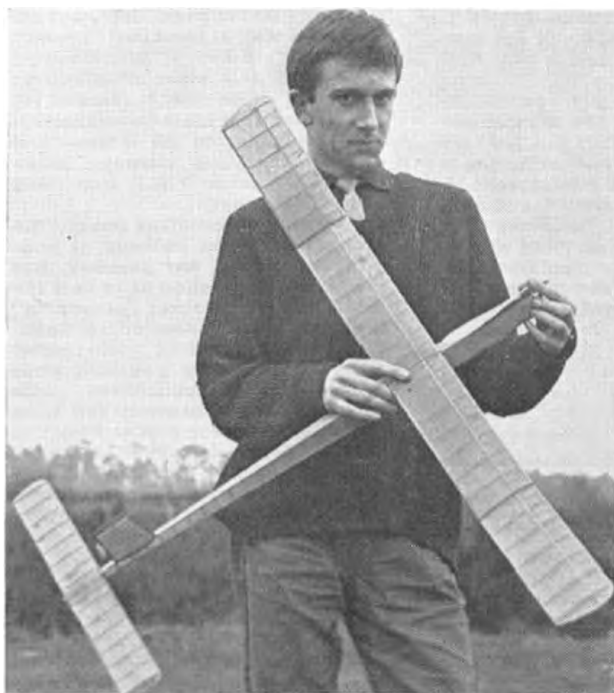
3. It is suggested that a team selected using silencers, might not be the same as one selected unsilenced. How true is this? We will never know, of course, but contest results in 1965 would not seem to suggest that there is any danger of a difference other than could be accounted for by normal variables which exist.

4. The Council's decision to select a team using silencers and then consider permitting the team to practise until the Trials unsilenced, provided no local bye-laws or Club Rules were broken, i.e. flying unsilenced under, as nearly as possible, controlled conditions, was thought to have been an acceptable compromise.

As an ex-team member myself, I am fully aware of the problems facing contest fliers. As a regular weekend flier, I am equally aware of the problems concerning noise which face the average club flier on his local flying field. It is the Society's job to look after all and if, in this silencer question, the compromise solution might seem to affect one section more than another, then it is you yourself who called for tolerance.

The Council of the SMAE does not dictate to all the members, it merely tries to implement the decisions of the majority. If the majority feeling on silencers has changed, then provided each individual member does his duty by informing his club delegate of his view, and makes sure the delegate attends Area meetings to brief the Area Delegate, then the Council will know the view of the majority and will legislate accordingly. Active participation in the Society's activities in this manner, is far more constructive than writing to the Model Press.

N. J. Butcher.  
Chairman, SMAE.



Dave Hipperson poses with his St. Albans Rally Coupe d' Hiver winner, note the simple or should we say straightforward structure. Made 5:58.

**A** GLANCE at the year's contest calendar will reveal that, whilst the major rallies are fairly well spread throughout England, most of the smaller ones are congregated in the South. In particular many rallies, with a variety of geographical titles, scheduled for Chobham Common.

This latter phenomenon seems to have arisen due to Chobham being one of the few venues easily available to London district fliers and hence being used for much general test and sports flying. Although somewhat rugged terrain, it does have certain indisputable advantages—being large, available at any time, unaffected by the crop season and ideal for thermal flying. Some years ago the Croydon Club started the idea of an informal rally "by fliers for fliers". This notion has now snowballed to the extent that I have heard comments that there are too many Chobham rallies. (This problem will undoubtedly be solved by the National Motorway construction scheme).

A corresponding situation does not exist elsewhere, presumably due to a lack of flying grounds and of inclination to stage events. There is no doubt that clubs with permission to use a good flying site (airfields in particular) are obviously and naturally reluctant to risk them by an open invitation to all and sundry. Many landowners will put up with a few people—but not

Bob Wells with Warring designed "Voodoo" Wakefield topped St. Albans Vintage rally "Veteran" section with 8:52, trimmed in black and orange tissue.



## John O'Donnell

offers some  
expert comments  
on Free Flight

with crowds! Whilst there is plenty of moorland in the North it is all too often at high altitude and inevitably windy.

Having made the "Chobham trip" more times than I care to count I obviously feel it is worthwhile. Although the events do not have the status of some other meetings nevertheless the standard of competition can be extremely high. At Chobham it seems to depend on the weather. If good, then the flying demonstrates a unique combination of quality and quantity. There is certainly more good flying done by more people than anywhere else in this country (at the present time). If the weather is bad Chobham events can have indifferent support as the "locals" take the view that there is another event of comparable importance the following week-end.

The high standard is presumably due to flying with and against other modellers on the same field. From personal experience I can guarantee that this produces better models quicker than flying against a stopwatch. There is only one drawback. A local "expert", with competitive flair and inclinations, will reach the stage where he can beat his immediate opposition fairly easily—and not improve thereafter. If he goes further afield he can suddenly find himself completely outclassed. This is the real test! He can either "buckle down" and get really good (and often kill off the original local interest in his speciality) or return to remain king of his own locality.

There are examples of clubs and areas that have much interest and enjoyment out of internal competition that is of a low standard objectively. It would be unfair to name examples as they could well get as much out of the hobby as more "successful" fliers. Beginners are sometimes said to enjoy a thing more than the proficient—but it isn't possible to put back the clock! I once heard that the curse placed on Mankind could be defined as "Progress".

From the general to the specific! St. Albans held their "Vintage Rally" on 6th March at the venue just discussed. In actual fact vintage was only one of four events. Weather was breezy (onto the woods and "tank factory"—admittedly over a mile away) but mild with bright sun giving plenty of thermals. Most interest was in the Mixed F.A.I. event—dominated in every way by A/2. To equalise tactical flying, rubber and power were required to be flown from the glider launching area. As there were only 2 or 3 wakefields and no power models this didn't cause any congestion. Chris Foss proved the eventual winner due in no small part to his Brighton clubmates' efforts in recovering his model from the downwind woods on his first max. This search deterred them from any inclinations to fly F.A.I. power. Chris eventually managed 4 maxs, interspaced by a 2 minute flight, to have a good lead over myself and Pete Trenchard. There were others who started well but who apparently left their last flights too late.

The only perfect score of the meeting was recorded by Paul Newell in winning A/1 glider with three threes. His "Synco-pator" design should be known to readers, it was given as a full-size plan in January issue. Following places were taken by Bert Turner and Martin Dilly with comparatively low scores. It is not obvious why A/1 times were generally so low as the models can be flown tactically just as easy as their larger brothers.

Coupe d'Hiver was won by Dave Hipperson just 2 seconds short of 6 minutes. I was second, just in front of Jack Allen, despite flying rather late in the day after most of the lift had gone. The R.O.G. procedure has now become very perfunctory—and is surely in need of reappraisal.

Vintage or "veteran" as St. Albans preferred to call it (as the former description gives the idea of improved quality) brought back lots of memories. Designs seen in and out of the contest included the *Banshee*, *Thorobred*, *Sugarfoot*, *Gismoe* and *Korda*. This event has already divided into two types of participant—those with nostalgic memories of a favourite model, and those out to win! The latter are the ones who appear in the results.

(Continued on page 288)

SEAPLANES enjoy a fair degree of popularity on the Continent and regular events are held for them in Yugoslavia, Italy and Switzerland, and for many years Monaco ran an international hydro-model meeting catering for R/C as well as the more usual rubber and power events. The R.O.W. event has also been long established in the American Nationals. Despite the immense popularity of boats and boating in this island, hydro-models have since the war tended to be a rather neglected branch of the movement despite the support given by the Aeromodeller in donating a cup for seaplanes at the now defunct "All-Britain" Rally. In pre-war years the Lady Shelley Cup was an annual centralised event for seaplanes and the White Cup was donated for flying boats, a specialised type of model of which the donor's Gander and Goose were famous examples immediately before the war.

Any ordinary freeflight model can readily be converted to a seaplane by the addition of floats, which if properly designed will have very little effect on the trim, although they do have a marked effect on performance. For model work the three float arrangement as used on full-size aircraft prior to World War I is the best solution, and for power models a single front float and two tail floats is the usual arrangement. For rubber models twin front floats and a single rear float is the more popular. Twin floats as used on modern full-sized aircraft can be used for sport or scale models, but with rubber motive power are almost impossible to unstick from the water.

In considering float design certainly the simple sled (Fig.1) does provide the best take off characteristics, but due to its poor aerodynamic qualities, is rarely used today on contest models. The tear drop shape while good aerodynamically has poor take off qualities, but is suitable for rear floats and a combination of both shapes (Fig.2) provide the best all round solution. Some designers do incorporate a step in their front float design although the writer has never found any advantage or necessity for this.

Structurally, floats are best kept simple with sheet sides, tops and bottoms. Rear floats should be kept as light as possible to avoid altering the G.G. They should be covered with lightweight model span (double on the bottom of power model's front floats or even silk on heavier models against punctures from sharp stones when dethermalising over land) and after doping given two coats of banana oil to water proof. The struts must be strong enough to assure that the rigging angle cannot

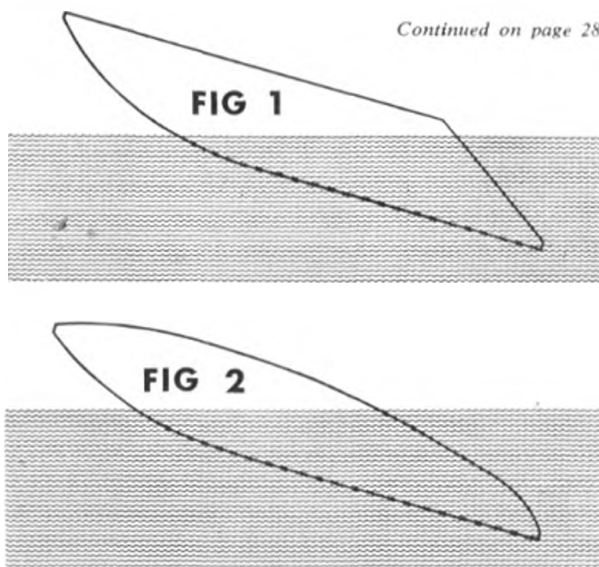
John WeWst's floatplane conversion of a "Dixielander". Note tail floats and sturdy nose float supports. Heading shows the author and his 1.5 cc. Clot Mark V".

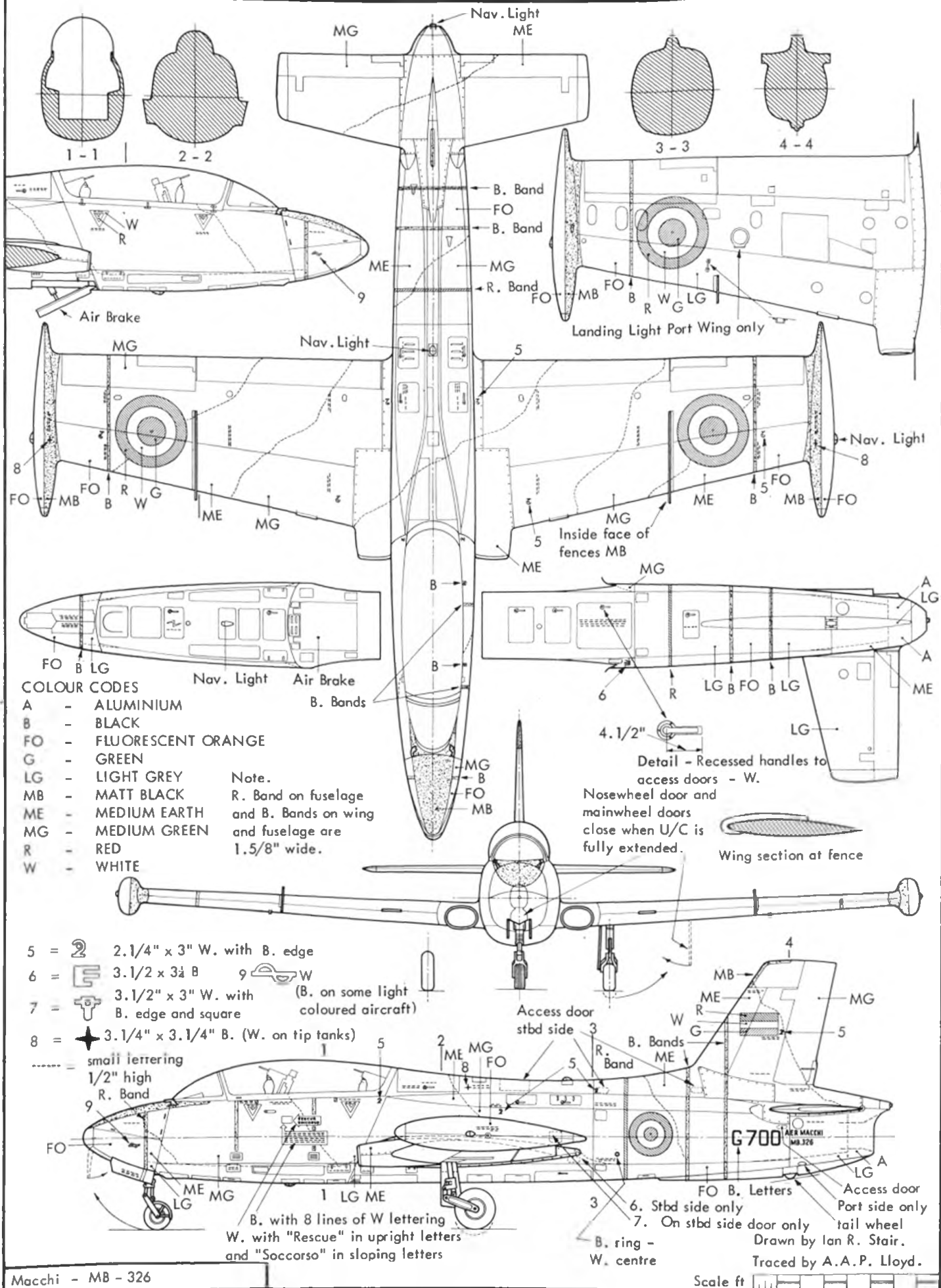


alter due to drag on take-off (one of the commonest causes of failure on first attempts) and on twin float designs a spreader bar or thread is essential to prevent any possible toeing out on the water. The attachment of the float struts to the floats is very important and on power models the use of ply bulkhead is essential to cope with the heavy jars occasioned on D/T. landings. On rubber models a single bamboo leg suffices, but on power models a single wire front leg and twin wire back legs provide the best solution. Rear floats which carry little or no strain can have sheet balsa "leg" and can be attached to the tailplane by rubber bands.

When attaching the floats particular care should be taken in their rigging angle as too fine an angle makes for

Continued on page 288





*Aircraft Described No. 150.*

# Aermacchi m.b. 326

**R**ECENT political strife over the Phantom, F.111, VC 10 and Concord has obscured the significance of this Italian "all-through" jet trainer. In September last, the Royal Australian Air Force announced that it had selected the MB 326H to replace its Winjeels and Vampires, and this after long analysis of the many aircraft in the trainer category offered by the U.S.A., Britain, France and Canada. It is to be made in Australia at Commonwealth A/C Corp Pty. Ltd. Earlier, the South African Govt. had reached the same decision and a factory is being established for Atlas A/C Corp to make the "Impala", as the MB 326 will be known.

The Italian Air Force, Alitalia, Ghana and Tunisian Air Forces have also equipped with the type and it is said that the N. Zealand A.F. may have an option on some to be made in Australia.

To achieve such commercial success is indicative of its efficiency as a multi-purpose two seat trainer. The Australians also stated it was the cheapest of the six types examined. Much of its development was undertaken with the closest liaison with British research and test facilities, and since the power unit is a British Siddeley Viper, the sales abroad have also meant increased export orders for Britain.

Initially conceived in 1954, the MB 326 utilizes a tandem seating layout in a pressurised cabin, fitted with Martin Baker automatic ejection seats. It was specifically designed for maximum utility and ease of servicing and on that score alone, its record is excellent. Add to this a load carrying capacity that converts it from a trainer to an armed attack aircraft, an aerobatic capability with outstanding spin characteristics and one can understand why it has been adopted in quantity. The announced variants are the 326B

Copies of the 1/72nd drawing plus 1/48th scale dye-fine prints of the original are available as plan pack AJ 2863 price 2/6 + 6d post from Aeromodeller Plans Service, 13/35, Bridge Street, Hemel Hempstead, Herts.



armed version with the P.R. Pod and under wing load points as used by Tunisia; the 326C electronic trainer with Lockheed F104 nose radome and Viper 20; the 326D airline pilot trainer with navigation equipment as in jet transports; the 326E with pylons for 5 in. machine guns, sidewinder missiles or rockets; 326F, for Ghana also an armed aircraft and the 326H for Australia.

Above, Alitalia Flying School MB 326D is polished aluminium with white tailplane and fuselage top, plus dark and light blue trim. Tip areas are orange, and fin green, white, red. Standard Italian Air Force MB 326 below is all orange with black lettering and anti-dazzle areas. Central below in a Ghanaian A.F. MB 326F camouflaged as on drawing opposite and loaded with ferry tank. At bottom, a Tunisian A.F. MB 326B, all light grey with red standard for almost all military types, and white roundels, black lettering and orange tip tanks. Note that stencilling is





Fred Boxall about to release a lightweight rubber float plane,—without waders poised on small islands in typical 'Fred' style.

#### FLOAT PLANE FUN Continued from page 285

a prolonged take off and a possible nose over, but too coarse an angle causes excessive drag in the air. An angle attack of 5 degrees on the main float and the same or slightly less on the rear floats gives satisfactory results.

The important question arises on constructing floats for the first time, and that is *how big*. It is easy enough to calculate the volume required to support the weight of the model with a reasonable margin of safety, but how should the volume be distributed between the front and rear floats? It should be borne in mind that on power models the weight of the model is mainly concentrated in the

nose and the front float should be positioned so that the propeller comes from 50% to 75% back from the front, whereas on long fuselage rubber models the main floats are positioned about midway between the nose and the wing L.E. Fortunately in this country seaplanes are rarely called upon to land on the water and although power models do so successfully, rubber models almost invariably nose over on landing. Based on the single front float and twin rear float system I have set out in the table suggested dimensions for various sizes of models to enable designers to have some data to work on.

	1.5 c.c. Power up to 12 ozs.	2.5 c.c. Power up to 17 ozs.	2.5 c.c. F.A.I.	Open Rubber Power up to 6 ozs.
Length (Front)	7½"	8"	11"	6½"
Width	3"	3½"	5½"	2½"
Height	1½"	1½"	2"	1"
Length (Rear)	5½"	5½"	6"	3½"
Width	1½"	1½"	2"	1"
Height	1½"	1½"	1½"	1"

Performance wise there is little to choose between rubber and power (on a 15 seconds run) and in the Brighton club's seaplane contest either type is eligible to compete and both seem capable of winning although the rubber model, in dead air conditions certainly has a slight edge which the advent of the new powerful lightweight glow motors may even up. However these present problems with their requirements for fine rigging angles which result in prolonged fast take-offs, are very spectacular but calling for a bigger expanse of water for safety.

#### FREE FLIGHT COLUMN Continued from page 284

Bob Wells proved the eventual winner having re-entered with a Warring "Voodoo" after an initial try with a Keilkraft "Gypsy". Second was Graham Head flying a Mercury "Mallard" powered by an Elfin 2.49 purchased the day before. This was legalised but not quietened by a Webra Silencer. Albert Russell flew a real old timer—a 15-year-old model to one of J. B. Knight's Wakefield designs—to third place. Few gliders were in evidence and would seem to be rather handicapped by the 164 foot tow-line allowed—especially compared with power models which are allowed 20 second engine run. The cure is quite apparent.

The organisers tried to make the Veteran event realistic with a set of hand-out rules designed to discourage the incorporation of modern improvements. Pre-1951 makes of engines were required and allowable airframe modifications were listed.

The following week saw the East Grinstead Gala held at Chobham in very pleasant flying weather. I couldn't manage another visit so have to thank John West and Colin Greig for brief details. The day started bright and sunny with low drift. It went dull around mid-day but brightened again in the early afternoon. It is hardly surprising that there was a good entry and that the fly-off's, held in calm and weak lift produced high times.

There were 7 in the open glider fly-off in which Len Larrimore repeated his Summer Gala technique (fly first) and win. A/1 glider was flown with a 2 minute max which was rather too low. Half of the 6 entrants maxed out—but Paul Newell repeated his previous week's victory with "Syncopator". Rubber had eight of the 13 fliers reach the fly-off in which scores ranged from Bruce Rowe's winning 8:50 down to over 4 minutes for 8th place. The organisers' opinion is that this event is rather a farce in these conditions.

Power events are in an obvious decline—*dare* I mention silencers? Only two reached the fly-off and Dave Posner very nearly did not start his engine in the ¼ hour allowed. Nevertheless he managed to edge out clubmate Vic Jays. ¼ A power

was not well supported although Bruce Edwards did three maxs. Coupe d'Hiver was notable for 21 entries—more than any other event except open glider—which seems to bear out some of my remarks last month.

Coupe d'Hiver (21 entries—20 flew) 1. D. Tipper (St. Albans) 6:00. 2. G. Greig (East Grinstead) 5:42. 3. J. Allen (Brighton) 5:33. ¼ A Power (5 entries all flew). 1. B. Edwards (Croydon) 9:00. 2. J. Boxall (Croydon) 8:42. 3. M. Brown (Maidenhead) 8:17. A/1 Glider (6 entries all flew 3 in fly-off). 1. P. Newell (Surbiton) 6:00 + 3:18. 2. M. Coomes (East Grinstead) + 2:49. 3. K. Smith (Croydon) + 1:19.

Open Glider (31 entries—23 flew 7 in fly-off). 1. L. Larrimore (Lee Bees) 9:00 + 4:04. 2. M. Dilly (Croydon) + 3:07. 3. B. Dyke (St. Albans) + 2:20.

Open Rubber (15 entries—13 flew 8 in fly-off). 1. B. Rowe (St. Albans) 9:00 + 8:50. 2. R. Bailey (Surbiton) + 7:33. 3. R. Elliott (Lee Bees) + 6:17.

Open Power 1. D. Posner (Surbiton) 9:00 + 4:44. 2. V. Jays (Surbiton) + 4:34. 3. G. Fuller (St. Albans) 8:40.



Chris Foss won F.A.I. with this A/2. It also won on Boxing day and was in the East Grinstead fly-off following week. Pin release for A/R (which is angled back on rear mounted fin), line extension works timer.

## TEAM RACE SPRINT EVENT

The Hall Roffey Speed Event to be held at the Hayes Control Line Circuit on May 15th is an unusual event in two ways. Firstly, it is run and sponsored by two individuals and not a club as is usually the case. All the entry fees will be returned as prizes and they are to be 4/- per model. Secondly, a special team racer sprint event is to be held, which caters for 1/4A, F.A.I. and B team racers. Pilots will have to stand outside the circle and the usual one minute warming up time will be allowed, three models will fly in each heat, moderate whipping will be allowed but the pilots will be disqualified if seen treading on or elbowing other pilots during the race, no restrictions will be imposed on the type of fuel used except of course Tetranitromethane. The sprint will be timed over 10 laps from the standing *Le Mans* start, and no speed models are allowed though the team racers may be entered in the appropriate speed event except F.A.I. of course. Sounds like a good day out, so clubman will be there complete with camera, models and, we hope, plenty of other competitors!

## Bald Eagles' Jumble Sale

To say that this years Worthing Bald Eagles M.A.C. first Annual Jumble Sale "was a roaring success from start to finish" would seem to be an understatement for it earned the club no less than £55! Two and a half weeks were spent on the distribution of just under six thousand hand-out leaflets, door to door canvassing and actual jumble collection, and they were pretty sure that every house hold in Shoreham knew about the Sale. Other advertising included two hundred foolscap posters which were circulated to shops in the town together with a polite covering letter, for window display. Advertisements were placed in the "*Evening Argus*" on the two Fridays before the sale. Response from local shopkeepers was very good indeed. All this told people that they were holding a Jumble Sale, where, when, and at what time, but they didn't have any jumble! Although they badgered parents, friends and relations for jumble the main effort started with a door to door canvassing project. They were simply "following up" their leaflets and took jumble "from the door" or arranged to "call back later". When the system was going, nine or ten members, with cars, vans etc., were engaged entirely with jumble collection. On the day it was all stations "go" at Huntingdon Hall from 9 a.m. for a duration of ten hectic hours.

Many helpers including gracious ladies, plus a full compliment of Bald Eagles spent the morning loading, transporting, unloading, sorting, packing, stacking, wrapping, dropping and chucking all the jumble. (Should be read quickly, you get a better effect). The Sale was advertised to open at 2.30 p.m. and at 1.15, a full seventy-five minutes before zero hour, a gathering of between ten to fifteen regular Jumble Sale enthusiasts (known in the Trade as "Professionals") were rowing and arguing about who was first in the queue! By 2 p.m. the queue had lengthened considerably it must have been at least fifty yards long, maybe more. Calculating from the total admission proceeds, charged at three-pence per person, some two hundred and sixty people visited the Sale. Without a doubt the Hall was too small. Within a few minutes it was jammed-up solid leaving a long queue waiting anxiously outside. Inside it was "big business"; the Spring Sales have nothing on this! The ladies manned the canteen (a bit queer that!) and supplied tea and cakes to the now ravenous queuers. As far as expenses are concerned, £1. 10. 0d. was spent on newspaper advertisements and fees for displaying the small leaflets in shop doorways etc. Producing the handouts and the posters cost £5. 5. 0d. and the hire charge of the Hall, including the caretakers tip, was £1. 0. 0d. "Repairs to television set" £1 16 3d. that's interesting! One of the three television sets given in as jumble was repaired for 36/3d. and sold for a fiver, clear profit of £3 3. 9d! Fish-and-chip dinners for the "whole day," workers amounted to £1. 14. 6d. and the milk cost 7/3d. How about that!

### LAVERTHREE at HARROGATE

Multi radio control is on the increase in Harrogate & D.M.A.C. with members having success flying A.P.S. *Uproars*, *Uplifts*, and *Smog Hogs*. The equipment ranges through Grundig, Raven, R.C.S., Remcon and R.C.S. Most spectacular prangs were those by Mr. Gaunt and Ed. Carrol who both had their wings fold at around 300 feet altitude. Resulting splats were really entertaining (*Funny type of entertainment!*) A twin pusher/puller E.D. Racer powered "Lavatory" single channel has been defying the reactionary sabotage elements of the club who are seemingly trying to write it off and it has now been fitted with yet another engine mounted on a pylon over the wing, thus the new name "Lavathree". They are joining the S.M.A.E. this year to arouse more interest in contest flying amongst their members.

# CLUB and CONTEST NEWS

## ST. ALBANS NEWS

Four St. Albans members went to *Gay Paree* for the Winter Cup Coupe d'Hiver contest with David Tipper the highest placing member. They relate that the performance put by the American models flown by proxy was disappointing after all the time and trouble that had been spent with them, as they arrived in various stages of destruction after being shipped from the U.S.A. by surface mail in cardboard boxes! Very little aeromodelling has taken place recently in the club room due to distractions in the form of electric slot cars, the track now being a permanent fixture. Dave Hinder a new member has not succumbed and following his example several other modellers are back at balsa bashing. On March 6th the club held a successful Vintage Gala at Chobham Common. The weather was kind providing an enjoyable day for both participants and spectators. Results:— *Vintage 10 entries* 1, A. Wells (Hornchurch) Warring Wakefield "Voodoo" 8:52. 2, G. Head (Lee Bees) "Mallard", Elfin 2:49. 8:30. 3, A. G. Russell (N. Kent Nomads) 1950 Wakefield "Knight" 7:50. *Coupe d'Hiver 23 entries*, 1, D. Hipperson (Croydon) 5:58. 2, J. O. Donnell (Whitefield) 4:52. 3, J. Allen (Croydon) 4:48. *A/I Glider 13 entries*. 1, P. Newell (Surbiton) 9:0. 2, A. Turner (Southampton) 7:04. 3, M. Dilly (Croydon) 5:23. *All In F.A.I. 29 entries 5 flights*. 1, C. A. Foss (Brighton) A/2, 14:19. 2, J. O'Donnell (Whitefield) A/2, 13:26. 3, P. Trenchard (Oxford) A/2, 13:11. A gent's wrist watch was found, also a compass on the site after the rally and the claimants should contact St Albans M.A.C., 96A Victoria Street, St. Albans, Herts. Note the rally date change.

## OUTDOORS & INDOORS

Outdoors the news from Coventry & D.M.A.C. is not too bright, they are still negotiating with the higher powers for the use of airfields, but so far without success. An associated club has the use of a large area of farm land which they intend to use in the future so the associated club had better watch out for their flying site! Indoors, a free flight comp was held in a school hall for scale rubber models with points awarded for:— workmanship, scale effect and detail, realism in flight, scale speed and landing, *phew!* Included in the entries were two Ryan P.T. 20's *Short Seamew*, *Avro 'F' Monoplane*, *Focke Wulf 190*, *Goodyear Minnow*, *Auster J/2 Arrow*, *D. H. Chipmunk*, *Globe Swift*, and two *Eastbourn Monoplanes* from the Aero-modeller full size plan, one partially covered in condenser tissue that flew very well.

### BRIGHT PROSPECTS for CHINGFORD

Prospects for Chingford M.F.C. look bright during the coming season. Two requests for

## Fete not to Clash

Northampton M.A.C. have shown a very sensible attitude towards the World Control Line Championship by announcing that a flying display, to have coincided with the World Control Line Championship has been declined as most of their fliers want to go and see the world's best flying at Swindon. Unfortunately this attitude does not seem to be an overall reflection as we hear the N.W. Area may be running a meeting with control line events at the same time. It seems a great shame that this situation should arise as both the Champs and the N.W. Area will be the losers with the modellers split between spectating and competing. For our money we know which one we would attend if we had the choice of the two!

public flying displays and static exhibitions having already been received. The main interest is now team racing, F.A.I. and 1/4A, also single channel radio control, although a proportional outfit may arrive soon. Any unattached flyers in the Chingford area are invited to come along to club meetings at 8.30 p.m. any Friday at Wellington Avenue Youth Centre.

## Cambridge Newsletter

We have just received the first Cambridge M.A.C. Newsletter and we are glad they point out quite clearly they do not intend to try and do Aeromodeller out of business by publishing *Free THROW AWAY PLANS* (humph.), They are trying to keep it small but with quality though (*Not in our league—eh?*). A film show is scheduled for April 22nd consisting of cartoons and films of general and aeronautical interest. Dusty and Sue Miller have taken delivery of two O.S. Max 15s to fit into a couple of 48 in. span club design Climaxes, so hang onto your braces, sorry, skirts, and all.

## AIRTECH SPOT LANDING CONTEST

Held on February 13th, 27 entries competed in the first Open Spot Landing Contest run by Airtech M.A.C. A friendly air (pun) was present throughout the meeting and coke braziers helped to keep the cold at bay. Norman Butcher thoroughly demoralised the opposition by landing with all three wheels on the spot and only ten seconds time error, thus winning the first prize which consisted of a silver tankard plus a bottle of champagne for the use of! C. P. Williams took second place with 14 pts. error and B. Heard third with 21 pts.

## Discount and Strip

Irvine R/C M.C. from Ayrshire, Scotland, report 10 active radio control modellers with equipment ranging from single channel R.C.S. to Citizen-Ship proportional. Permission has been granted for them to lay a take off strip at "Gailes" Irvine, and work is now well under way with completion in sight. A discount has been arranged from a local model shop for club members so any keen R/C fliers who want to join an active group with their own clubroom, flying field, take off strip and discount on modelling goods should contact J. Bingham, 9 Church St., Kilwinning, Ayrshire, Scotland.

## AMAZING PUBLICITY

Cork M.A.C. really knocked *Clubman* out, when they sent in a few of their regular weekly press cuttings from the *Cork Evening Echo*. Written by MAC' an average weekly coverage is approx 25 inches and two photographs. Details range from local club meeting to flying field reports and contest calendars. In all, a very good effort by the club for Aeromodelling publicity. In operation since the late 40s, it is only during the recent years they have become established and at present they have forty members with 10 active contest fliers and the rest sports minded. Control Line is the most popular with free flight a poor second, but as always, radio is making rapid strides into the popularity stakes. Weekly meetings are held at a local hostelry and its reported they take their Guinness very seriously.



Leatherhead D.M.F.C. chuck glider enthusiasts attended the first Indoor meeting at Cardington on March 15th in force. Tony "The Arm" Slater at right was repeatedly making 45 second flights.

S.M.A.E. Competition Secretary, Stan Wade, bottom right at Cardington, regaining indoor form and showing several newcomers the special techniques involved.

John West with latest FAI job has ST G15. Enya silencer, variable incidence tailplane and auto rudder. He has no difficulty in achieving treble maxes.

## EVENTS THIS MONTH

April 17  
April 24

May 1

May 1  
May 1

May 8

May 8

May 8

May 15

May 29/30

S.M.A.E. Event F.A.I. Rubber, Open R/G/P at Area Venues.  
Southern Area F.F. Gala Beaulieu Heath (Ex Airfield) Nr. Southampton. Open R/G/P and A.I. Glider.  
Airtech F/F Rally. Haddenham, Bucks., Open R/G/P entry on field. Silencers must be fitted.  
S.M.A.E. Event R.A.F. Cardington Beds. Indoor Rubber.  
Finchley C/L Rally. Glebe Lands, Summer Lane, Finchley, London N.12. Jnr. Stunt, A and B Combat.  
Burtonwood Criterium R.A.F. Burtonwood. Combined Speed, Class A and B Combat, Novice Stunt, Stunt, Rat Racing, J.A. F.A.I. and B team racing. Scale. Control Line Events only. Pre Entry:— 1/6d to U. A. Wannop, 13 Dane Court, Stockport, Cheshire.

Imperial College C/L Rally. College Sports Ground, Sipson Lane, Harlington, Nr. London Airport. Class A Combat and B Rat Race. Pre-Entry 3/- to:— I. Turner, 9 Rycroft Street, Fulham, London S.W.6.

Kilmarnock F/F Rally. Ballagelich Moor, Eaglesham, Renfrewshire. Open R/G/P Pre-entry to:— W. McGill, 12 Clyde Place, Kilmarnock.

Hall/Rolfe Open C/L Speed Meeting. Charville Lane, Hayes, Middlesex. All classes of speed, plus 8 lap T/R Sprint event (J.A. F.A.I. and B) Pre-entry 4/- to:— I. Rolfe, 4 Glynde St., Brockley, London S.E.4. All entry fees returned as prizes.

S.M.A.E. British National Championships R.A.F. Hullavington, Wilts., on A429 between Malmesbury and Chippenham.  
May 29 Sunday Events. Open Rubber (M.A. Trophy). Open Power (Shelley Trophy). R/C Multi (S.M.A.E. Trophy). R/C Scale Qualifying Flights. C/L Scale Qualifying Flights (Krooke Trophy). Team Race Class A (Davies A). Combat (heals) C/L Speed Handicap, plus one unorthodox event.  
May 30 Monday Events Open Glider (Thurston Cup). Combined R/G/P. (Womens Cup). R/C Multi (S.M.A.E. Trophy). R/C Scale Judging. C/L Scale Judging. Team Race Class J.A. (R.A.F. M.A.A. Trophy). Stunt (Gold Trophy) Combat (Finnia)

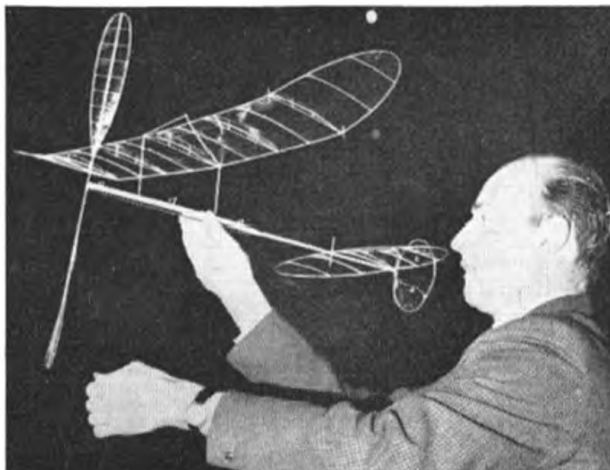
## COMING EVENTS (to add to the Calendar)

Sept. 25

Luton D.M.A.S. Slope Soaring Rally. Ivinghoe Beacon, R/C Multi and Single F/F Chuck Glider:— Write to D. Baleman, 14 Ridgeway Drive, Dunstable Beds. Please NO Power Models

June 28

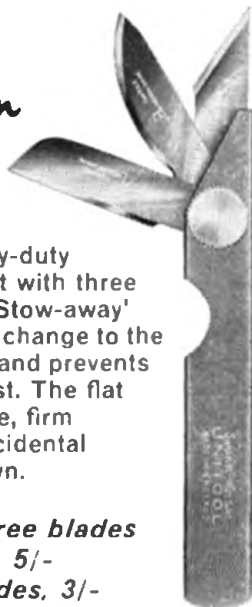
St. Albans Gala. Chobham Common, Surrey. Open R/G/Ps Coupe d'Hiver, A/I Glider. John Simons Trophy for Power.



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## FOR SALE

Cox .049 for sale + prop: Any reasonable offer over 35/-, 13, Bowes Road, Newton Aycliffe, Co. Durham.

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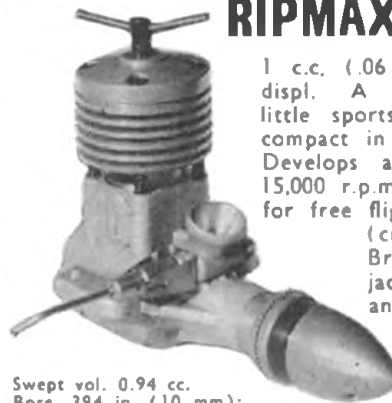
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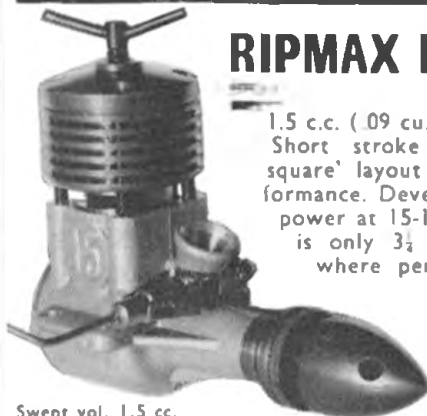
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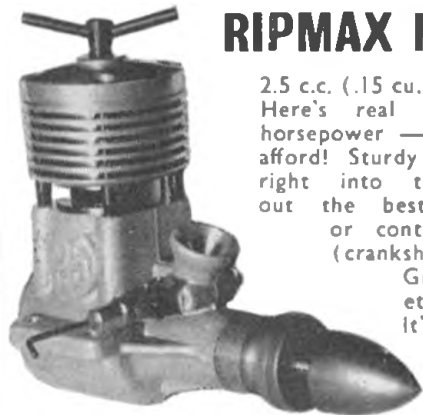
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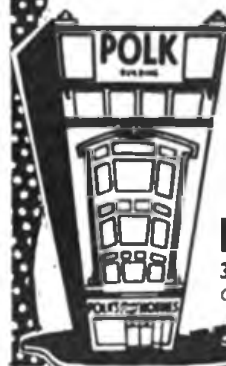
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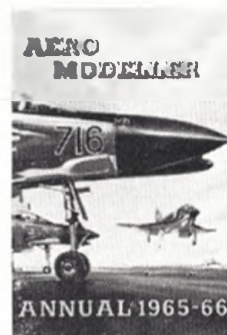
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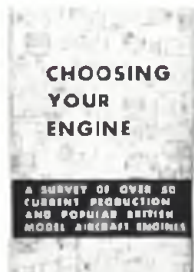
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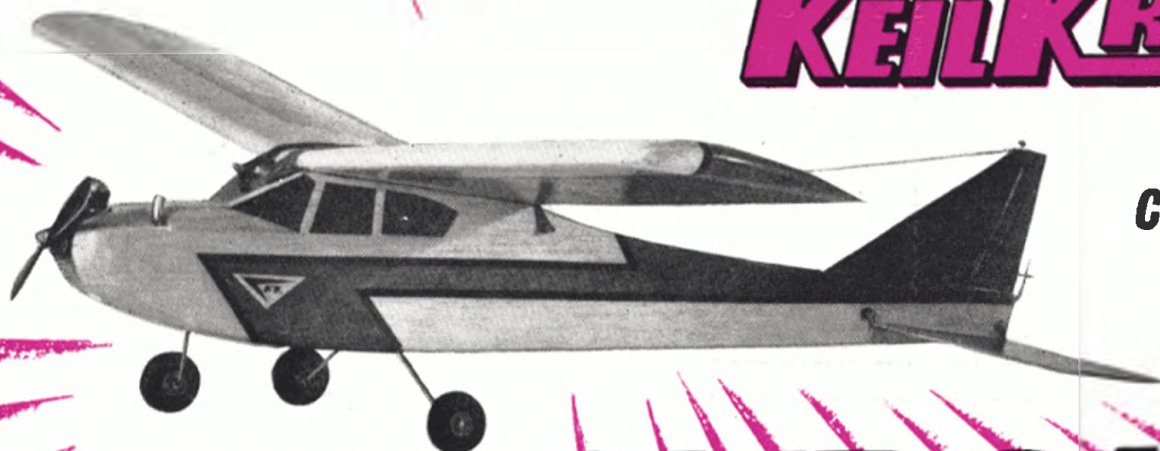
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