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AERO MODELLER

MAP **HOBBY MAGAZINE**

other modelling angles . . .

March edition of *Model Maker & Model Cars* will have something a little different—a large (five foot) clipper ship model for sailing—and the Mercedes Benz W125 are two feature articles, plus a working free-running armoured car, R/C yacht information, a complete list of M.P.B.A. clubs, and the usual something-for-everyone, drawings, etc., etc. and a complete list of available electric motors! This will be very useful for all modellers, especially radio and boat fans.

Radio Control Models & Electronics for March contains a useful constructional article describing a multi servo built from readily obtainable parts. Boat modellers will appreciate the three channel installation in a scale model with a spot of character; the "*Pibroch Puffer*". For aeromodellers, a ¼-size plan for a *Galloping Ghost* model takes the centre two pages and is accompanied by an interesting article on construction, installation and flying. *Miniature receivers* form the subject of the month's test report and construction of a kit version of one of them should be helpful to beginners.

Both magazines are the same price . . . 2s. per copy. If your Hobby Shop or newsagent does not carry a stock send 2/4 for a return post delivery from the address below.

March 1963

VOLUME XXVIII No. 326

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cover

Departure from our recent styles is this new cover design by John Silvester, illustrating the McCannard 27 and Model Rocketry. These two subjects, which are quite new to AERO-MODELLER readers will no doubt evoke fresh enthusiasm among those who favour the less orthodox forms of modelling. We can thoroughly commend the petite little Canard as a tremendous source of flying fun for very little financial or time expenditure. Moreover, the engine is amply protected in its mid position. The greatest risk is that of loss through high performance—be sure to fit a name and address label. In the same way, don't forget your parachute if you take up rocketry!

next month...

Always a popular World War I enthusiast's favourite, the **De Havilland 5** stagger-wing biplane fighter, will be described and drawn in his customary style with ample fine details by Peter Gray. Often considered a difficult flying model subject, the D.H.5 also represents a challenge for solid scale modellers. Col. Taplin has been researching for many months on production methods and materials selection for his twin cylinder diesels. The new **8 c.c. twin** will be the subject of our Engine Analysis, sure to appeal to many sports flying enthusiasts who prefer larger models. **Class B team racing** is said to be losing interest, could this be due to lack of design inspiration? Granger Williams, one of the originators of team racing, presents his very attractive biplane speedster, which is quite a new and very realistic approach. **Winter Model Trade Fair** survey will summarise all the revelations of Chicago, Nuremburg, London, Harrogate and Brighton expositions. Look out for a few surprises! All included in April edition out on March 15th.

Editorial and Advertisement offices

38 Clarendon Road, Watford, Herts

Telephone: **Watford 32351** *(Mon.-Fri.)*

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The Royal Air Force

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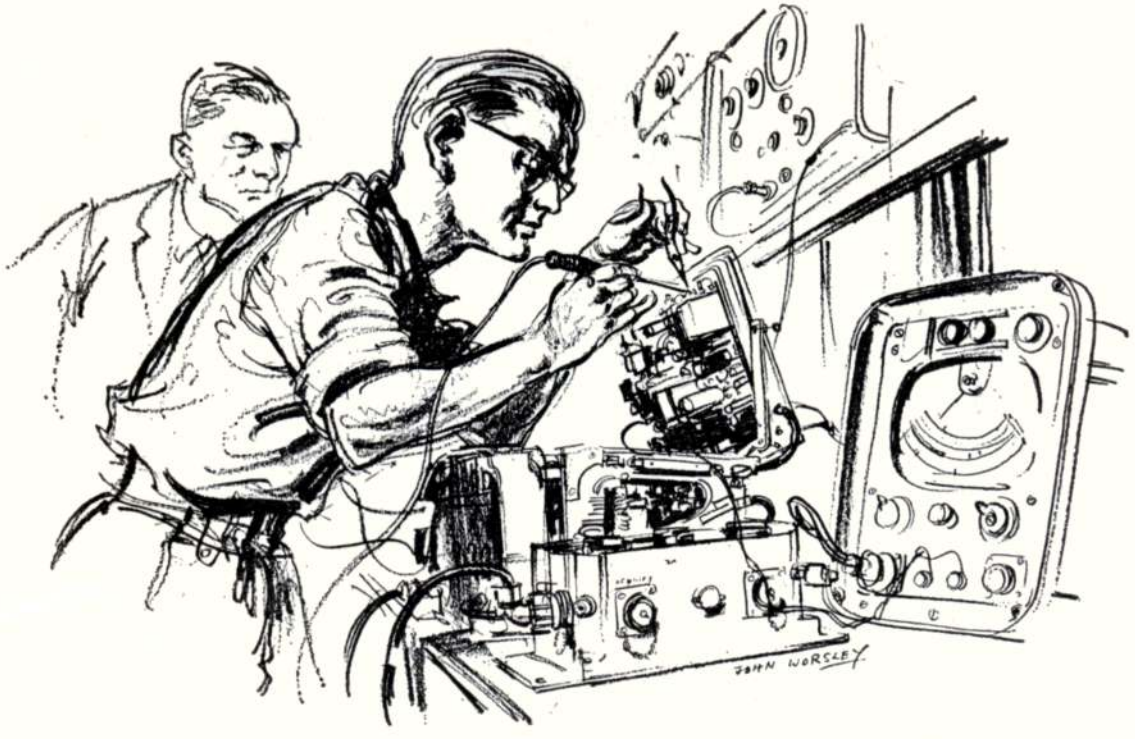

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This is the fifteenth annual appearance of this ever-popular volume. Cover shows man-powered Puffin against the starry sky and space capsule Friendship VII. Articles include electric free flight power, man-powered experiments, attache case models light weight rubber, theory facts and fallacies, control surfaces, anti-warp methods, Italian Schneider Cup models, R/C prototypes small transistor R/C receiver, plus a wealth of model plans from all over the world, fully dimensioned, engine analysis, contest results, etc., etc. 160 pages, size 8½ by 5½ in., covering the world of aeromodelling printed on high quality gloss paper with modern colourful board cover.

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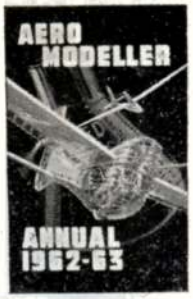

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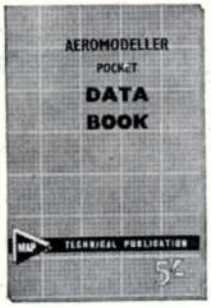

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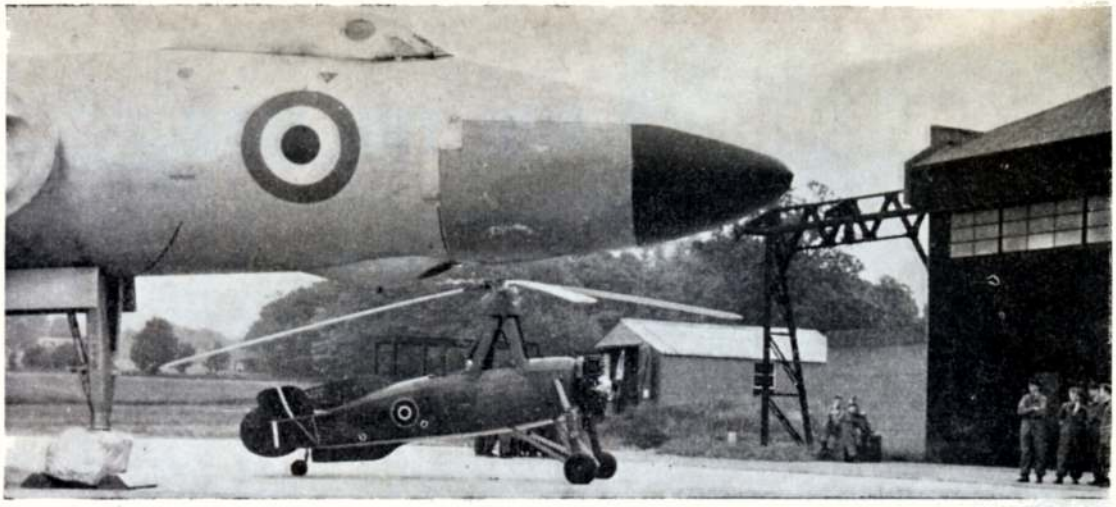


HEARD AT THE HANGAR DOORS

Record News

A NUMBER OF improvements have been made on Soviet-held world records, now recognised by the F.A.I. Most notable is the distance in a straight line flight which, if our interpretation is correct, was made with a *rubber-driven* model over no less than 267.18 miles! This outstanding effort by G. Chiglintsev was established on August 1st, 1962. Duration flight for radio controlled power models is now increased from 6 hours 1 minute to 6 hours 31 minutes with a flight by Novikov of the U.S.S.R. on October 3rd, 1962.

The rubber-driven flight now establishes an absolute world distance record for all classes. Distance in kilometres was 430, which handsomely extends the previous Soviet-established record (with a power model) of 378 Km. We hope soon to be able to publish a complete listing of all F.A.I. international records in view of the confusion that has arisen in recent months. Our friends in Australia were particularly unfortunate in not being aware of an improvement on the radio controlled distance record before they made the first of their several attempts with their sights set too low for the proper target. The actual R/C record is just under 93 miles, as reported in our September issue. An amusing account of the latest attempt across the red dust, pot-holed road in the western plains of Australia on Labour Day Week-end, is given in the December edition of *"Model News."*

The target was 200 Km. (124.27 miles). *Cicada* 88 was prepared and capable (see November *"Over the Waves"*). For the first 18 miles all went well. At this stage the pilot, seated precariously on an extension behind the bouncing station wagon was convinced that the model was in a dive. He fought with the trim whilst the rest of the crew laughed their heads off, for they alone, with their eyes on the road, realised they were climbing a hill and the model was flying level! The flight progressed until quite suddenly, at the 23-mile point, *Cicada* dropped the right wing and terminated in the desert with nose ripped away. Reason for the failure was a vibration fatigued wire on a servo. Plans are in progress for another attempt by the same team, this time with apparently smaller models using the Australian Taipan 2.5 engine.

Beside the distance records, there has also been an onslaught on speed. Following his return from the World Championships at Kiev, Bob Lauderdale and Tom McDonald working as a team have made a 2.5 c.c. flight of 247.64 Km./h. (154 m.p.h.) at Huntsville on December 1st, under the full terms of F.A.I. regulations. They used a Super Tigre G20, 6 x 10p "Record" prop, "This is it" fuel and .012 in. Monoline. The existing record was established at the Budapest World Championship meeting by Z. Pech at 246.07 Km./h. Each new record must beat the preceding record by at least 2 Km./h. and under these terms it seems that the American team has failed by a fraction of a kilometre to gain recognition for their fine attempt.

They have also made a 10 c.c. flight at a record speed (for the U.S.A.) of 187 m.p.h.

Home Built

In January we reproduced photographs of the "Little Toot" Biplane, a full-size aircraft which was actually developed by George Meyer after he produced his dream craft in model form. This month our photograph (shown below) shows the *Contester*, which looks exactly like a scaled up model and was entered in the Experimental Airplane Association 1962 design contest by Leon Tefft of Chicago. In the photograph, Al Neuntathol is seen flying it in formation with the photographic Beech T-34 "Mentor" at 5,000 ft. Of all wood construction with ply covered wings, the Contester has a Continental 75 h.p. engine. The wings can be folded and the aircraft winched on to a car towing trailer in less than 10 minutes. Full-size planes like these give aeromodellers a particular kick of satisfaction when they look so much like the type of product from an ingenious model builders bench.

International '1,000'

Wharfedale Club opened their annual 1,000-lap team race marathon to all comers on a postal basis in 1962. Australia and the U.S.A. provided other participants. At Moorabin, fastest eliminating heat time was established by the Moore/Green team, who had travelled 1,000 miles to enter, all the way from South Australia, but they had the misfortune to

Nestling under the nose of Avro Vulcan XA 892, which had been flown into the small grass field at R.A.F. Halton, is the rebuilt Cierva C.30A, AP 507, code lettering KX-P, ex G-ACWP. The Autogyro was also Avro built as the "Rota" so that each of these contrasting airframes came from Woodford, Manchester. The C.30 A is destined for the new Science Museum whilst the Vulcan remains for R.A.F. Apprentice instruction

shear the crankshaft on their Enya 29. The Australian section was won by the Holtham/Kidd team from Victoria, using an OS Max 29, which averaged 93 m.p.h. for 42 laps per tank. They completed the 1,000 laps with 24 pit stops in 66 minutes 24 seconds.

In the U.S.A. the team of Joe St. Marie/Biddle/Pitt led from start to finish with their fast model, also powered by OS 29, averaging 105 m.p.h. for 30 laps with 34 pit stops in the 1,000-lap distance. They finished in 65 minutes 21 seconds. A most creditable effort which became the best of the contest.

On home ground, 20 teams entered, many of them circulating at over 100 m.p.h. A mid-air collision forced the retirement of two fast teams from Novocastria and Chorlton, so preventing an anticipated record time of about 51 minutes, leaving the Halifax lads, Bullock, Hollingworth and Fitzgerald, to finish unscathed with their Eta 29 powered *Dalesman*, which averaged 85-90 m.p.h. for 40 laps, making 25 pit stops in the distance for a time of 75 min. 1 sec.

"Rushy"—as we remember him

TRIBUTES IN MEMORY of C. S. "Rushy" Rushbrooke continue to arrive from his wide circle of friends and acquaintances in the world of aeromodelling and we should like to thank the many readers who have extended their sympathies. Such letters, with their expressions of high regard for "Rushy" as a man, show clearly the many facets of his character. We quote some extracts below as a token of the universal esteem for his work . . .

★ ★ ★ ★ ★

Every talk one had with Mr. Rushbrooke reminded one of his unusual knowledge in the model field which has always been accompanied by his fine humour. His joyfulness and openmindedness have made him a well liked friend far across the borders of his own country.

Johannes Graupner.

★ ★ ★ ★ ★

Men of such calibre are not easily replaced and he will be missed in the modelling world.

E.Mayhew, Macgregor R/C.

★ ★ ★ ★ ★

His enthusiasm and ability for hard work will be very much missed by the model aircraft movement and by all who have had the pleasure of working with him in particular.

A. F. Houlberg, Chairman, S.M.A.E.

★ ★ ★ ★ ★

He was a tireless worker for our movement whose personality will be sorely missed.

High Wycombe Model Aircraft Club.

★ ★ ★ ★ ★

He was both a very kind man and a good man for all concerned with Aeromodelling where his loss will be felt very strongly.

C. E. Hennecart, Director General F.A.I.

★ ★ ★ ★ ★

My thanks and regrets follow you, Rushy, I will never forget that with your assistance we have become a group of good modelists.

Abbe Amiard, Flers, Orne.

★ ★ ★ ★ ★

We thought a great deal about Rushy up here; we remember the very hard work he has done for the model aeroplane movement in this country and his efforts to promote International meetings.

R. Firth, Chairman, Northern Area S.M.A.E.

I shall always remember him for his forceful thinking and his urge to "get things done"! He was so full of vitality. Scrupulously fair he never spared his effort on behalf of the model aeroplane movement, and the modellers of today will never realise the important part he played in the organisation of the S.M.A.E., especially his efforts many years ago to establish the Area Scheme.

C. A. Rippon.

★ ★ ★ ★ ★

Rushy will never be forgotten by us out here, especially for his work as F.A.I. representative.

J. Malkin, New Zealand.

★ ★ ★ ★ ★

I always admired Rushy's indifference to personal popularity. He always did what he felt had to be done. In a world where prestige and status are widely courted, it is a rare man who will be guided solely by personal sincerity and a deep integrity. Like other men, Rushy could make mistakes. But unlike most of us, he could admit them.

B. V. Haisman, Canada.

★ ★ ★ ★ ★

In his long association with your magazine he did a great deal to further the cause of model aviation throughout the world, and his passing leaves a gap that will indeed by hard to fill.

J. Fullarton, Australia.

★ ★ ★ ★ ★

It was easy to underestimate Rushy for he put on no airs, but there was an implied standard of excellence about him which one simply sensed. My outstanding impression of him, the sum total of it all, was that he was a mighty fine gentleman, in the very best sense of the word. It is a great distinction that a man could pass his lifetime in the useful service of others, and in a hobby that uniquely means so much to so many.

W. Winter, U.S.A.

★ ★ ★ ★ ★

It just doesn't seem possible that anyone as robust and as vigorous as he could be taken so suddenly. We know what a tremendous shock it must have been to his family, to you folks at the "Model Aero Press" and to his many friends, both in England and abroad. There can never be another "Rushy".

R. W. Nichols, Executive Director, A.M.A.

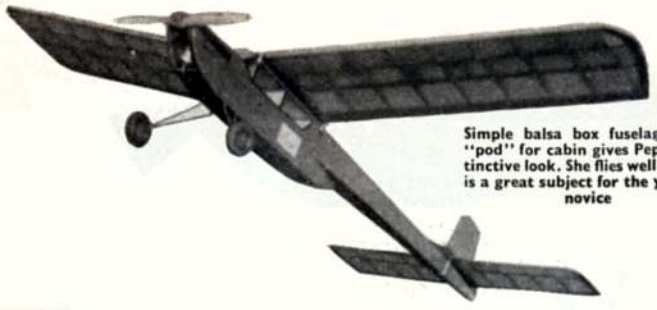
Subtle difference

Our statement that the new scale of membership fees for the S.M.A.E. Ltd., allowed Clubs to deduct 10 per cent. from affiliation fees for all full members was not exactly correct. Country Members will pay a subscription of 40s. for Seniors, 20s. for intermediates and 12s. 6d. for Juniors. Clubs *on affiliation* pay 36s. for each Senior, 18s. for intermediates (Under 21 and over 16 years of age) and 11s. 3d. for Juniors. It is correctly drawn to our attention that there is no question of Clubs deducting 10 per cent. from all full members although the S.M.A.E. Special Notice read "Clubs are entitled to a discount of 10 per cent."

It should also be borne in mind that a member of a Club affiliated to the Society is not himself a member of the Society; it is the Club which is a member.

Opportunity

A vacancy exists on AEROMODELLER staff for a keen enthusiast with broad interests in most branches of the hobby, able to express himself clearly in good English, and capable of a good standard of modelling. The post of Editorial Assistant has excellent opportunities for the right person and application for interview should be made in writing to the Editor. Details of experience, education and age should be quoted.



Simple balsa box fuselage with "pod" for cabin gives Pepe a distinctive look. She flies well too and is a great subject for the youthful novice

PEPE

by A. Healey

A simple 36 inch free flight sportster

WANT AN EASY MODEL to build for that spare .3 to .8 c.c. engine? Here's one that even the least experienced of aeromodellers can build without difficulty. East Lancashire club members would agree to this from practical experience. She flies without any troubles whatsoever and the E.D. Baby powered prototype just built, had the designer chasing all over the countryside due to the height it gained even on a half empty tank.

Start construction with the fuselage. Accurately mark and cut out the fuselage sides and formers. The designer measures his sides on to medium hard balsa, in preference to tracing the outlines. Next, bend the undercarriage wires, bind and cement well in place on F1 and F2. Follow this by fixing the engine bearers to these formers.

Now cement formers F1 and F4 in their respective places on the starboard fuselage side. Cement the port side in place, adding the $\frac{1}{4}$ x $\frac{1}{8}$ in. wing mounts, checking always for correct alignment. When dry, crack slightly behind F4, bring the sides together and cement at the tail with F9. Add remaining formers, sheet top, cabin, etc. Nose inserts can be fitted now. Sand lightly, add dowels and celluloid, tail skid, and wheels to complete.

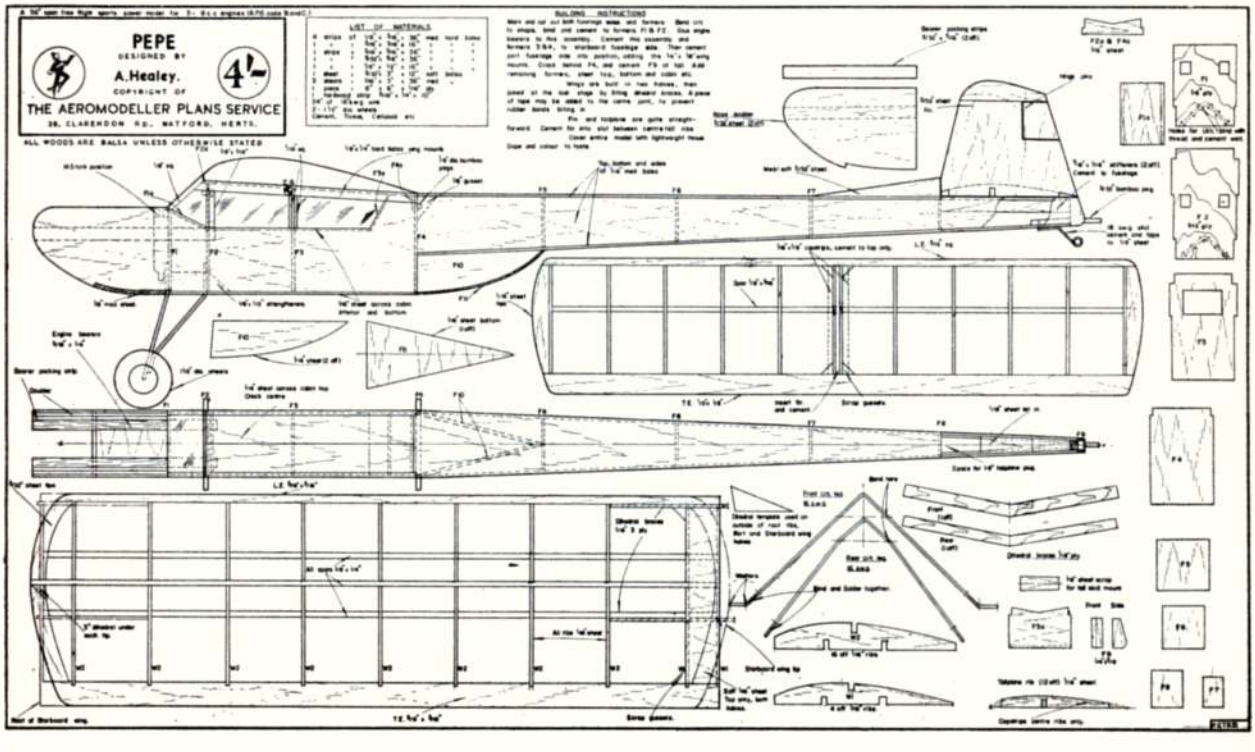
Wings are made in two halves leaving the fitting of dihedral keepers until the last stage. Don't forget that the root rib has to be tilted for which the dihedral template is used. Cement the keepers in one half of the wing then bring together, cementing the root rib support to give 3 ins. dihedral under *each* tip. Add a piece of tape over the joint at the trailing edge extending past the next rib in each half. This prevents the rubber bands from cutting.

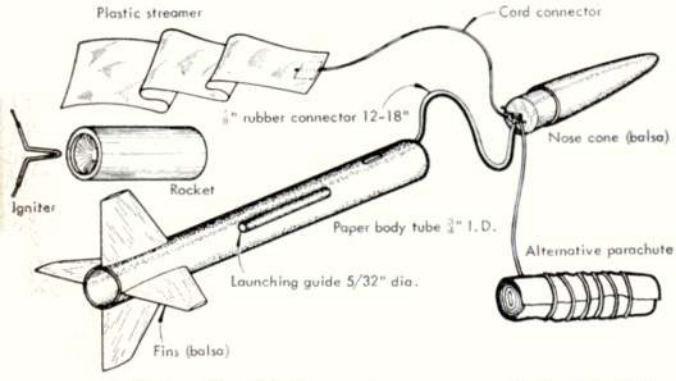
The fin and tailplane require no special instruction other than to mention that the fin is cemented permanently to the tailplane in the slot between two centre ribs, Also, the cap strips on these two ribs (to protect the tissue from the rubber bands) are simply made by using two $\frac{1}{8}$ x $\frac{1}{16}$ in. strips of balsa and cracking or steaming them to follow the curvature of the ribs. Cement one to each rib outside of the slot for fin.

Cover the entire model with lightweight tissue, then dope and colour as preferred.

Flying will present no problems, and *Pepe* will soon show how tolerant she is of maladjustment to her flying surfaces—don't forget that name and address label to be stuck on the cabin side—for she is sure to try to get away some time with her snappy performance!

FULL SIZE COPIES OF THIS 1/5th SCALE REPRODUCTION ARE AVAILABLE THROUGH A.P.S. AS PET 833, PRICE 4/6 INC. POSTAGE.





Model Rocketry (U.S.A.)

SINCE 1959, A new hobby has swept across the U.S.A., attracting many aeromodellers and offering a new challenge in modelling achievement. It is Model Rocketry, —not in any way to be confused with Amateur Rocketry. Subtle difference is that the "Amateurs" make their own propulsion units, whilst Model Rocketeers, who belong to the N.A.R. (National Association of Rocketry) are only permitted to operate with commercially produced units to approved standards of safety.

Natural enquiry is for the distinction between Model Rocketry and casual firework displays, and the answer comes in a stack of N.A.R. Technical reports and their pink jacketed Sporting Code. This is indeed a well organised association with headquarters at New York and regular National Championships each year, that for '62 taking place at the U.S.A.F. Academy, Colorado. It is far from juvenile in all aspects, has the blessing of the U.S. Air Force, and through good public relations, is steadily increasing its following with International recognition through the F.A.I.

Contests are arranged for many classes of rocket, varying in size and number of units as well as purpose. Typical examples are the *Parachute duration* (time taken to return by parachute from moment of firing) *Multi-stage altitude* (3 stages are used sometimes), *Payload* (5 ounce take-off weight incl. 1 oz. of ballast) *Scale* (Plastic kits adapted for flying) and *Boost-glide*

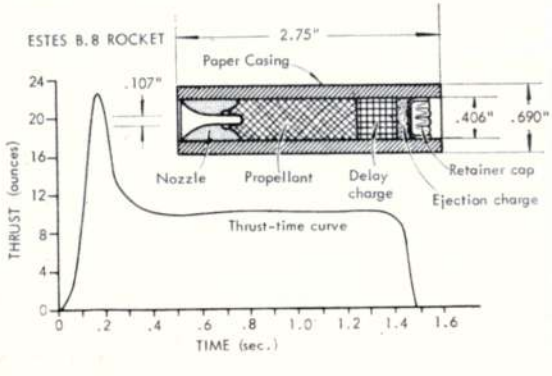
Boost Glide rocket, having the propulsive unit fitted at rear. "Blow-back" type elevator gives a glide trim when speed falls off. Durations up to 2 mins. possible. Right is typical rocket cross section and performance curve. Note short, but effective duration

At left, typical rocket structure showing alternative recovery methods. Above is variety of rockets shown to F.A.I. by G. Harry Stine of the N.A.R. including 3 boost glide types and two scale models. Note. ONLY COMMERCIALLY PRODUCED ROCKETS CAN BE USED. Similar regulations would apply in Britain if Rocketry were to be adopted here

(Up as a rocket, descent as a glider),—these are but a few of the events. National records established so far include a Payload altitude of 1,700 ft. and Class B altitude (2 oz. weight, single unit) of 2,265 ft. Height is measured by a prescribed optical theodolite system.

Safety regulations begin with supply of the rockets by mail. They are classified as "Toy propellant devices" and three units per package is a general limitation. Some States, for example California, have regulations prohibiting model rocket operation, and elsewhere the guardian eye of N.A.R. is on constant watch that its requirements are met. Rockets are fired off electrically by short circuiting 6 to 12 volts across a short length of Jetex fuse which has a convenient copper wire core. The rocket is guided by a vertical rod or length of 10 g. Piano wire to steer it accurately on a vertical course until aerodynamic stability takes over, and naturally enough, great play is made of the count down procedure.

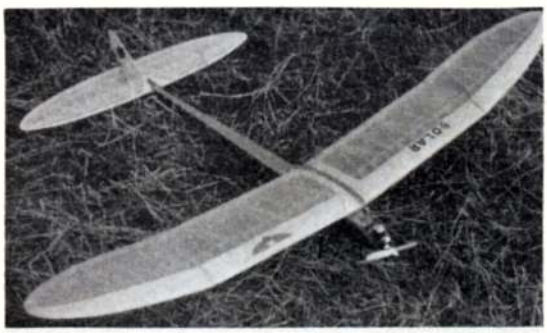
The rockets come in a wide range, from a few ounces up to two pounds of thrust over varying impulse duration. They are made of wrapped paper tube with a ceramic moulded nozzle pressed in the rear. Astronite-B is a standard solid propellant and according to design, burning takes place either on the face or along the centre bore outwards, the latter being the quicker; but more powerful variety. After a delay charge is burned, a final ejection charge will blow off the nose cone. This is attached to the main rocket with shock absorbing elastic, and then the rocket descends with trailing streamer or 'chute.



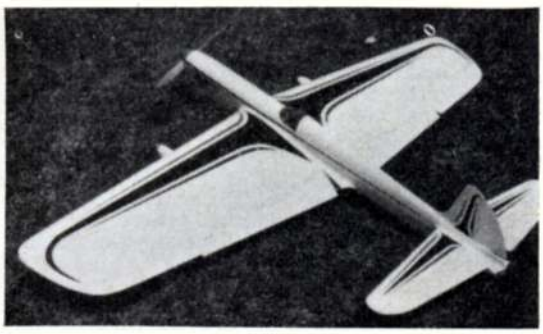
John Malkin reports on the

N.Z. Nats

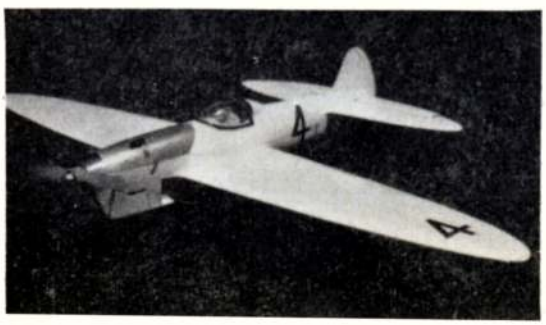
All-rounder Bill Cook leads F.A.I. Power team with his "Saturn Mk. 2a" complete with Yankee Doodle stars and SCAT Club transfer. Torpedo 15 R motor



Brian Roots' Payload "Solar" with Cox motor placed second. Shows influence of these attractive U.S. designs in N.Z.



Above is Nev. Dawson's modified "Ares" stunt winner, complete with designer's decoration style. Below, Bob Kennedy's Class A racer was second by a mere 3.9 secs., looks like yet another "Miss F.A.I."



THE 15TH N.Z. NATIONALS opened at Fielding on the 27th December. Excellent facilities had once again been arranged at the Racecourse and Taonui Aerodrome 4 miles away. Weather on arrival was not very encouraging with a cold southerly blowing, and mid-summer snow (!) on the surrounding mountains.

After one of the coldest nights spent under canvas (and also one of the smelliest, due to there being a meat works 1½ miles away) the popular **A/2** event started at 5.30 a.m. on December 28th with a light cool Northerly blowing. During this contest, the thermals seemed very small and easily dumped a model out on the side. In fact, throughout the Nats, the downdraughts were particularly vicious. Four maxes only were scored in round one by Cook, Keegan Hewitson and Hopley. Then the wind swung East. Ten maxes were scored in the 2nd round and the lead changed to Ivan Treen of Levin, with John Armstrong, a junior of Ashburton, and Ted Malkin, Upper Hutt following. John Sheppard's new 130 in. span 3½ in. chord solid wing flapped in the breeze.

For round three the wind swung round to a light southerly and lift became more powerful. Treen, Malkin, Hewitson and Armstrong all scored another max to secure top places. By the fourth round nobody was very keen to fly as the wind died, and most of the top boys really muffed matters. Ted Malkin was up and down for 67 secs. Hewitson managed 84.2 secs. and Ivan Treen returned from his third round retrieve with the sad tale of stuck timer and no reserve. John Armstrong made 133 secs. for top place with Hewitson and Malkin in second and third respectively.

As if to confound the weather experts the wind again swung back to the East and blew just as hard for the fifth and final round. All three leaders missed out a max., Malkin being highest with 116 secs. The final result was a win for a junior:—

1. John Armstrong	*Ashburton*	743.4 secs.
2. R. N. Hewitson	*Auckland*	729.8 secs.
3. Ted Malkin	*Upper Hutt*	708.7 secs.

Of 52 contestants entered, 43 returned times.

An old event now reinstated was **Class A power**, the rules of which conform to the old F.A.I. rules (17.6 oz. total weight). Entries were slight and most promising looking model there was Henry Grocock's (Auckland) *Ramrod* 750, powered with an O.S. Max 29. Of 40 entries only 19 flew, and some of these only had one flight as their machines were either shredded or disappeared downwind. This class could prove quite popular next year as there is a move to abolish *all* rules and make it Open.

1. N. Hopley	*Mt. Roskill*	481.4 secs.
2. M. Stevens	*Christchurch*	434.1 secs.
3. B. Keegan	*Auckland*	422.3 secs.

During all this, the "Try to fracture their arms boys" were getting wound up. Most of the **chuck gliders** were the usual 18 in. sized models, but some big 24 in.—30 in. models were seen. Arthur MacAulay of Kaiapoi had airdraulic timers concealed in the wing centre section connected to a tip up D.T. tail.

52 entrants out of 62 returned times.

1. T. Martin	*New Plymouth*	338.6 secs.
2. G. Bowden	*Mt. Roskill*	332.0 secs.
3. J. Armstrong	*Ashburton*	286.5 secs.

After another bitterly cold night everybody was very slow to get out of their warm sleeping bags to fly **Wakefield** on the 28th. It was a glorious day.

Round one commenced at 5.30 a.m. in cool, calm conditions and everybody held back in the hope that conditions would warm up.

Round two saw the thermals starting to bump and eight maxes were scored. MacAulay holding his lead at 351.5. Ted Malkin next with 331, brother John Malkin third with 313.7 and Bill McGarvey fourth with 301. Nine maxes were scored in the third round with leader positions unchanging. One or two of the models did drift outside the drome and Ted Malkin was unfortunate in losing his model having to finish the contest with an untrimmed reserve. During the fourth round the whole aerodrome seemed to be one massive thermal as at one time there were 9 models circling in this "uppie".

In round 5, MacAulay, John Malkin, and McGarvey again gained maxes thus assuring top places for themselves. Except for a few in the third round, most of the models D.T'd within 250 yards of the take-off spot—surely one of the best flying contests held in N.Z.

All the while a high pitched buzz was apparent, the reason being **Multi R/C.** Smears were few and far between, and most of the

Far left is Devon Sutcliffe with his modified McKenzie "Goulash" design which placed 10th at 766 secs.

Left, Brian Roots arrived well equipped with neat models, this one his own designed A/2 glider which placed seventh

Right: After the final, J. Crombie and W. Cook with the former's Class B racer which was held back by a cooked plug at start of the final, their 10 mile heat time was 9:09. Note the headgear in these top pics.

contestants appeared not very keen to do their maneuovres down low. The main exception to this was Dave MacPherson of Palmerston North, who likes it under 200 feet, but he was unfortunate to lose "up" elevator and only through good flying with ailerons managed to get his machine back on the ground fairly intact.

1. E. G. Hartley *Palmerston North* 89 pts. (Orbit Tx Johnson Rx)
2. Colin Boyd *Palmerston North* 80 pts. (REP Tx Kraft Rx)
3. Bob Milne *Hastings* 75 pts. (Orbit 8 Tx, Rx)

C/L Aerobatics were flown all day and most of the machines were Detroit type stunters. Top points went to Nev Dawson of Upper Hutt who flew a beautifully constructed and finished modified "*Ares*" powered with a Johnson 35. Second place getter, Peter Wheeler of Kaiapoi, flew a Max 35 powered "Thunderbird" style design.

1. N. Dawson	*Upper Hutt*	398 pts.
2. P. Wheeler	*Kaiapoi*	367 pts.
3. R. Goding	*Christchurch*	363 pts.

Class A Team Race also was flown off in the afternoon and the final was the closest that has been for some time. Pit stops were extremely good, Barnard of Auckland was clocked in one at just under 4 seconds.

1. P. Barnard	*Auckland*	5:48.0
2. D. & R. Kennedy	*Oanaru*	5:51.9
3. J. T. Wooly	*Kaiapoi*	5:54.2
4. A. Clarke	*Lone Member*	6:52.5

In the evening, after a lapse of twelve years, the **indoor** fiends were let loose in the Feilding Civic Centre, a fair sized building with a 30 ft. ceiling. Unfortunately, conditions were extremely rough and it was very hard to get through the turbulence. Biggest model was flown by Henry Grocock of Auckland, this being a Micro-Dyne *Super C*. Other machines there were two Bilgri "*Dittos*" five *Easy B's*, and an interesting eliptical dihedralled model built and flown by Angus McDonald of Auckland, plus three tissue models.

With 12 flyers out of 18 entrants this event could become popular once again so long as a suitable hall is available.

1. B. Keegan	*Auckland*	408.7 secs. ("*Ditto*")
2. B. Roots	*Wellington*	326 secs. ("*Ditto*")
3. W. Choy	*Wellington*	316 secs. ("*Easy B*")

These times are the *best* of three attempts. It is interesting to note that Choy, built and covered his model during the afternoon!

With Indoor not finishing till about midnight, it was an extremely weary crowd that got up at 4.45 a.m. on the morning of the 30th to fly **F.A.I. Power.** Once again the weatherman turned the tap the right way. No true three minute models were seen during this contest.

By round four Bill Cook who was in the second place decided to fly early and this proved rather lucky for him as he broke the fuselage of his *Saturn* just aft of the pylon. After a hectic 45 minutes with balsa, glue and silk plus a team of willing helpers he launched into a thermal that brought him into the lead with 693.8. Noel Hewitson who was 3rd round leader, got into a downdraught and for 72 secs. as did 3rd man Sutton who managed only 59 secs. Scott of Kaiapoi had gained a max and this placed him second with 538.9. This left Cook to do only 54 secs. in the last round to win if Scott maxed, which he did, together with 3rd man Lagan. Cook got back from a fairly long fourth round retrieve and went out to fly and struck a "downie" and was back on the ground for 89 secs.; not much, but enough to consolidate his first place.

1. W. Cook	*Upper Hutt*	782.8 secs.
2. M. Scott	*Kaiapoi*	718.9 secs.
3. P. Lagan	*Christchurch*	716.9 secs.

During the afternoon **Class B Team Race** held sway and the surprising thing was the lack of the so called 100 m.p.h. plus racers. It appears as though they were around, even at the Nats on the night before, but on the actual day they either overheated or cooked plugs. One really fast model was Barnard's Eta 29 machine which was clocked at 120 m.p.h. but had such a short lappage as to not seriously worry other contenders. Fastest heat time went to Tony Cook of Christchurch, who did the ten miles in 7:34.5.

An interesting note was introduced by one T/R fan who stated that because his model was so fast "could he please stand still in the centre of the circle and let the other pilots walk around him." When his heat came up he could only get his machine into the air for twenty or so slow laps.

The final looked as though it could become quite interesting but when the flag dropped Barnard had trouble getting a needle setting, and Crombie found he had cooked a plug, leaving Cook and Partridge to establish a fair lead. Barnard was meanwhile having trouble and due to piloting errors, was disqualified.

1. A. Cook	*Christchurch*	8:06.1
2. G. Partridge	*Southland*	9:08
3. J. Crombie	*Wellington*	12:33.2

Immediately after Class B the **Control Scale** event was flown, and this year models were flown and *then* judged. N.Z.M.A.A. is trying to eliminate models which win only on static points. Nev. Dawson produced his beautifully finished Dynajet powered *Grumman Panther*. He "knocked it up" in a couple of months, and yet the finish had to be seen to be believed. Incidentally Nev. believes in building his models whilst kneeling down, and scorns the use of a table and chair!

1. N. Dawson	*Upper Hutt*	810 pts. *Grumman Panther*
2. L. Akroyd	*Hawera*	700 pts. *FVIIb Southern Cross*
3. B. Keegan	*Auckland*	572 pts. *Great Lakes*

Unluckiest contestant was Brian Ellison of Kaiapoi who had a nicely built and finished *Dakota* powered by two A.M.15's which came in on the lines and tore a wing off. To add insult to injury some heavy footed person trod on the remains.

The morning of the 31st dawned with an overcast sky and a light North Westerly. **A/1 Glider** boys were quite happy. It was pleasing to see such a good turnout of models, 44 flying out of 54 entries. The A.P.S. "*Aiglet*" is still a model to reckon with. The competition turned out to be a duel between Peter Levet of Auckland flying his O/D model, and Ian Barber of Wellington flying an "*Aiglet*". Peter towed his model into three of the 9 maxes scored in the event whilst Ian was content to fly in good air to return reasonable times.

1. P. Levet	*Auckland*	665.5 secs.
2. I. Barber	*Wellington*	634.8 secs.
3. Ross Glenny	*Wanganui*	603.2 secs.

Also flown in conjunction with this class was **R/C Rudder only** and on the whole the majority of fliers flew a poor pattern, some of them not even knowing the schedule. Most of the models tended to climb too fast with the result that their final maneuvres were done at about 400 ft. altitude. Mike Kendrick of Wanganui was a notable exception whose low winged "*Houdini*" flew an extremely neat pattern to win, using an O.B.M. motorised servo.

1. M. Kendrick	*Wanganui*	91 pts.
2. A. McDonald	*Auckland*	77 pts.
3. D. Whitehead	*Hastings*	76 pts.

In the afternoon Class 1 (2.5) and Class 5 (jet) **speed** were flown and most of the 2½'s returned times led by John Winn's 109.1 m.p.h. but in jet, the boys were really having trouble and the only competitor to return a time was B. Deakin of Palmerston North whose model made 118.4 m.p.h.

F/F Scale models first had to fly before scale scrutiny and their task was not lightened by a short take off board so many hand launched. Bob Milne's *Tiger Moth* won by a clear 100 pts. over Laurie Ackroyd's *D.H.C. Beaver*.

New Year's Eve celebrations were comparatively quiet, prior to early starting **Payload** on a beautiful New Year's Day, usually it's a blowout in N..Z Wind was slight, taking a max just out of the 'drome. Young Steve Raskin, a promising Junior from Levin hit two early max's then an 18 minute whopper (D.T. Failed) to clinch leadership with 779 secs. over Brian Roots with 602. Then the Nats wound up with 5 and 10 c.c. **speed**, taken by Phil Staples at 124 m.p.h. (*Dooling* 29) and John Winn with 130 (*Dooling* 61) respectively.

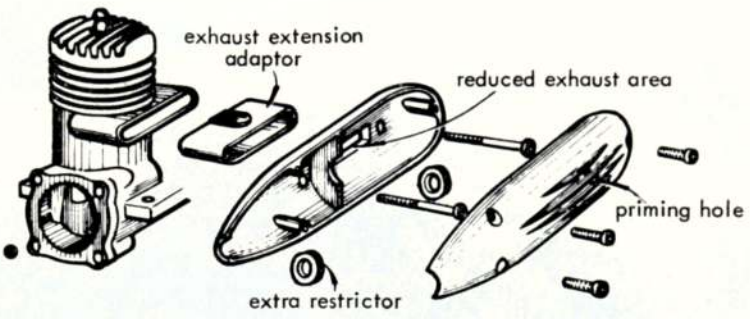
It was possibly the most enjoyable of the 15 Nats yet held and congratulations are due to the N.Z.M.A.A. and the Palmerston Nth Aeroneers for the spadework. Fielding has become an ideal North Island Nats. site. Auckland became Champion Club, with its members, Noel Hewitson and Peter Levet the F/F and C/L Champs.

'63 will also see first ever "live" participation of an N.Z. Team at a World Champs with all the A/2 men over in person, supported by R. Magill of Auckland, the full teams now announced are:—

A/2 Glider	**Wakefield**	**F.A.I. Power**
N. Hopley (*Roskill*)	A. MacAulay (*Kaiapoi*)	W. Cook (*U/Hutt*)
W. McGarvey (*Auckland*)	W. McGarvey (*Auckland*)	P. Lagan (*C/Church*)
E. Malkin (*U/Hutt*)	J. Malkin (*U/Hutt*)	M. Scott (*Kaiapoi*)

SILENCER SURVEY

PART TWO

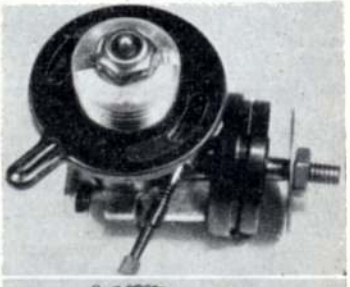


O.S 'JETSTREAM' SILENCER UNIT

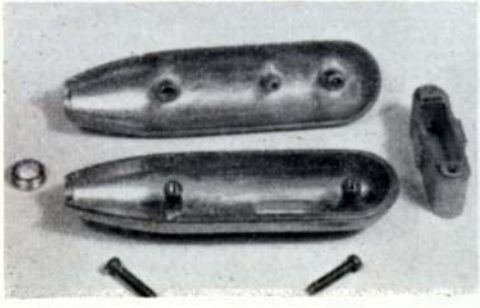
AN EXCELLENT RESPONSE continues in answer to our world wide survey extended to all manufacturers of model engines concerning production of mufflers or silencers. Last month we were able to reveal the products of four British, one German and two American engine manufacturers.. This month we have news from Australia, Japan and another manufacturer in the U.S.A.

Gordon Burford in South Australia, tells us that he intends to manufacture silencers to fit his new series 29, 35 and 45 glow plug engines and that these products will be available during March, 1963 in Australia. He also intends to manufacture a silencer to fit the existing *Taipan* 19 and 15 series. The *A.M.F. Wen-Mac* Corporation of Los Angeles, have sent us a sample of their muffler, designed to fit the .049 *Hustler* and the *Rotomatic* variant with spring starter. This is a clever pressed steel expansion chamber with a rotary lid. The lower fins of the cylinder head serve to apply pressure on the top plates as well as to retain the silencer on the engine. As the capping is rotated, so it closes off two slots. When fully closed, a 1/32nd diameter drainhole is the only means of taking away the exhaust and, in fact, the engine will run on this alone, but with reduced power. The particular engine to which our test sample is fitted was stamped as a Mark V. This silencer will sell separately in the U.S.A. at $1.50. It had been hinted for some time that the *Ogawa Model Mfg. Co.* had been working on the subject of silencers and last month's mention of the *O.S. Jetstream* units, confirmed their existence. We have now had an opportunity of examining samples of the two sizes which will be available, the smaller one to fit the 15 and 19, the larger for the 29, 35 and 49. Beside external size differences, there is also an additional baffle in the larger unit as can be seen by comparison of the drawing above with the photograph at bottom left. Each has a simple expansion chamber, entry to which is first reduced by a smaller port than that provided on the engine for the exhaust, with a further restriction at the rear orifice, which again can be reduced by a nozzle ring (in the case of the larger unit, by *two* nozzle rings). The silencer bodies are cast in a light alloy with thin walls, so that the weight of each unit is certainly no inconvenience to any model. What did surprise us, was the fact that the screws supplied do not permit the fitting of the larger unit to the OS.49 R/C and although an extension adapter is supplied to take the silencer outside a cowling, the screws were insufficiently long to retain the unit. No doubt this point will soon be overcome, but this type of long screw is not easy to obtain and usually has to be specially made. Apart from the aspects of pleasing appearance, light weight and efficiency (r.p.m. loss is claimed to be 500 to 700 r.p.m. with nozzle rings fitted), there is also an added feature in the form of a priming hole cast into each unit.

This is by no means the first time we have seen such a device fitted to a silencer, in fact, it is quite common practice, but this is the first time we have seen such an injection tube cast into a commercial unit. The general design of the *O.S. Jetstream* reminds one of the much earlier Webra silencer, presumably now defunct as we have had no answer to requests for information on their availability.



Above, sketch of O.S. large Jetstream unit using centre baffle and means of fitting. Below left, the smaller Jetstream unit without a centre baffle, showing priming tube opposite exhaust, nozzle ring and extension. Below Ripmax Marine Accessory exhaust stub for water-cooled E.D. 3.46 Hunter, which can be adapted to other engines, sells for 12s. 10d. Right, top, the WenMac Rotomatic with silencer, and below the O.S. 49 with Jetstream.



World News

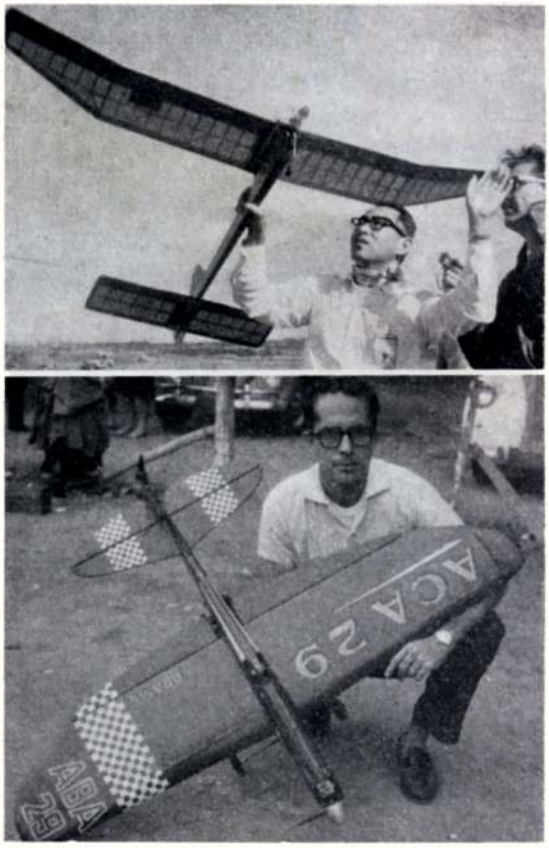
THE SUBJECT OF "World Regional" Championships has been thrashed often enough in these columns, nearest approach being the South American Champs as reported in brief last October. At F.A.I. level, several propositions have been studied for breaking the Internationals down into Zonal events but no practical solution has been discovered. In the **U.S.A.** a number of keen individuals have followed the line of an Inter-American Championships, and Don Thompson of Illinois has now issued a note to the effect that a free-flight International will be held in the summer of 1964. It is expected to stimulate interest in F.A.I. events and selection of the host U.S.A. team will be by a fund raising eliminators. Pan-American are to supply a chartered flight to pick up teams from the Southern American countries several of which have already indicated their intention to attend though official invitations have not yet been issued.

Air travel can be a costly business, and for the South American Champs, each nation is expected to send not only its teams but also officials for judging and lap scoring etc. At the meeting in Sao Paulo, **Brazil** last July, the **Argentine** team had a Douglas DC-3 for 21 people plus all the models. They returned with many of the trophies and presumably will be sure to visit the States in '64.

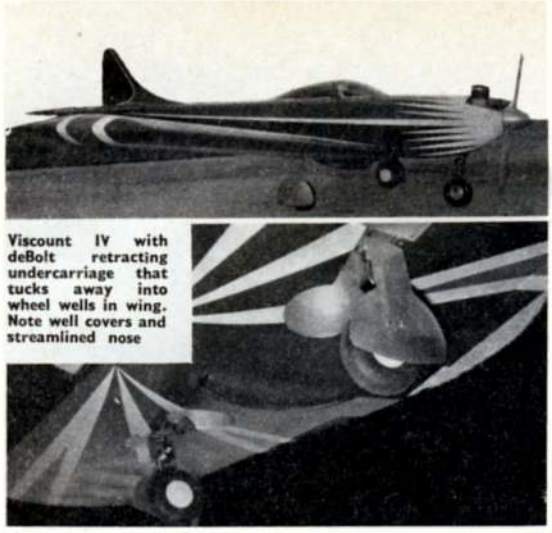
Wild whispers went around the world following the unfortunate accident at the U.S. Nats when an over-confident multi-channel flyer flew his model into young Richard Miller of Silver Springs Maryland as he was demonstrating his Gilbert ready-to-fly winner before officials. We're happy to report that Richard fully recovered after hospital treatment at Glenview N.A.S. and is a very keen chuck glider fan in spite of his unnerving modelling experience.

First copy we've seen of a model magazine from **Portugal** arrived this month. *Aero modelismo* is the title, and it carries results of many domestic contests. We hope to have more news from this country in future.

Coupe d'Hiver fans will be interested to learn that Guy Guidici headed a field of 90 models, including some **Italian** entries, at the 1962 Coupe de la Cote d'Azur. Held at Levens, about 12 miles north of Nice, the event was run in perfect weather. Guidici's winning model, the "Ferion" was detailed a year ago in March 1962 AEROMODELLER and has the appearance of a scaled down Wakefield design—strangely conventional for this famed flyer from **France**! Latest eyepopper from this country where it seems they can make all shapes of aeroplane fly, is no less than an asymmetric canard with unequal size wing and leading plane halves *plus* a single offset engine on one wing panel! Needless to say it's control-line, and claimed by designer R. Allier in "Modele Reduit d'Avion" to be aerobatic. He tells us his next is an annular wing.



South American Power Champ, Kiyoshi Ueno of Brazil in top picture uses Enya 15D. Stunt Champ is Thunderbird flyer Cesar Gama of Brazil. Below left, Uruguaian A/2 glider team, Abulifia, Blecich and Quartine under cold skies at Sao Paulo with well constructed models, and below right the sporting Bolivians, Del Barrio and Villarre with a "Texan"



Viscount IV with deBolt retracting undercarriage that tucks away into wheel wells in wing. Note well covers and streamlined nose

Over the Waves

Veron Robot by M. Forden, Eastcote Radio Control Club, employs Tatone Timer, seen below wing leading edge, for timed throttle control. Direct link to Fox 15 engine cuts to slow motor speed after predetermined time lapse

AT THE HEAD of this column you see well known radio control enthusiast Hal deBolt's *Livewire* Viscount IV which he used to test and demonstrate his fully retracting and extending undercarriage system. This has been in limited production during 1962. Each retracting leg is a self contained unit consisting of coil sprung leg and servo mechanism which is switched by radio, or an SPDT limit switch. The mechanism measures 3¼ x 3 x 1 in. and weighs 3½ ozs. It costs $24.95 and normally a minimum of two would be required. Obviously it is a luxury item, but its introduction coincides with the announcement of several 12 channel radio sets in U.S.A. and the feature is likely to be common for the future.

Tatone Timer Engine Control

Ex-free-flight R/C'ers, with surplus F/F equipment, may find of use the throttle control system used by Michael Forden of Eastcote Radio Control Club. Michael uses a Tatone Tick-Off timer connected direct to the throttle of his Fox 15 R/C engine. The timer is set to cut the Fox 15 to slow speed after a predetermined time lapse when his model, a *Veron Robot*, has reached a considerable altitude. The slow motor speed position is adjusted to give a moderate rate of descent, prolonging the flight, while minimising the danger of an O.O.S. flight, out-of-range fly-away. The Robot is equipped with a Macgregor Terrytone receiver and Elmic Commander compound escapement, operated by a Tommytone transmitter, equipped with Aristo Code-a-matic control box. The Robot, which we witnessed executing loops and rolls, certainly makes an excellent trainer.

Simple Club R/C Competition

Roger Hargreaves, a member of Rolls-Royce Welfare M.A.C., inspired this simple competition designed to place all R/C enthusiasts, whether single or multi, on equal terms. Rules are simple. On a signal from the starter, a competitor proceeds with his model and one permitted helper, to a point about 200 paces down wind. After starting the engine (fuel tank may be filled beforehand if desired), the competitor puts his model airborne. He must then fly his model to round a pylon situated a further 400 to 500 paces down wind (determined beforehand to suit wind strength). After rounding the pylon the competitor may then fly ad lib, according to the time left at his disposal. Total time allowed from starter's signal to touch down is seven minutes and a six-minute warning signal should be permissible, the competitor then endeavouring to land his model at base, as near to the seven-minute mark as possible.

Scores and penalties:—

Handicap		
Rudder only	—	Scratch
Rudder and Engine	—	—10
Rudder, Engine, Elevator	—	—20
"Full House"	—	—30
Landing		
Within 20 paces	—	+30
20—40 Paces	—	+15
More than 40 paces	—	—10
Time Limit penalties		
Overrun	—	15 for each half minute
Underrun	—	5 points for each half minute.

This exercise is somewhat akin to the R/C Spot Landing event at the 1962 Northern Heights Gala, where the event comprised a spot landing to a nominated air time. The added pylon course makes the idea far more interesting and although it may appear simple, it should prove most enjoyable for week-end flying.

More on Manual Pulse

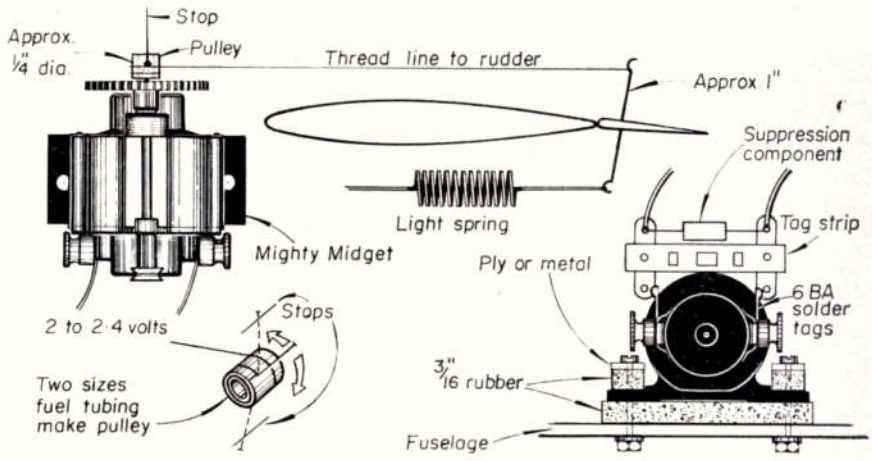
Interesting letter from one of the pioneer manual pulse enthusiasts, Doug Bolton of Nottingham, is a good guide to those who have developed a liking for this system described in December *Over The Waves*.

"It seems that the press for right, release for left, system may be catching on after all these years.

"The system which we (and Dave McQue, to win the N. Heights Gala in 1962) have been using around here for several years is a different one to that described. A Mighty Midget motor is used simply to pull the rudder to the right and a spring returns it to the left. The "drive" is a piece of thread wound round a "drum" on the motor shaft, the drum consisting of two pieces of fuel tubing, one inside the other pushed over the gear. It is advisable to put a pin through the tubing and let this hit "end" stops (more pins) on the fuselage side (the motor rotates less than a full turn). This prevents the drum unwinding too far and allowing the thread to become slack.

"A tip to keep the brushes of Mighty Midgets in place is to solder a piece of tag strip to 6 B.A. solder tags on the brushes. The tags in between will have to be drilled out; by careful positioning it is possible to pass the top shaft of the motor through the centre tag position if this shaft is required.

Left; Bolton Manual Pulsed Servo is based on the popular Mighty Midget motor. Note the tag strip, which holds the motor brushes in place, and rubber shock absorbers either side of mounting lugs. Power supply is 2-2.4 volts



"Beginners to radio control usually make the mistake of bolting a Mighty Midget solidly to the fuselage. Putting pieces of rubber each side of the mounting lugs reduces the danger of damaging the motor in a heavy landing."

Jet Powered!

First public demonstration on December 16th at the Royal Australian Air Force Base, Laverton, Victoria, Australia, was made with Keith Hearn's enormous multi-channel jet propeller model. John Lamont was at the controls for two flights in a stiff, 15 knot wind. Spanning 8 ft. with an all up weight of 10 lb., the model is propelled by Red Head Dynajet mounted over the top of the fuselage above a shoulder wing centre section. Spectators tell us that it makes as much noise as an Air Force Sabre when overhead! Fuel consumption is considerable and a half-pint is just enough for a couple of quick circuits, though by this time enough altitude is gained for a terrific glide. The free flight jet model is not insureable and also not generally permitted in Great Britain.

New Servos

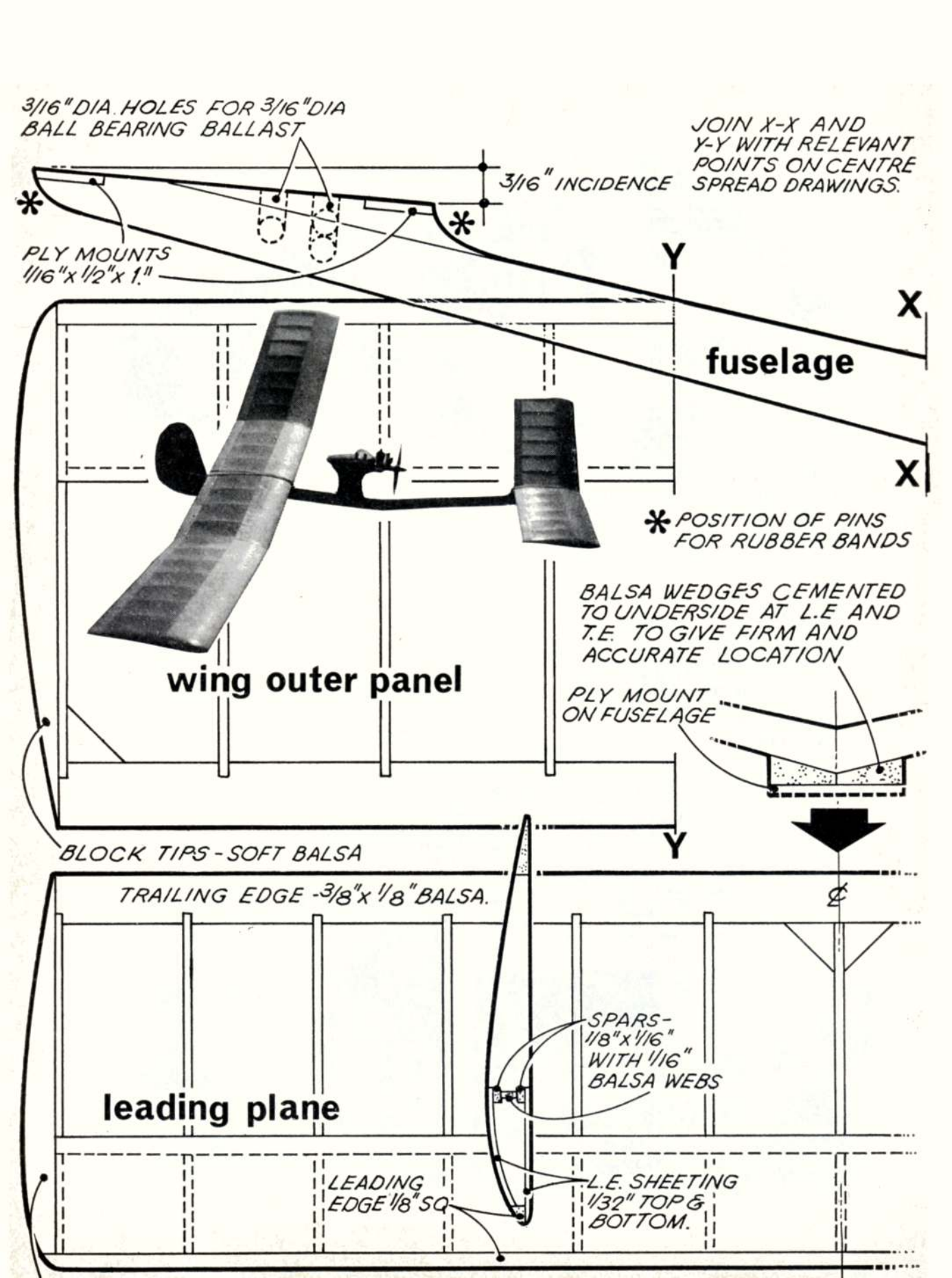
C & L Developments Ltd., will shortly be offering two entirely new servos to radio control enthusiasts. *Climax Unimite* is a fast relay switched single channel motorised actuator which weighs 1½ ozs., measures 2 11/16 x 1 7/16 x 1/6 in. It uses a Microperm-Special motor and draws 200—300 mA. current on 4½ volts. The push rod pickup is a rotating arm providing a ⅜ in. movement from left to right positions and is electrically self centring on release of signal. Transit time is ½ second.

Provision is made to permit a second, auxiliary control (i.e. engine) switched by the quick blip method, obtained by the use of either a relay with a double back contact and the servo battery already in use, or a standard relay and an additional battery. A most interesting point is that this servo may be used as a relay switched two position actuator working from one channel of a multi channel receiver, on quick blip, for example as a trim shift actuator on elevator with six or eight otherwise fully occupied channels. Price is £3 1s. 7d.

The *Musclemite* is a completely new multi servo designed specifically for transistorised switching using a Milliperm motor. Power required is 4½ to 6 volts. Built in a metal chassis with metal cover, Musclemite weighs 2¾ ozs. and measures 3¼ x 1¾ x 1 1/16 ins., narrow enough to permit the installation of three abreast in a fuselage. Throw at the take-off arm is ⅜ in. either way, full travel taking ⅜sec. Maximum load is 16 ozs. The transistorised Musclemite costs £8 17s. 0d. but relay enthusiasts are not forgotten, a transistor-less version costing £4 10s. 11d.

Next month we hope to have details of the new Ripmax *Maxamite* servos.

Below; Dynajet powered radio control model designed by Australian Keith Hearn was constructed by his A.T.C. pupils. Spans 8 ft. and weighs 10 lbs. with O.S. 10 channel radio gear. Note the shrouded rudder leading edge, for protection from jet blast. Right; Duke Fox (holding Space Control Transmitter) and his Stormer, is test bed for new Fox 59 R/C Engine with two needles. Top one has rotating spray bar acting as air restrictor. Lower N.V. from Fox .049. Stormer is Duke's first radio control model. Great to see the manufacturer's having a go!


3/16" DIA. HOLES FOR 3/16" DIA BALL BEARING BALLAST
JOIN X-X AND Y-Y WITH RELEVANT POINTS ON CENTRE SPREAD DRAWINGS.
3/16" INCIDENCE
PLY MOUNTS 1/16" x 1/2" x 1."
Y
X
fuselage
X
* POSITION OF PINS FOR RUBBER BANDS
BALSA WEDGES CEMENTED TO UNDERSIDE AT L.E AND T.E. TO GIVE FIRM AND ACCURATE LOCATION
PLY MOUNT ON FUSELAGE
wing outer panel
Y
BLOCK TIPS - SOFT BALSA
TRAILING EDGE - 3/8" x 1/8" BALSA.
SPARS - 1/8" x 1/16" WITH 1/16" BALSA WEBS
leading plane
LEADING EDGE 1/8" SQ
L.E. SHEETING 1/32" TOP & BOTTOM.

Have fun with CANARDS! introducing

James McCann's McCANN-ARD 27

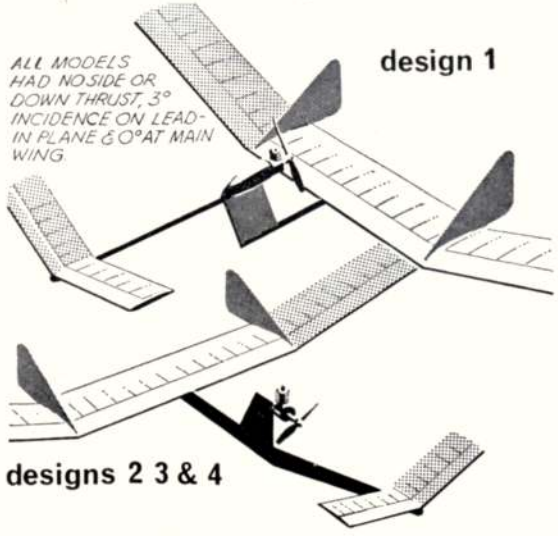
McCann-ard 27 in. displays the Cox .010 on pylon mount amidships—saves the little engine from the dirt!

IN THE PAST, most Canards (and they have been very few) have been of the sports or novelty type, with little done to investigate the possibilities of this layout as regards a duration machine, in spite of the accepted theoretical advantages. There is, consequently very little information available for prospective designers and the development of a design is very much a case of experimentation and learning by experience.

My first model was a modified "Quack" (*Zaic Year Book* 59-61, page 85) with the twin fins moved to just inboard of the dihedral break, and powered with a Cox T.D. .020, with hand-carved pusher prop. This model showed considerable promise, and was trimmed out to give a near vertical, straight climb, with as good a glide as one can expect from such a small model. It was eventually lost in the "jungle" at R.A.F. Elvington (which many know only too well!) after about 30 flights.

The success of this stimulated the building of a larger model of similar proportions, with the exception that the motor was mounted on a pylon, with a tractor prop, a commercial pusher of the size required (6 x 3) not being available. Powered with a T.D. .049, performance was impressive—a rapid steep climb, straight into the wind, and a good glide, comparable to conventional models was realised after initial trimming. With this model, two design features came about. The first, the motor mounted on a pylon over the C.G., and the second, a "cranked" fuselage to elevate the leading plane. Twin fins were still used, with the wing keyed to the fuselage. In very windy conditions this model was doing nearly 2 minutes from 5 sec. motor run.

Right, Doug Joyce of Reynoldsburg, Ohio, narrowly missed a place on the 1963 U.S. Power team with this potent Cox F.A.I. Canard. Below is author James McCann with Canard 2, using Cox TD .049, 36 x 6 wing, 18 x 4½ leading plane. Model was lost soon after picture was taken at R.A.F. Elvington

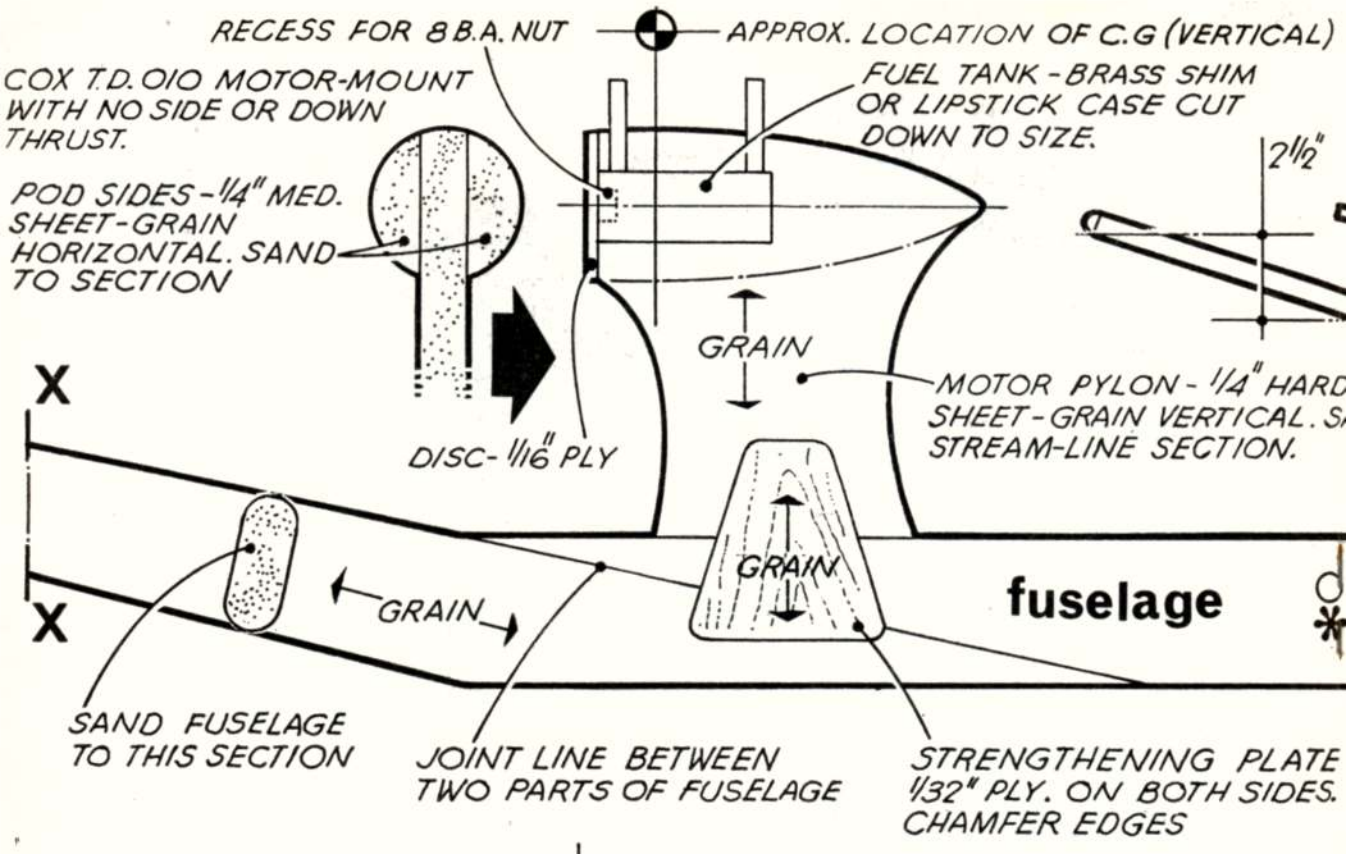


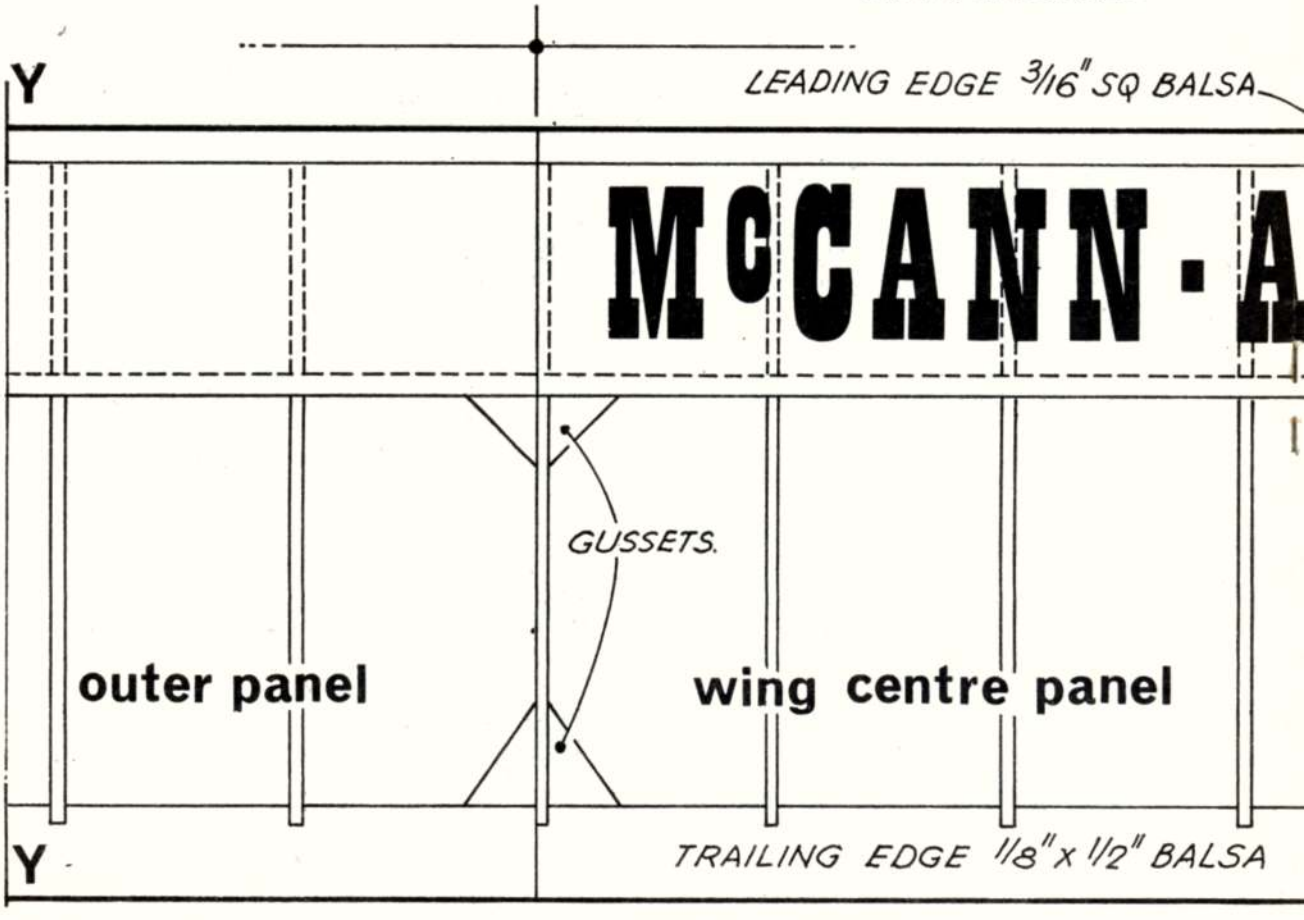
This model was also lost at R.A.F. Elvington, but was returned 3 weeks later in a very sorry condition, having been battered about by high winds and rain during its exposure to the elements. It is virtually a write-off.

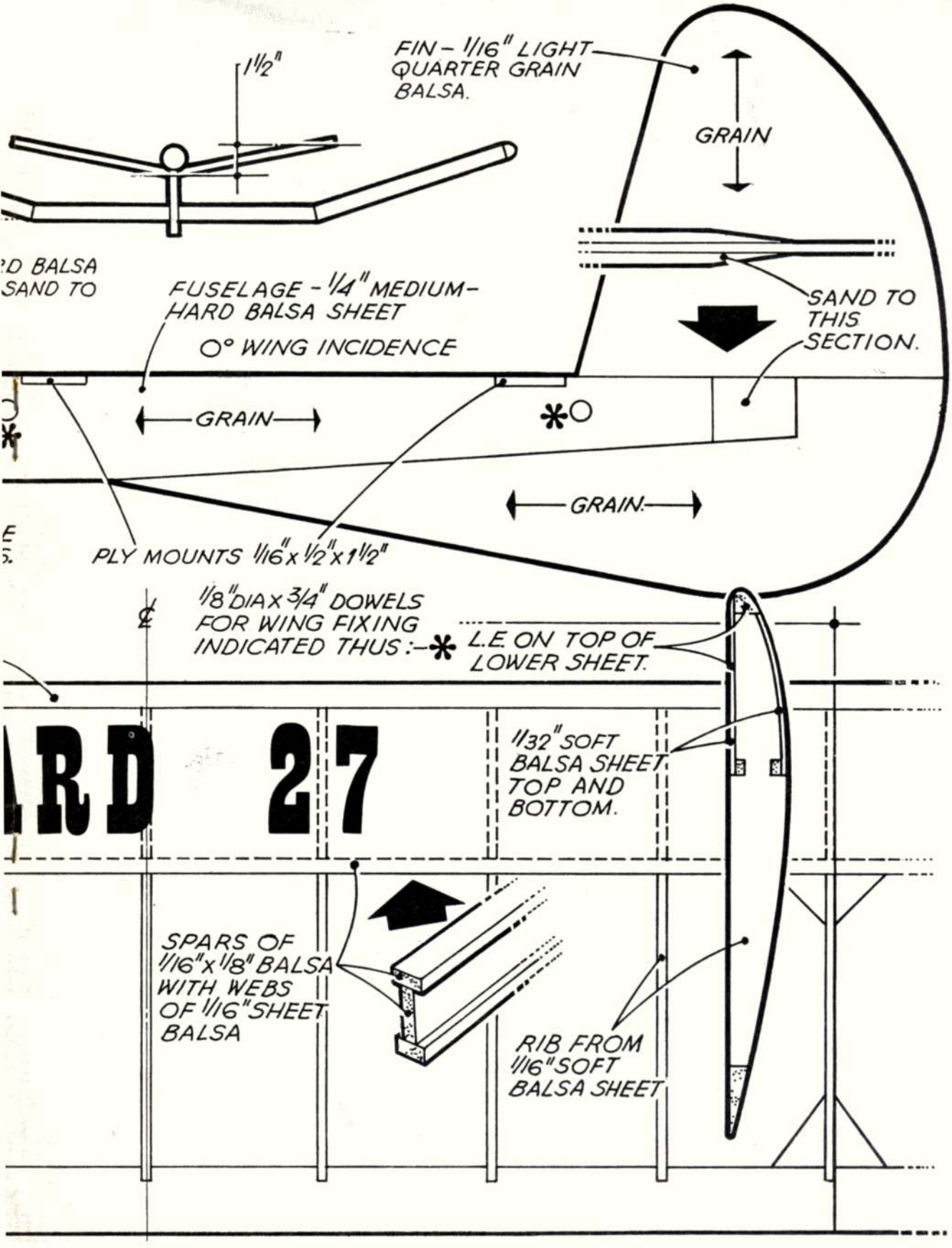
Canard No. 3 was built, but seemed to have a jinx. Powered by T.D. .15, it was perhaps too small—only 48 in. span, weighing 15 oz. The wings folded during its first power flight—it had tremendous acceleration and a *very* rapid climb for 3 seconds.

The wings were rebuilt and the next outing subsequently showed a snag in this layout. A post-mortem indicated that twin fins on the wing were unsatisfactory, due to the need for extreme accuracy in alignment, and it was felt that the wing tended to "blanket" the fins during the climb. Canard No. 4 was built before No. 3 was flown, and was to F.A.I. specification. As before, a twin fin layout was used, and after a very good glide had been obtained, the first power flight was undertaken. The motor cut prematurely and the model was left in a near-vertical attitude only a few feet up. The resulting dive to earth shattered the fuselage and wing.

Continued on page 136


RECESS FOR 8 B.A. NUT
APPROX. LOCATION OF C.G (VERTICAL)
COX T.D. 010 MOTOR-MOUNT WITH NO SIDE OR DOWN THRUST.
FUEL TANK - BRASS SHIM OR LIPSTICK CASE CUT DOWN TO SIZE.
2 1/2"
POD SIDES - 1/4" MED. SHEET - GRAIN HORIZONTAL. SAND TO SECTION
GRAIN
MOTOR PYLON - 1/4" HARD SHEET - GRAIN VERTICAL. S STREAM-LINE SECTION.
X
DISC - 1/16" PLY
GRAIN
GRAIN
fuselage
X
SAND FUSELAGE TO THIS SECTION
JOINT LINE BETWEEN TWO PARTS OF FUSELAGE
STRENGTHENING PLATE 1/32" PLY. ON BOTH SIDES. CHAMFER EDGES


Y
LEADING EDGE 3/16" SQ BALSA
McCANN - A
GUSSETS.
outer panel
wing centre panel
Y
TRAILING EDGE 1/8" x 1/2" BALSA


1½"
FIN – 1/16" LIGHT QUARTER GRAIN BALSA.
GRAIN
D BALSA SAND TO
FUSELAGE – 1/4" MEDIUM-HARD BALSA SHEET
0° WING INCIDENCE
SAND TO THIS SECTION.
GRAIN
GRAIN
PLY MOUNTS 1/16" x ½" x 1½"
1/8" DIA x 3/4" DOWELS FOR WING FIXING INDICATED THUS :-
L.E. ON TOP OF LOWER SHEET.
1/32" SOFT BALSA SHEET TOP AND BOTTOM.
SPARS OF 1/16" x 1/8" BALSA WITH WEBS OF 1/16" SHEET BALSA
RIB FROM 1/16" SOFT BALSA SHEET

CANARDS continued . . .

With the experience thus gained (the hard way!) a revised design was drawn up, to improve both aerodynamic efficiency and also to make the model easier on the eye. The main change was to abandon the twin fins, and to have a single fin on the extreme rear of the fuselage, with a fairly large underfin, to ensure adequate directional stability during the climb. The fin now in the slipstream made power trim much easier.

To test out this revised layout, a small (27 in. span) model was built powered by T.D. .010 and this model is a real pleasure to fly. It seems to be quite free from any vices and stability is impressive. In spite of such a small engine (which actually develops surprising power) the climb is very steep and "on rails", and the glide very good. The layout thus arrived at seems to be the most promising for duration Canards, and will give conventional models a run for their money. Development is still continuing and the author won't be content until competition results show the Canard to be superior!

During the year the following points have been noted about Canard building and flying:—

1. Side area ahead of the C.G. should be kept to a minimum, with a single large fin to be most satisfactory.
2. An elevated leading plane increases stability, and reduces need for large angles of incidence, which bring the leading plane nearer to the stall. Canards are sensitive to leading plane alignment, it must be "square" in all respects. The reason for the cranked fuselage, is to raise the leading plane without having to use a pylon, which would increase side area.
3. Wing to be at 0° incidence. Various angles have been tried, with compensating increases to leading plane incidence to maintain longitudinal dihedral. Increasing wing incidence makes the model hang back on the climb and appears to increase sinking speed on the glide.
4. C.G. position. Various formulae have been put forward to determine C.G. position, but these seem to give only an approximate position. Rigging angles also determine C.G. position, and it is only finalised during trimming. Trimming is merely a matter of locating the C.G. by gliding tests then producing a left turn by rudder tab alone. Warps and offsets are not required.
5. Angle of climb. It appears that this can be varied by altering the leading plane incidence, with a compensating correction of C.G. position. Increasing incidence steepens the climb and vice versa. Providing extremes are avoided, the author's Canards have not shown any looping tendencies, possibly due to the high thrust line.
6. Wind penetration. Increasing wind velocity has, in the author's models, produced a slightly shallower climb, the high thrust leaning the model with the wind. The straight into wind climb is no doubt aided by the wing being at the rear. This is the largest component producing drag, and being well behind the C.G., gives weathercock stability.

The McCann-ard 30 in. twin has two Cox .010 engines in tandem fed from same tank, rear prop laminated from 1/32 ply to make 3 x 2 in. pusher. Wing has 209 parts—not for the novice! Whole model seen at top of column. Engine sound said to be terrific. Shows possibilities with this basic McCannard layout

It is hoped that interest may be stimulated in Canards. They have proved a stimulating mental exercise and arouse interest whenever they are flown. The author is convinced that a little more effort devoted to Canards will produce a duration machine capable of rivalling the performance of conventional pylon models, which, even though they have had many years development, still have a lot to be desired. All the author's larger models have used GÖ 795 for both wing and leading plane sections, which in practice have proven to be excellent.

For those wishing to build a Canard, full size plans of "*McCann-ard* 27" are given here. This model incorporates the lessons learned during a year of Canard flying and is simple to fly and success assured.

The following notes will assist the building and flying of "McCann-ard 27."

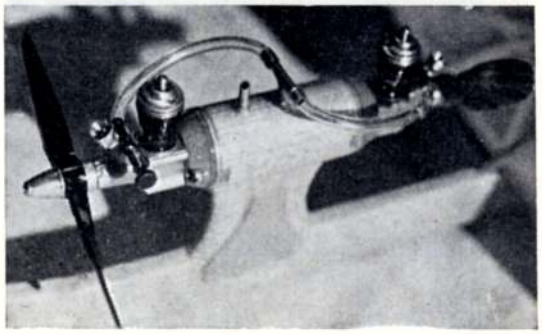
Fuselage. Medium hard, ¼ in. thick straight grained balsa is used. Carefully pre-cement all fuselage joints for maximum strength. The two parts forming the fuselage are first assembled, followed by the motor pylon and nacelle sides, carved and sanded to section. At this stage the tank is installed (an old lipstick case cut down, on the original), and then the ply disc against which the motor is mounted. Ensure that the thrust line is 0°—0° and carefully check that the fin is accurately in place.

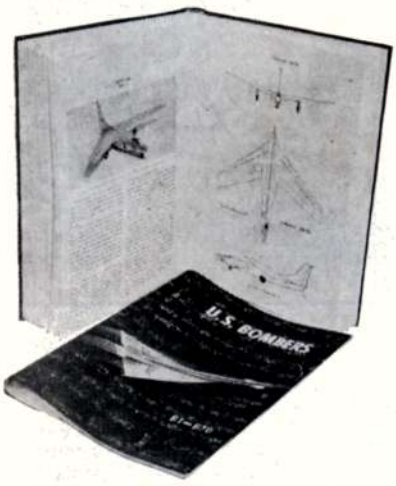
Wings and Leading Plane. Medium balsa is used for spars and edges, while soft is used for the ribs, webs, and especially the sheeting. If really light balsa (4—6 lb. stock) is not available for sheeting, sheet cover on upper surface only. It is, however, preferable to build as per plan, with a full torsion box leading edge as this gives a rigid wing structure. Cover with superfine Jap tissue; 2 or 3 coats 50-50 dope/thinners and fuel proof.

Assembly. When assembled, check that rigging angles are as shown on plan. If required add ballast to bring the C.G. to position shown and test glide over long grass. Add or remove ballast as required to give a flat glide.

Flying. Test flights should be made with a short motor run. Trim the climb either straight ahead or slightly turning to the left. Gradually increase motor run, adjusting as necessary, but remember to make adjustments a little at a time—these small models are more sensitive than larger ones. However, the inherent stability of the Canard is quite forgiving and a satisfactory performance should be arrived at quite easily. Best to date is 2 minutes 25 secs. from a 12 seconds engine run.

Come on, now, raid your scrap box for little materials are required, build the "*McCann-ard* 27" and join the ranks of those "backward" people who fly Canards!





New Books

Latest titles in the boom list of 62/63 Aviation literature

A LONG TITLE, **United States Navy and Marine Corps Fighters 1918-1962,** is more than justified by the volume of content in this book compiled by Paul R. Matt, published by Harleyford at 50s. By now we are thoroughly familiar with the Harleyford format and the technique of producing standard size books with 1/72nd scale drawings produced by a team who are selected specialists. This one is a companion to last autumn's title on U.S. Army & Air Force Fighters of which over 10,000 copies have been sold. Paul Matt is well known for his fastidious attention to accuracy in his model making and drafting of some of the more obscure aircraft. With this collection, ranging from the earliest Curtiss Pusher to the remarkable McDonnell Phantom, the compiler must have found himself in many a quandary deciding what to include or dismiss. The range of photographs is excellent, particularly so in the case of the lesser known types and also for the variety of markings. Although to constant 1/72nd scale, the tone drawings do, however, lack the provision of cross-sections or underside detail. Whilst the divided top/under view is not popular with aerophiles, we feel that there are many model makers who are disappointed not to have the detail hidden by a single plan view. Otherwise we can thoroughly recommend this book and know that Harleyford series collectors will not fail to miss it. It includes a colour chart in which a serious attempt has been made to reproduce the accurate colour tones. Colour information is, in fact, generally included as a caption to the tone drawings but not for the 60 representative fighter-unit insignia.

From Aero Publishers Inc., Los Angeles 26, California, we have two companion volumes, **U.S. Bombers,** and **U.S. Civil Aircraft,** with American prices $7.75 and $7.50 respectively. The work on bombers includes many unusual prototypes which were not developed, for example the Martin XB.16, six engined, two boom design of 1935, a variant on an earlier, more conventional four engined type. The Martin XB.33 Super Marauder, Convair XB.53, Boeing XB.56 and XB.59 give a spicey variety in outline drawing and model photos for the collector. Lloyd S. Jones is the author and the broad claim of coverage from B.1 to B.70 is qualified by a little about each one of these interesting and often very famous projects.

The Civil Aircraft book is actually the first of eight volumes of Joseph P. Juptner scheduled to be in production through to 1965—a mammoth task. Any indexing of American aircraft of this type must have some firm basis and Mr. Juptner has chosen to use the sequence of issue of approved type certificates (A.T.C.). The first volume runs from No. 1, the Buhl-Verville J4 Airster of 1927 through to the 100th certified aeroplane, the Travel-Air model 6,000 by Walter Beech. Regrettably, these aeroplanes of a glamorous age are not detailed in 3-view drawings but the photographs and descriptions create fascinating reading.

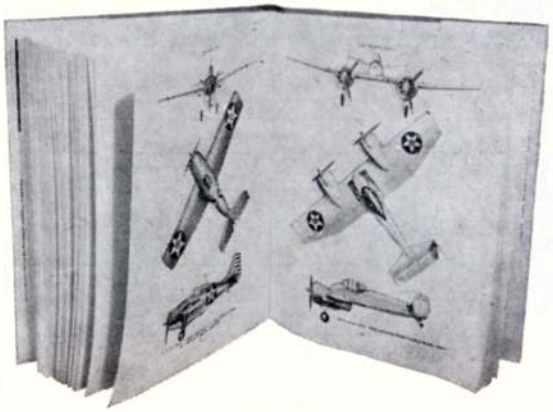
Peter Twiss, first man ever to fly faster than 1,000 miles per hour in the Fairey Delta 2 has now written his account of that famous and successful attempt on the world speed record under the title **Faster than the Sun,** published by MacDonalds at 30s. Such a first hand account from so authoritative a person is bound to bring with it amusing and at times frustrating reminiscences. The inside story reveals some detail of the amount of organisation necessary and the political connections which tied the hands of our once enterprising aviation industry. Definitely a book to read and reflect upon, for such attempts will never be made again.

We are given to understand on very good authority that the next best seller to the Holy Bible in any bookshop is the little **Observers Book of Aircraft,** compiled by William Green and published by Frederick Warne at 5s. The 1963 edition describes 150 aircraft with 271 illustrations. It is right bang up to date with the IL.62 rear engined jet transport included among its silhouettes. For quick identification reference it is invaluable and the drawings sufficiently accurate for good models to be made of even the most advanced aircraft on which so little other information is generally available.

Popular visiting spot in summer months is **London Airport. Heathrow.** Though not a book the **map** produced by Esso for 1s. as a guide to the Airport is well worthy of inclusion among our recommendations. It offers Airline insignia with coloured side-views of the various aircraft employed by no less than 44 different Companies plus photographs, an approach map and a detailed plan of the Airport itself. Altogether a really first class bob's worth.

Flying the D.H. Chipmunk by H. H. Edwards, published by Pitman at 7s. 6d., is a fine introduction to the complicated business of obtaining a pilot's licence. The Chipmunk has become almost standard flying club equipment and for the absolute novice this book is invaluable. Anyone considering taking up flying should buy it. For only three half-crowns, one is taken right into the cockpit and given an immediate impression of some of the sensations which can be anticipated and can decide for ones-self whether or not to get off the ground. Many a person aspires to becoming a fully qualified pilot but the majority have little idea of what is entailed. This little guide will soon tell them.

Tone drawings of Grumman fighters in Harleyford's latest Book



Two products of model institutes

. . . *from* HUNGARY

MOKI M-3

5.96 c.c. glowplug

ENGINE ANALYSIS

No.106 *by R. H. Warring*

Propeller rpm figures

Propeller	*R.P.M.*
9 x 6 K.K. nylon	11,600
9 x 4 K.K. nylon	15,000
9 x 7 K.K. nylon	11,000
10 x 6 Frog nylon	11,200
9 x 6 Frog nylon	13,100
8 x 6 Frog nylon	13,500
10 x 6 Topflite nylon	10,600
9 x 6 Topflite nylon	12,100
11 x 4 Topflite nylon	10,500

THE MOKI M-3 is a Hungarian state-sponsored engine, this time in the "35" glow motor class. Basically it is a clean, well made engine of typically orthodox appearance with a bore and stroke of 20 mm. and 19 mm. respectively and an excellent performance, after due running-in, of .53 B.H.P. developed at 14,000 r.p.m. This puts it into the control line rather than the radio control class and, indeed, no provision has been made for readily adapting the M-3 for a throttle unit. Workmanship and fits are first class throughout and particular attention appears to have been given to the crankshaft fit in its plain bronze bushed bearing, and piston-cylinder fit.

Design layout follows perfectly orthodox lines, with a certain impression of "solidity" given, in no small part by the clean and smooth external appearance. The hardened steel crankshaft of 10.5 m.m. diameter has a counterbalanced web and typical "speed" porting feeding through a generous centre hole. The fact that the shaft is ground between centres to finish would appear to indicate production with a limited range of machine tools, and the general standard emphasis on individual workmanship. In spite of its size, however, we do feel that the shaft is weak where it changes from the taper section immediately in front of the bearing to the threaded length since it is grooved to the bottom depth of the threads at this point. That appears to be the only weak point on an otherwise thoroughly robust glow engine.

The crankcase unit appears to be a pressure die casting (or a very good gravity die casting) which is given a matt sand-blast finish all over. A fair amount of machining is done on the casting, including facing the top and machining the bore. The liner is of integral form with fins machined on, in mild steel. Exhaust and transfer ports are plain rectangular holes cut through the wall and a fairly generous bore relief is given below the port height. Turned from cast iron the piston is of generous size but thin walled and also relieved in diameter below the gudgeon pin. A conventional 'plate" deflector is formed on the top. The gudgeon pin is hollow, fully floating, with brass eyelet end pads. The connecting rod is a fairly massive affair machined from dural and incorporating good bearing lengths in both ends.

Cylinder head is a pressure die casting in the American style with thick fins but also leaving a substantial mass of metal for heat retention. The plug-in portion is slightly spherical, with a slot cut for deflector clearance. Assembly is by three short and three long screws—all perfectly conventional practice. The glow plug is centrally mounted.

Height of the intake tube (integral with the crankcase casting) appears rather excessive even by modern standards, especially with the spraybar well down towards the base. Bore opening is only slightly tapered and the final throat section is drilled parallel, the actual contraction in area being quite small. Nevertheless the engine had more than adequate suction lift and starting was quite straightforward. The brass spraybar fitted seems diminutive for a 6 c.c. engine, one often finds the same size adopted for 1 c.c. diesels. Again, however, it passed enough fuel for high speed running.

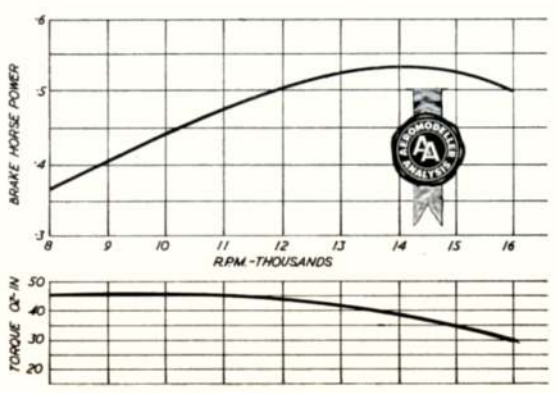
Summarising, the Moki M-3 appears to be a very good contest engine with a power output equal to most in its class. With proper balance of fuel and good attention to running-in, etc., it could be a very potent power plant. It is a "no frills" engine with a lot of potential. We cannot see any other engine manufacturer learning anything from it, except possibly in the matter of workmanship.

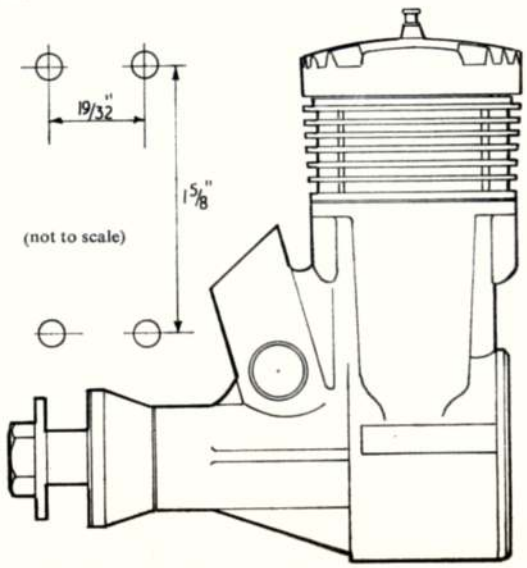
Specification

Displacement: 5.94 c.c. (.36 cu. in.). *Bore:* .7874 in. (20 mm.). *Stroke:* .748 in. (19 mm.). *Weight:* 7⅛ ounces. *Max. power:* .53 B.H.P. at 13,800 r.p.m. *Max. torque:* 45 ounce-inches at 10,000 r.p.m. *Power rating:* .089 B.H.P. per c.c. *Power/weight ratio:* .067 B.H.P. per ounce.

Material specification

Crankcase: light alloy die casting. *Cylinder:* mild steel (integral fins). *Head:* light alloy die casting. *Piston:* cast iron. *Connecting rod:* dural. *Crankcase back cover:* dural. *Prop-driver:* dural. *Spraybar:* brass.





. . . *from* CZECHOSLOVAKIA

MVVS-1D

0.99 c.c. diesel

ENGINE ANALYSIS No. 107

THE MVVS—1D is the latest product of a government (Czechoslovakian) modelling institution, presumably sponsored in anticipation of a F.A.I. change of heart over the maximum capacity of International contest engines.

Contest performance—and the MVVS achieved a peak B.H.P. figure of .132 on test—has not been achieved with any sacrifice of starting or handling characteristics. At the same time a lot of attention has obviously been given to getting detail design points "right". This is one of those delightful engines which changes immediately from four-stroking to two-stroking, both on needle and compression adjustment, as optimum adjustments are approached. And the fact that it develops over .13 B.H.P. per c.c. establishes a figure which would be hard to rival with a normal production engine.

Designwise and constructionally the MVVS is a more or less orthodox crankshaft rotary engine with no apparent frills or unusual features. The crankcase unit is a light alloy gravity die casting housing a hardened steel liner cased with a light alloy finned jacket and perfectly plain solid dural head, the whole cylinder assembly secured with three screws extending down into the crankcase. The large (.316 in.) diameter hardened steel crankshaft has a perfectly plain (unbalanced) web and runs in a plain (unbushed) bearing. The connecting rod is machined from dural and polished to finish and the piston is of cast iron.

Starting with the crankcase induction port, this is basically rectangular in shape with rounded ends, very cleanly finished and opening into a 3/16 in. diameter hole in the shaft. The liner has a conventional rectangular exhaust port but the diametrically opposed transfer is cut on an arc and angled upwards with a narrow wedge-shaped central "pillar" supporting the liner wall—a fairly straightforward machining operation, but an unusual form on a model engine. Transfer passages (one each side) are formed in the crankcase casting and the exhaust opening is formed by a step in the casting. The liner is a tight push fit "bottoming" on a machined flanged in the casting, the lower end being relieved in diameter to promote improved transfer gas flow. The liner otherwise is plain over its length, except for a flange at the top which "sandwiched" the finned jacket in position, with screws through the head holding everything down.

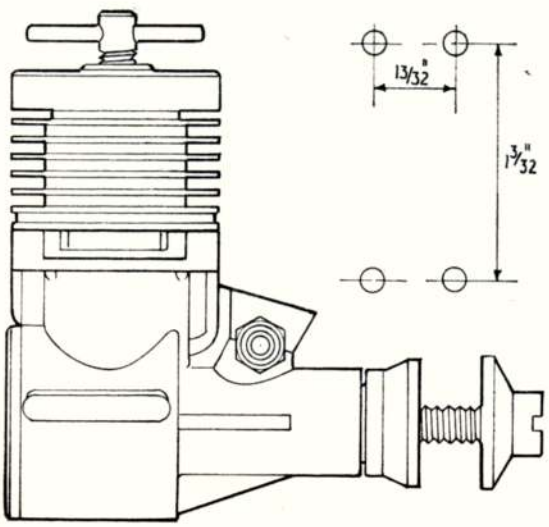
The piston appears quite small and is relatively light. Whilst basically plain in shape the skirt incorporates two square cut-outs which presumably assist to some extent in opening up the transfer area and also provide a measure of sub-piston induction. Gudgeon pin is of the fully floating type (and must be removed to free the piston before the engine can be disassembled). Crankcase volume is reduced to a minimum by the deep, screwed-in backplate. The contra piston is of conventional hollow-cylinder form but carries a loose slug or disc resting in it, this disc taking the pressure of the compression screw. The compression screw itself is of conventional form with a fairly loose fitting thread and a relatively short tommy bar, yet remaining easy to adjust and holding positive settings.

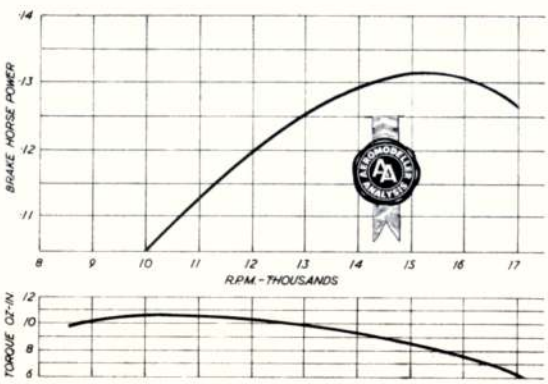
The intake tube, formed integral with the crankcase casting, is very short and rectangular in section, tapering down to a circular waist. The spraybar assembly is of brass, of perfectly orthodox pattern and with a rather crude spring brass ratchet spring for the needle thimble, but the thimble is also split for locking action. This spring is about the only "cheap" feature of this engine, and we readily forgive it that because of its outstanding performance and feeling of being "right", and excellent workmanship and handling qualities.

Specification

Displacement: .99 c.c. (.01622 cu. in.). *Bore:* .420 in. (10.7 m.m.). *Stroke:* .430 in. (11 m.m.). *Bare weight:* 2¼ ounces. *Max. power:* .132 B.H.P. at 15,400 r.p.m. *Max. torque:* 10.8 ounce-inches at 10,500 r.p.m. *Power rating:* .13 B.H.P. per c.c. *Power/weight ratio:* .048 B.H.P. per ounce.
Crankcase unit: light alloy gravity die casting. *Cylinder liner:* hardened steel. *Piston:* cast iron. *Contra-piston:* cast iron. *Con. rod:* light alloy. *Crankshaft:* hardened steel. *Cylinder jacket:* turned dural. *Cylinder head:* dural (solid). *Crankcase back cover:* turned dural. *Prop. driver:* turned dural. *Spraybar assembly:* brass.

Propeller	*R.P.M.*
7 x 6 Frog nylon	10,800
7 x 4 Frog nylon	13,200
8 x 4 K.K. nylon	10,800
7 x 4 K.K. nylon	12,600
6 x 4 K.K. nylon	16,000
8 x 4 Topflite nylon	10,500
7 x 4 Topflite nylon	12,500
6 x 4 Topflite nylon	17,000





How much do YOU know about the one item which every aeromodeller has to use?

This feature explains the purpose of various types of adhesive, and outlines their value in aeromodelling.

BASIC CLASSIFICATION OF ADHESIVES

I	II	III	IV	V	VI	VII	
					SYNTHETIC RESINS		
Animal	Vegetable	Mineral	Plastic/ Solvents (Cements)	Rubber Base	Thermo-Plastic	THERMO-SETTING (*a*)	(*b*)
Albumen	Cellulose	Bitumen	Cellulose Acetate	(*a*) Latex	PVA	Urea	Epoxy
Casein	Dextrins	Sodium Silicate	Cellulose Nitrate	(*b*) Rubber Solutions		Phenolic	Polyester
Gelatin	Flours Gums Starches		Polystyrene	(*c*) Rubber Cements		Resorcinol	
			Perspex	(*d*) Rubber-Resin Compounds		Melamine	
			PVA PVC	(*e*) Rubber-Resin-Vulcanising Compounds			
				(*f*) Contact Adhesives			

For aeromodelling purposes, the bulk of gluing requirements are met by group IV cements. PVA is not normally used as a cement, however, but in water-emulsion form (Group VI). Group II adhesives (notable dextrin pastes) are widely employed as tissue pastes. Group VIIa represent the modern "woodworking" glues; and group VII (*b*) the multi-purpose high strength synthetic resin adhesives. All adhesives in group VII are of two-part type when produced as cold-setting glues. Heat-curing resins of these types (particularly the phenolic resins) are used industrially, setting under combined heat and pressure.

ADHESIVES

by R. H. Warring

UNTIL COMPARATIVELY recently aeromodelling construction has relied almost entirely on Balsa cement for all glued joints, with a limited application of other adhesives (notably dextrin pastes) for applying tissue covering. In fact every glue-jointing or adhesive requirement could—and still can—be met with the so-called cellulose cements—a "normal" Balsa cement for structural joints in balsa; an extra "strong" slower drying cellulose cement for gluing in hardwood members, such as motor bearers; and a thinned cellulose cement for sticking on tissue.

The only special need in aeromodelling, in fact, has been for a cement to stick polystyrene plastic. The original plastic mouldings were in cellulose acetate, which can be stuck with Balsa cement. A cellulose cement will not stick polystyrene, however—hence the emergence of special "plastic" cements when this material came into common use. Polystyrene cement (plastic cement) is, basically, a "gummy" solution of polystyrene in a suitable solvent. Whilst having a powerful "cementing" or bonding action in contact with polystyrene it does not make a very satisfactory adhesive for other materials, although it will stick balsa after a fashion (but nothing like as strongly as cellulose cement). Other "plastic" cements can be compounded in a similar fashion by dissolving scraps of the particular plastic concerned in a suitable volatile solvent. In some cases the strength of the resulting glued joint can be enhanced by compounding the cement with other additives, particularly when the plastic concerned is not readily soluble.

Balsa cement is a "plastic" cement in the sense that it is based on a solution of cellulose plastic in a volatile solvent. It is unique as a plastic cement in also being an excellent general purpose adhesive which bonds readily to wood, paper and other porous materials. If the material is not so porous—e.g. a so-called "hardwood" instead of balsa—the adhesive power of a "straight" cellulose cement is not so good. It can, however, be greatly improved in this respect by the addition of a resin reinforcement, as is done in the case of the so-called "strong" cellulose cements. At the same time these more powerful adhesives may exhibit certain disadvantages, such as a slower setting time or a high degree of contraction on setting. The latter may prohibit

WATER RESISTANCE OF ADHESIVES

Not Resistant to Water	Resistant or Partly Resistant			Fully Resistant To Boiling Water
	Cold Water	Up to 50°C.	Boiling Water	
I II IV (PVA) VI	III IV (except PVA) V (same)	V	V (same)	VI(*a*) VI(*b*) VII

Well known brands, Britfix, Croid, Durofix and Casco share the photographs at right. The Britfix range is numbered, runs through the Cellulose types to PVA and Rubber-Resin. Croid is renowned for its high strength Universal Liquid Glue, animal base, ideal for hardwoods. It is used cold, unlike their "Aero" glue which is employed hot. Durofix has long bren a modellers favourite where special strength is needed, as with engine bearers. Casco Contact is a Rubber-Resin in small handy size tube, good for application on sheeted areas

Two Casco stablemates, the Urea "Cascamite" resin glue is thermo-setting and the Casco casein, each mixed with water and ideal for ply, though the "One-shot" Cascamite is preferred for weatherproof needs

IDENTIFYING UNKNOWN OR UNMARKED ADHESIVES

FORM	POSSIBLE TYPES	IDENTIFICATION
Transparent solution (tubed bottled or tinned)	balsa cement polystyrene cement "Perspex"	Identify by smell. Balsa cements have a typical "acetate" smell. Polystyrene cement often smells of carbon tetrachloride ('Thawpit'). Perspex cement usually smells of chloroform. Try if cement has any solvent action on a piece of scrap polystyrene plastic. Only polystyrene cement will act.
Yellow or yellow brown solution (in bottles)	almost certainly a gum	will have a mild "gum" smell and lack a smell of organic solvents or thinners
(In tubes)	animal or vegetable glue or gum	as above.
	balsa cement polystyrene cement	identify as for clear solutions.
	rubber solution	identify by smell (slightly rubbery or smell of benzene or petroleum).
	epoxy resin hardener	identify by sour, rather offensive smell. Quite sticky but does not dry.
White liquids or creams	latex rubber dextrin solutions PVA solutions	identify by smell. Latex solutions will usually smell of ammonia, also may be stringy. Dextrin solutions have faint scented smell, feel slippery to the touch and are tacky. PVA adhesive is odourless and non-tacky.
White pastes	latex adhesive dextrin pastes (photographic pastes) PVA adhesive Epoxy resin tubed)	identify by smell, as above. Dextrin paste has a "lardy" feel and becomes more liquid if rubbed. Epoxy resin is semi-opaque, feels sticky but does not dry.
White powder	casein	slightly off-white colour. Slight odour.
	one-shot (urea) resin	pure white powder. Appreciably reduces in bulk when mixed with water to form off-white liquid.
	U.F. resin powder	readily dissolves in water with an appreciable reduction in bulk. About the only way of telling whether it is a resin powder or a one-shot mixture is to see if a small quantity will set after mixing with water.
	water soluble cellulose	expand in bulk and form a glutinous, semi-transparent mass in water (e.g. wallpaper pastes).
	starches and flour pastes	produce a creamy, opaque paste when mixed with water with little or no change in bulk.
Syrupy clear liquid (tins or jars)	U.F. resin polyester resin	U.F. resins have little odour. polyester resin can be identified by its positive odour.
	epoxy resin	Epoxy resins are unlikely to be found in bulk (usually in tubes for amateur work).

Theboave notes are only intended as a general guide

ADHESIVES (continued)

their use on very flimsy structures—e.g. 1/32 inch wing ribs—if the possibility of warping is to be excluded. On the other hand they are "all-purpose" aeromodelling adhesives in that they are suitable for bonding both balsa and hardwoods.*

Apart from producing a satisfactory bond for almost all aeromodelling structures, cellulose cements have three distinct additional advantages—

(i) they are quick setting, minimising assembly time and assisting in quick field repairs.

(ii) they are "sticky" and thus will hold parts in place without the joint being subject to pressure (although some form of simple "clamping up" is invariably employed in major airframe construction).

(iii) they are gap-filling to a reasonable extent, so that badly fitted joints are not necessarily weak joints.

Against this they have three main disadvantages—

(i) the bonded joint is not waterproof.

(ii) the quick-drying properties make the gluing up of large areas difficult (e.g. sheet covering of wings), with the possibility of part of the cemented surface setting before the assembly is complete.

(iii) surplus cement is difficult to remove from fingers, clothing, etc.

Of these, (i) is not particularly important in aeromodelling, although significant in the case of model boats or marine aircraft (ply skinned hulls glued with balsa cement, for example, are liable to early failure. In this respect it is worth noting that cellulose *acetate* cement is more water-resistant than a cellulose *nitrate* cement, the latter being the more common type of balsa cement. Unless the manufacturers specify that it is a cellulose acetate cement one can assume that it is a nitrate type.

Point (iii) is an "occupational hazard" we have grown to accept! No mention has been made of strength characteristics, although these do vary with different balsa cements. Modellers normally have a preference for one make or another and know their characteristics and suitability.

Whilst cellulose cements are used to some extent in the woodworking industry, standard woodworking glues have not, until recently, been employed on any scale in aeromodelling. Casein glues were at one time popular for such jobs as making laminated formers

* Strictly speaking balsa is a "hardwood". Common practice in aeromodelling, however, is to use the term "hardwood" to describe all *harder* woods which might be used for bearers, wing spars, etc., although the actual wood used may, in fact, be a "softwood" by correct definition. Spruce, for example, is a "softwood". To avoid confusion we will stick to aeromodelling convention and refer to all woods other than balsa as "hardwoods".

Below: H. Marcel Guest range of various Styrene, Cellulose and PVA adhesives, "Puk-Ka" balsa cement being well known for fast drying

from wound balsa strip, where balsa cements do not allow enough "shuffling time" and dry joints could be common as a consequence. But casein is one of the older types of woodworking glues, not waterproof and now largely replaced by the modern cold-setting synthetic resin adhesives. These would be a more logical choice for such jobs, especially where a "waterproof" bond was also required.

Modellers "discovered" the virtue of the cold-setting synthetic resin woodworking glues many years ago and often prefer them for hardwood joints, and particularly plywood assemblies, where they have a superior performance to the best of balsa cements. This type of "hardwood" construction is comparatively limited in model airframes, however, and so such types of glues have not become particularly popular or much used for aeromodelling (although a "standard" for model boat construction). For the sake of completeness they are worth describing briefly.

Chief type is the urea formaldehyde resin adhesive which is a two-part mixture comprising resin and "hardener". When the two are mixed a self-curing action is initiated, the whole mixture setting in a time determined by the characteristics of the hardener and the ambient temperature. With separate solutions—*e.g.*, liquid resin to be mixed with liquid hardener to "activate", ready for application or use—setting time can be controlled to some extent by the choice of hardener. A rather more convenient form, however, is to mix the resin and hardener as powders which do not react until mixed with water to form the final adhesive solution (the so-called "one-shot" adhesive). In this case the setting time is determined solely by the ambient temperature. In both cases, once the mixture is activated it has a limited pot life and so any excess of adhesive remaining unused is wasted. The bulk of the adhesive in powder form is also misleading. Made up with water, it shrinks in volume to a very large extent though weight increases. *E.g.*, $3\frac{1}{2}$-oz. of resin urea mixed with $1\frac{3}{4}$-oz. water makes $5\frac{1}{4}$ ozs. in liquid form though the powder bulk is reduced.

Although a point of only limited interest to aeromodellers, the U.F. resin adhesives are not *fully* weatherproof, although they are the most common type employed for full size ply-skinned boat construction. Resorcinol resins offer a superior performance in this respect and usually have somewhat better gap-filling properties. Phenolic resins, also fully weatherproof, are suitable for hot curing only (*i.e.*, setting under heat and pressure). These are used in the manufacture of plywood.

Summarising the advantages and disadvantages of the "woodworking" type two-part synthetic resin adhesives—

Advantages:

(i) They are capable of producing maximum strength in all wood joints (stronger than the wood).

(ii) They permit a reasonable "shuffling time", facilitating the gluing up of large areas.

(iii) they are waterproof.

(iv) the bond is durable and irreversible (i.e. the adhesive is the thermoset type which is not softened by heat, solvent action, etc.).

Disadvantages:

(i) Mixture has to be made up, and then has limited pot life—thus not so convenient to use as a "tubed" cement or similar adhesive.

(ii) They lack "stickyness" and all joints *must* be clamped up during the setting period.

(iii) They may not set properly in very cold weather. As a general rule synthetic resin adhesives should not be used in ambient temperatures below 50 degrees F.

continued on page 144

Three of the handy size packs of PVA glues are tnese by Casco, Britfix and Croid. This adhesive is used extensively by many modellers and is probably the cleanest of all to work with

A modern adhesive which combines many of the advantages of the synthetic resin glues and at the same time is much easier to use is P.V.A. (polyvinyl acetate). Polyvinyl acetate is a solid vinyl derivative soluble in many common solvents such as acetone, toluene, butyl acetate, etc. As a wood glue (initially) and general purpose adhesive, however, the most satisfactory P.V.A. adhesives are compounded as an emulsion in water form. Such emulsions are capable of embracing a wide range of solids content, particle size, viscosity, plasticiser content, etc., and slight differences in compounding can result in considerable differences in performance—see Table below. The fact that a glue is specified as a P.V.A. adhesive, therefore, does not automatically guarantee an attractive performance. Where it has been specially compounded with regard to maximum performance, however—as in the case of reputable branded products—it has unique properties of considerable value.

It can be used as an alternative to balsa cement for all airframe construction, being equally good with balsa and hardwoods, and many modellers now prefer PVA for high strength joints (particularly on R/C model airframes, for example). It is another "non-sticky" glue and all joints must be clamped in contact to ensure a satisfactory bond (e.g. pinning in place as with conventional balsa cement practice); although "rubbed" joints can be made satisfactorily without mechanical pressure, such as gluing reinforcing blocks in position. Setting time is longer than with balsa cement, which is a particular advantage for gluing up wing sheeting and other large jobs, and the joint dries absolutely clean with an absence of staining or "tearing". A PVA bonded airframe is free from the hard nodules and "fillets" of excess adhesive common when using balsa cement.

Unlike the other synthetic resin glues, PVA is a thermoplastic which never sets "brittle hard" but retains a certain flexibility. Theoretically, at least, this also renders it susceptible to plastic flow or deformation under stress, although this does not appear to produce any weakening of the bond under normal conditions. The bond will be weakened at higher temperatures, the upper limit in this respect being about 160 degrees F. PVA reacts chemically with iron, and must therefore not be kept in iron pots or stirred or applied with an iron or steel spreader.

Test figures for P.V.A. glues joining ½ in. square beech testpieces, subject to breaking test after 24 hours setting time at 60 degrees F.

Formulation	Strength in Pounds	Wood Failure	Glue Joint Failure
A	1370	70%	30%
B	2080	90%	10%
C	2040	70%	30%
D	1770	40%	60%
E	1770	30%	70%
F	1280	25%	75%
G	1230	5%	95%
H	860	Nil	100%
J	670	Nil	100%

The main limitation of PVA adhesive is that it is not waterproof and, in fact, very little better in the matter of water-resistance than animal glues. Again this does not appear to be significant in the case of aeromodelling structures, but would exclude the type for marine use. The performance of PVA joints would also be suspect in conditions of high humidity. In the aeromodelling field it has proved its worth over sufficient period to establish its reliability—whether used for all the structural joints or, as is more usual, as a supplement to balsa cement for gluing in hardwood members and bonding sheet covering, etc. It is an easy-to-use glue since it is a ready-to-apply mixture which does not suffer from limited "pot life" (although some skinning or drying out may occur in a partially used jar), and not unduly temperature sensitive. A stock of PVA glue which has been subjected to very low temperatures and allowed to freeze, however, can suffer a loss of properties on thawing out. This is not a characteristic of all formulations. Some can undergo freeze-thaw cycles without deterioration.

A further group of thermosetting resin adhesives have a more limited application for aeromodelling, although possessing properties not shown by other adhesives—notably the characteristic of "wetting" or otherwise adhering to non-porous as well as porous surfaces. These make it possible to produce high-strength glued joints with materials which have hitherto been regarded as "ungluable", such as metals, glass, etc. The two most common types are the polyester resins (widely used as the bonding agent in the construction of glass fibre laminates); and the epoxy resins.

There are others, but these are the two main *cold-setting* types which are this easy to use and applicable as general purpose adhesives without special heating equipment, etc.

Apart from its main use in glass fibre construction, cold-setting polyester resins mixed with suitable powders are the basis of "fillers" for automobile repair work, etc. Possessing excellent adhesion to metals and most other surfaces, such fillers set "metal hard" and have a variety of uses in modelling for detail construction. They are not adhesives as such, however, nor would they be used on woodwork in preference to normal fillers because they are too hard once set. Mainly they can be used for local reinforcement around metal fittings, etc., fastened to wood assemblies.

Typical 2-tube Epoxy glue set is the popular Araldite pack having hardener in black and adhesive in blue/white tubes. United States equivalent is the Wilhold Blue & Yellow 2-tube set

The epoxy resins are suitable for bonding metal or laminated plastic fittings to wood (or other hard surfaces, including metals), with a bond strength equivalent to that obtained by rivetting, bolting or screwing. Easy-to-use cold-setting adhesives of this type of 2-tube sets, can be regarded as a simple alternative to riveting, etc., in such applications. Just how far one carries bonding is largely a matter of individual preference (and confidence in bonding, as opposed to a fastened joint). Metal motor mounts, for example have given a satisfactory performance bonded to a ply firewall; although most modellers in this case would prefer not to trust bonding (or at least not bonding alone) and use bolts. Even the most conservative modeller, however, can find the bonded metal joint a considerable time-saver (as well as often making for a neater assembly), and from experience get to trust it in the case of less critical applications, at least.

Another class of general-purpose adhesives is worth description—those based on rubber and comprising rubber gums, solutions, cements and "pastes". Many of these have the property of sticking to both porous and non-porous surfaces to produce tenacious, high-strength joints, although the resulting bond retains a certain amount of flexibility. Yet another class of rubber adhesives —not available on the general market—incorporating curing agents to produce vulcanisation of the rubber during curing, resulting in a thermo-set bond. These have a performance approaching that of the epoxy resins.

About the only clearly defined use we have found for rubber-base adhesives in aeromodelling is for gluing on metal faced papers onto sheet balsa surfaces, etc., for decoration, etc.; or for affixing foam plastic or rubber insulating mounts. A resin-reinforced rubber solution or cement is superior to other types of adhesive for this job as it allows the surface to be "rubbed out" or even shuffled, if necessary. Rubber-base formulations have

Gaining popularity among modellers fast recognising its advantages is Evo-Stik "Impact"—the ideal medium for work with expanded polystyrene, Melinex, Polyurethane etc. as well as balsa sheeting

found their main application as general-purpose domestic adhesives for "sticking anything" (and appreciably cheaper than the epoxy resins); the sticking down of sheets of laminated plastic for example.

These "contact" adhesives, where a solution of synthetic rubber/resin cement is smeared on each of the two surfaces, allowed to dry off and then pressed into contact with one another, have a special application for latest forms of construction. Many of the new plastic materials, *e.g.*, P.V.C. Melinex, Polyurethane Foam, etc., can be bonded to balsa framework and extensive sheet balsa covering on a wing with a very quick application of this type of adhesive which, when dry, produces a strong bond without introducing undue joint stress.

AERO MODELLER

AIRCRAFT DESCRIBED
NUMBER 120

Distinguished by the straight lines of the cylinder cowls, the S-5, N219 taxies (with some manual aid) on the enormous beaching dolly used to bring it out of the Solent. Note, rudder stripes are not carried here

described and drawn by
J. H. ROBINSON

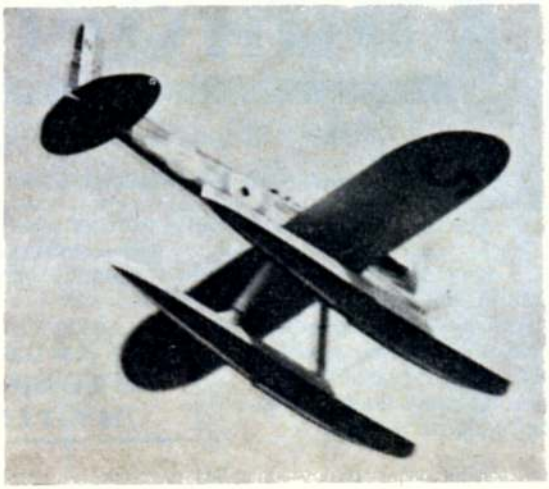
The SUPERMARINE S-5

CONVINCED THAT THE Napier Lion engine could win the Schneider Trophy R. J. Mitchell continued to develop the design of the Supermarine S-4, and by November 1925 Supermarine Aviation Works drawings of Type S-5 showed an aircraft similar to the S-4 but smaller, with a low, tapered, cantilever wing, no external radiators, and paired V-struts supporting slim cross-braced floats. Further development led to a design substantially similar to that finally built, except for a cantilever wing and stainless steel interfloat and lift struts. This aircraft was not built for the 1926 Schneider race and Britain did not challenge the Trophy which was won by the Italian Macchi M-39.

During 1927 three virtually identical S-5 airframes were built, with wire-braced wings of similar proportions to the previous cantilever design. Portion of the Italian aeronautical press hysterically claimed that the S-5 and even the Mercury-engined Short-Bristol Crusader were copies of the Macchi M-39, which was unknown in Britain before November 1926. Mitchell's evolution of the S-5 from his earlier S-4 was by then almost complete, emphasising the futility of the "copying" claim.

Sound reasoning proved by wind-tunnel testing lay behind the changes from S-4 to S-5. The pilot's view was improved by lowering the wing, and wire bracing made possible a narrower and thinner root section and elimination of the interfloat struts, these changes giving an estimated 3 m.p.h. increase in speed. Reduced frontal area of the floats added 4 m.p.h. and the change to surface radiators a further 24 m.p.h.

Frontal area of the slender stressed-skin fuselage was approximately two thirds that of the S-4. Basis of its dural monocoque structure was a heavy reinforced frame carrying engine bearers, front centre-section spar, forward lift struts, front and rear landing wires, and two intercostal members which in turn carried two reinforced half frames supporting the engine bearers, and a further reinforced frame carrying the rear centre section spar and lift struts. Engine bearers extended aft as longerons, and light frames generally 6 in. apart were riveted to 18 G dural skin, which was of two and in places three thicknesses above and below the wing. The fin was built integral with the fuselage.



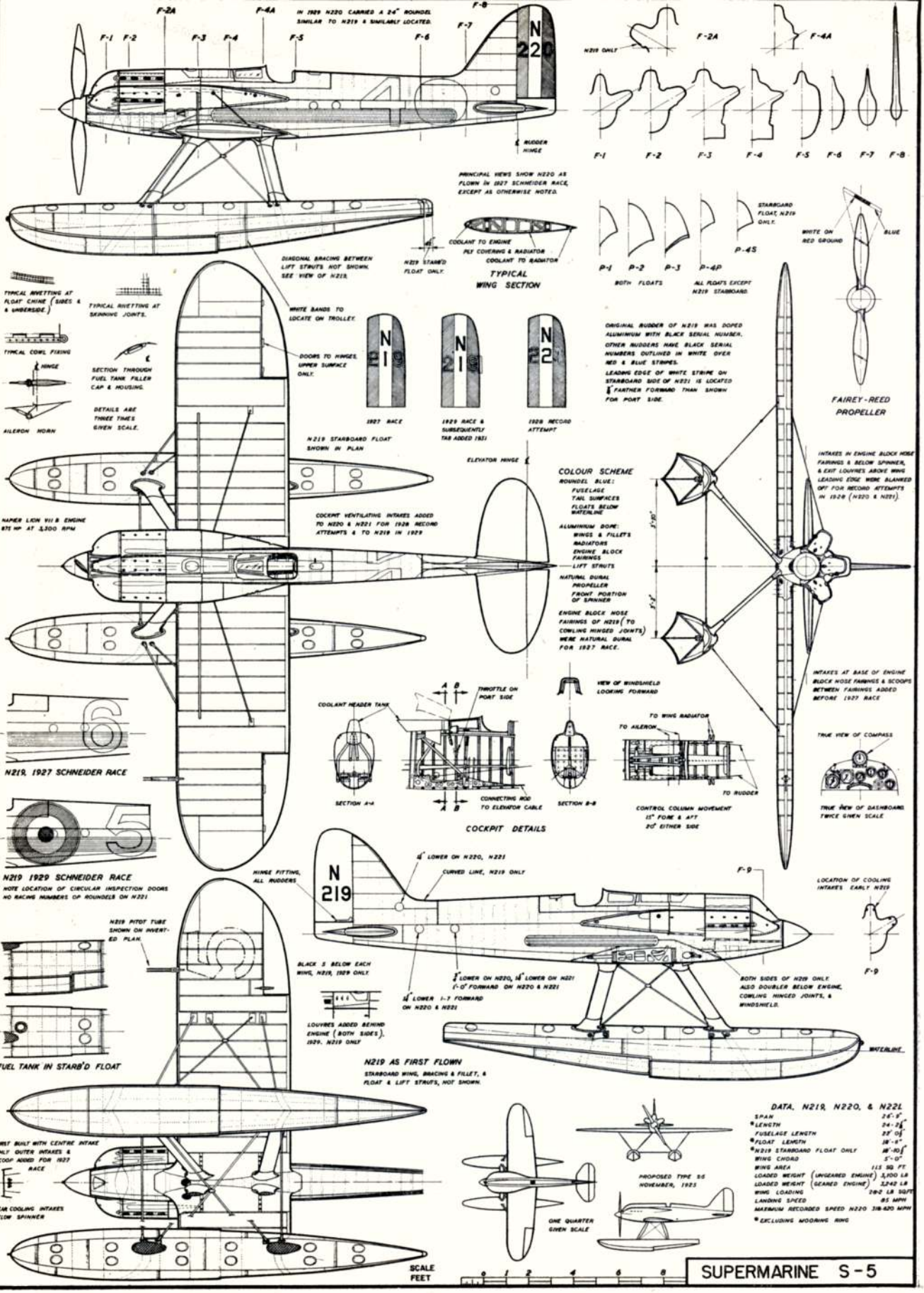
All-wooden wing panels were of symmetrical section, with ply-faced built-up spruce ribs and compression ribs, two box spars and a heavy diagonal box member near the tip to resist torsional loads. Tips and edges were laminations of spruce and ash, and two spanwise stringers helped support the 3/32 in. ply covering. Two bolts at either spar root connected each panel to top and bottom plates of the centre section, which was faired by long nosed dural fillets.

Surface radiators of flat copper panels corrugated internally for stiffness were screwed to both surfaces of the wing. Cooling water was pumped to a header tank behind the centre engine block, piped along the wing trailing edge, through the radiators and along the leading edge to the engine. Wing flexing on steep turns at first caused radiator weeping which was overcome with a common proprietary sealing compound. Lubricating oil was cooled in surface radiators along the fuselage sides and returned to a cylindrical tank behind the cockpit, which became uncomfortably hot during the hour-long Schneider race since oil temperature rose to 135 deg.

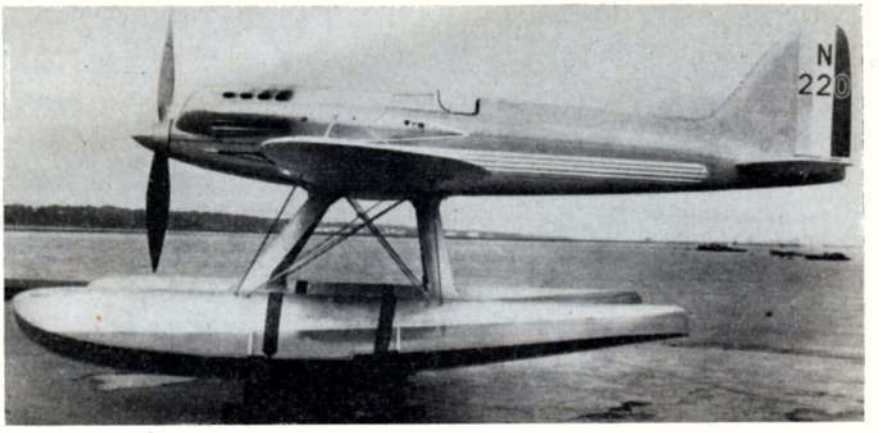
The one-piece tailplane was constructed about two spindled spruce spars with built-up ribs, laminated edges and 3/32 in. ply covering. Elevators were similarly constructed on a common box spar. Rudder and ailerons were built on two solid spruce spars, the rudder covered with 1 m.m. ply and ailerons with 3/32 in. ply. All controls were operated by 20 cwt. flexible cable running in fibre fairleads.

Anodised dural floats, offset 4 in. to starboard, were built around a central longitudinal bulkhead. This with seven frames and associated skinning was of stainless steel in the starboard float to form the 55 gallon fuel tank. Steel tube lift struts were bolted to reinforced frames in the floats, and their fairings housed fuel lines through which petrol was pumped from the float tank

Flashing past the camera during the 1929 race, N219 displays its prominent racing numbers on fuselage and wing. The "Flight" photograph also emphasises the slimness of the Supermarine S-5 fuselage


F-2A
F-4A
F-1
F-2
F-3
F-4
F-5
F-6
F-7
F-8
IN 1929 N220 CARRIED A 24" ROUNDEL SIMILAR TO N219 & SIMILARLY LOCATED.
N 220
℄ RUDDER HINGE
N219 ONLY
PRINCIPAL VIEWS SHOW N220 AS FLOWN IN 1927 SCHNEIDER RACE, EXCEPT AS OTHERWISE NOTED.
DIAGONAL BRACING BETWEEN LIFT STRUTS NOT SHOWN. SEE VIEW OF N219.
N219 STARB'D FLOAT ONLY.
COOLANT TO ENGINE
PLY COVERING & RADIATOR
COOLANT TO RADIATOR
TYPICAL WING SECTION
STARBOARD FLOAT, N219 ONLY.
P-1
P-2
P-3
P-4P
P-4S
BOTH FLOATS
ALL FLOATS EXCEPT N219 STARBOARD.
WHITE ON RED GROUND
BLUE
FAIREY-REED PROPELLER
TYPICAL RIVETTING AT FLOAT CHINE (SIDES & UNDERSIDE)
TYPICAL RIVETTING AT SKINNING JOINTS.
TYPICAL COWL FIXING
HINGE
SECTION THROUGH FUEL TANK FILLER CAP & HOUSING.
AILERON HORN
DETAILS ARE THREE TIMES GIVEN SCALE.
WHITE BANDS TO LOCATE ON TROLLEY.
DOORS TO HINGES, UPPER SURFACE ONLY.
N 19
N 219
N 21
1927 RACE
1929 RACE & SUBSEQUENTLY TAB ADDED 1931
1928 RECORD ATTEMPT
ORIGINAL RUDDER OF N219 WAS DOPED ALUMINIUM WITH BLACK SERIAL NUMBER. OTHER RUDDERS HAVE BLACK SERIAL NUMBERS OUTLINED IN WHITE OVER RED & BLUE STRIPES.
LEADING EDGE OF WHITE STRIPE ON STARBOARD SIDE OF N221 IS LOCATED ½" FARTHER FORWARD THAN SHOWN FOR PORT SIDE.
N219 STARBOARD FLOAT SHOWN IN PLAN
ELEVATOR HINGE ℄
COLOUR SCHEME
ROUNDEL BLUE:
FUSELAGE
TAIL SURFACES
FLOATS BELOW WATERLINE
ALUMINIUM DOPE:
WINGS & FILLETS
RADIATORS
ENGINE BLOCK FAIRINGS
LIFT STRUTS
NATURAL DURAL PROPELLER
FRONT PORTION OF SPINNER
ENGINE BLOCK NOSE FAIRINGS OF N219 (TO COWLING HINGED JOINTS) WERE NATURAL DURAL FOR 1927 RACE.
INTAKES IN ENGINE BLOCK NOSE FAIRINGS & BELOW SPINNER, & EXIT LOUVRES ABOVE WING LEADING EDGE WERE BLANKED OFF FOR RECORD ATTEMPTS IN 1928 (N220 & N221).
NAPIER LION VII B ENGINE 875 HP AT 3,300 RPM
COCKPIT VENTILATING INTAKES ADDED TO N220 & N221 FOR 1928 RECORD ATTEMPTS & TO N219 IN 1929
INTAKES AT BASE OF ENGINE BLOCK NOSE FAIRINGS & SCOOPS BETWEEN FAIRINGS ADDED BEFORE 1927 RACE
N219, 1927 SCHNEIDER RACE
N219 1929 SCHNEIDER RACE
NOTE LOCATION OF CIRCULAR INSPECTION DOORS NO RACING NUMBERS OR ROUNDELS ON N221
COOLANT HEADER TANK
THROTTLE ON PORT SIDE
SECTION A-A
CONNECTING ROD TO ELEVATOR CABLE
SECTION B-B
VIEW OF WINDSHIELD LOOKING FORWARD
TO WING RADIATOR
TO AILERON
TO RUDDER
CONTROL COLUMN MOVEMENT 15° FORE & AFT 20° EITHER SIDE
COCKPIT DETAILS
TRUE VIEW OF COMPASS
TRUE VIEW OF DASHBOARD. TWICE GIVEN SCALE
HINGE FITTING, ALL RUDDERS
N219 PITOT TUBE SHOWN ON INVERTED PLAN.
FUEL TANK IN STARB'D FLOAT
BLACK 5 BELOW EACH WING, N219, 1929 ONLY.
LOUVRES ADDED BEHIND ENGINE (BOTH SIDES), 1929. N219 ONLY
½" LOWER ON N220, N221
CURVED LINE, N219 ONLY
½" LOWER ON N220, 1⅛" LOWER ON N221 (-0" FORWARD ON N220 & N221
¼" LOWER 1-7 FORWARD ON N220 & N221
N 219
F-9
LOCATION OF COOLING INTAKES EARLY N219
BOTH SIDES OF N219 ONLY. ALSO DOUBLER BELOW ENGINE, COWLING HINGED JOINTS, & WINDSHIELD.
WATERLINE
N219 AS FIRST FLOWN
STARBOARD WING, BRACING & FILLET, & FLOAT & LIFT STRUTS, NOT SHOWN.
FIRST BUILT WITH CENTRE INTAKE ONLY OUTER INTAKES & SCOOP ADDED FOR 1927 RACE
GEAR COOLING INTAKES BELOW SPINNER
PROPOSED TYPE 516 NOVEMBER, 1935
ONE QUARTER GIVEN SCALE
SCALE FEET
0 1 2 4 6 8
DATA, N219, N220, & N221
SPAN 26'-9"
*LENGTH 24'-2½"
FUSELAGE LENGTH 23' 0"
FLOAT LENGTH 18'-6"
*N219 STARBOARD FLOAT ONLY 18'-10"
WING CHORD 5'-0"
WING AREA 115 SQ FT
LOADED WEIGHT (UNGEARED ENGINE) 3,100 LB
LOADED WEIGHT (GEARED ENGINE) 3,242 LB
WING LOADING 26.2 LB SQ/FT
LANDING SPEED 85 MPH
MAXIMUM RECORDED SPEED N220 318.620 MPH
*EXCLUDING MOORING RING
SUPERMARINE S-5

Supermarine S-5
continued



Supermarine S-5 N 220 as raced during 1927 at Venice. Italy. It won the Schneider race of that year with Flight Lieutenant S. N. Webster at the controls with a speed of 281.54 m.p.h. This Imperial War Museum photograph No. MH 4552 shows N 220 without its racing number and the fuselage roundel which it carried later, in 1929. Note the high pitched propeller.

to a service tank behind the starboard engine block to be gravity fed to the engine. Afterbody of the starboard float of N219 was 4 in. longer than standard, and its fuel tank was of slightly greater capacity than N220 and N221.

Six bolts attached the modified Napier Lion engine to the box-section bearers. To reduce frontal area magnetos had been relocated, cylinder blocks lowered and connecting rods shortened. Redesigned pistons, increased compression ratio, and special petrol/benzol/dope fuel boosted the Lion VII B to 875 h.p., which with the forged Fairey-Reed dural propeller gave an estimated speed increase of 30 m.p.h. Smooth cylinder heads made cowling unnecessary, and Napiers designed new gearing to fit within the cowling of the direct drive Lion.

N219 with the direct drive engine was tested at Calshot in August and subsequently modified with enlarged engine block nose fairings and increased oil cooler surface. N220 and N221 were built with these modifications as well as nominally flush riveting to fuselage and lift strut fairings, and geared Lion VII B engines.

1927 Venice Race

N219 and N220 went to Venice for the Schneider contest, which was flown over the Venice Lido for seven laps of a 50 km. (31.060 miles) course on September 26, 1927. Engine failure forced down all three Macchi M-52's, and despite a loosened cowling panel the race was won by N220 and Flt. Lt. S. N. Webster at 281.54 m.p.h. with N219 and Flt. Lt. O. E. Worsley second at 272.96 m.p.h.

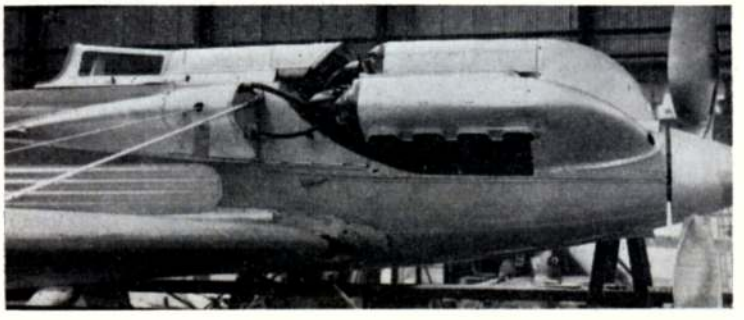
In February 1928 belated preparations were begun for bettering Bernardi's Absolute Speed Record established soon after the Schneider race on a Macchi M-52. In a record attempt off Calshot on March 12, the day before departure of F.A.I. officials, Flt. Lt. S. M. Kinkead was killed. Conditions were totally unsuitable, with glassy flat calm sea, low late afternoon sun, and haze obscuring the horizon. Kinkead, ill with malaria, flew N221 straight into the sea as he approached the 3 km. course.

In June Flt. Lt. D'Arcy Greig took over the High Speed Flight, making practice flights in N219 and many tests on N220 to determine the most suitable propeller. His speed with N220 of 319.570 m.p.h. at Calshot on November 4 was not sufficiently in excess of Bernardi's 318.620 m.p.h. to be recognised as a record by the F.A.I., and no further attempt was made.

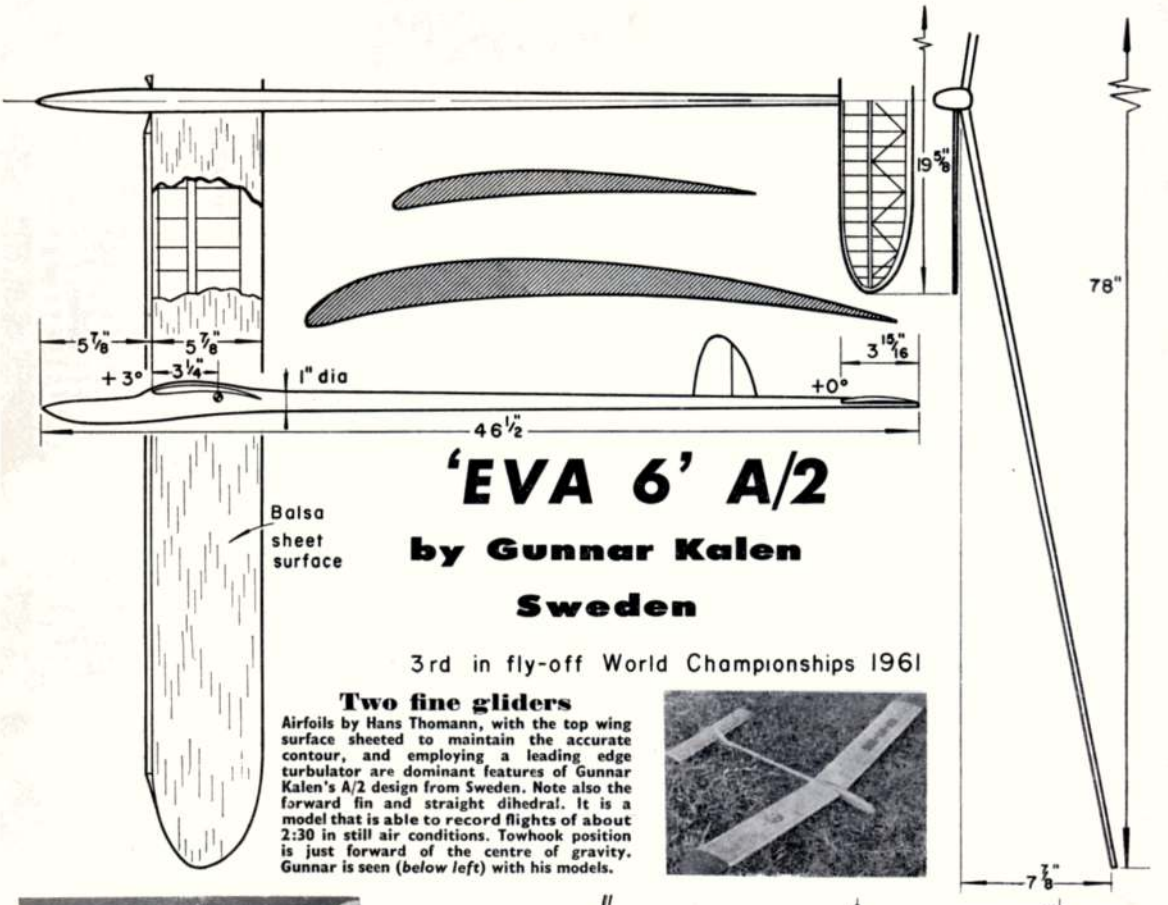
N219 and N220 were both used for training during 1929. In mid July N219 was returned to Supermarine's for complete overhaul including the fitting of a new geared Lion engine, and because of this and its greater fuel capacity was selected as reserve aircraft for the race. Flt. Lt. Greig flew N219 to third place at 282.11 m.p.h., only 19 seconds slower than the 284.2 m.p.h. of the second place Macchi M-52bis with its 1,030 h.p. Fiat engine. Both S-5's were used as practice machines in 1931, but took no part in the final Schneider contest.

In designing the Supermarine S-5 R. J. Mitchell made no inspired leap forward, but by continued refinement of conventional techniques achieved a practical compromise with excellent control and the fastest take off of any Schneider monoplane. Utterly reliable and a joy to land, the S-5 was the fastest seaplane of its power in the world.

Acknowledgements:
Air Commodore D. D'Arcy Greig, D.F.C., A.F.C., R.A.F. (Ret'd).
Wing Commander T. H. Moon.
Mr. C. F. Andrews, Public Relations Officer, Vickers Armstrongs (Aircraft) Ltd.



Some impression of the closeness of the cylinder cowls can be seen in this "Flight" photograph of N 220 in February 1928, where the covers have been removed. The central cylinder block forms an ideal "hide" for a model engine. Can we expect to see S-5 replicas in an Italian style Schneider Trophy in Miniature?



'EVA 6' A/2

by Gunnar Kalen

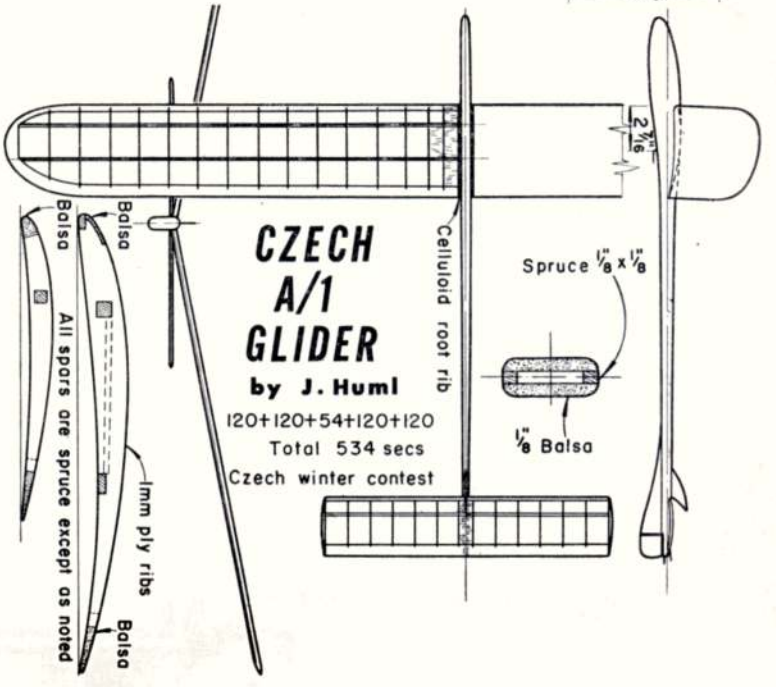
Sweden

3rd in fly-off World Championships 1961

Two fine gliders

Airfoils by Hans Thomann, with the top wing surface sheeted to maintain the accurate contour, and employing a leading edge turbulator are dominant features of Gunnar Kalen's A/2 design from Sweden. Note also the forward fin and straight dihedral. It is a model that is able to record flights of about 2:30 in still air conditions. Towhook position is just forward of the centre of gravity. Gunnar is seen (*below left*) with his models.

The A/1 glider class is a popular club event though yet to be officially adopted by many aero clubs. This Czech winner (*photo above right*) is notable for the straight dihedral, small fin and square spar sections. It has an enviable record as the winter contest result shows, with four flights exceeding the 2 minute maximum. Centre of gravity is at the rear spar position. Note the leading edge sheathing and inset mainspar for best airfoil contour preservation



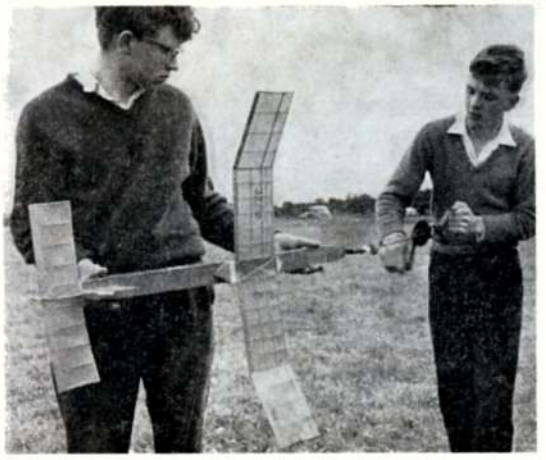
CZECH A/1 GLIDER

by J. Huml

120+120+54+120+120

Total 534 secs

Czech winter contest



CLUB NEWS

Club Secretaries are requested to make sure they complete their section of the Questionnaire included with this issue so that they can be included in our register for 1963

Sunny days will be here again—soon we hope! Flashback to August '62 shows Scot, Arnott (of Kirkcaldy) putting on final turns prior to a 4 minute flight at Rush Trophy Gala, Thornaby on Tees. Model is blue with one orange tip for identification in the air

HERE'S A NOTE for the pocket book lads. The Scottish Gala scheduled to be held on August 11th under the S.M.A.E. 1963 Contest Programme listing, has been brought forward a week and will, therefore, take place on August 4th.

Just for a change this year, **Eastcote Radio & Free Flight Club's** Christmas party was held at a Chinese Restaurant, where reactions which greeted the various dishes were as mixed as the concoctions, those members with adventurous digestions delighting in the treat. On January 3rd a dozen members of this **LONDON** club visited the Hivac Valve Company at South Ruislip, where, after a tour of the premises they are better informed on the subject of valve manufacture. A free flight Scramble with the **Northwood** and **Watford** Clubs on January 13th was their start to new year activities. Despite freezing conditions and deep snow the day was most enjoyable, D. Smith of **Watford Wayfarers** winning Chuck Glider with a time of 2:47 for five launches, and the Scramble with a time of 15:47 for the nominated half hour. R. Coward of **Eastcote** took away the Precision honours with a zero error.

In **Cosmo A.C's** two recent club Rat Races, Ron James proved himself their champion with outright wins in both "A" and "½A" events using Oliver engines in each competition. B. Chiswick's "½A" performance made him runner-up in that event and in the four-in-a-circle, two hundred lap "A" final, P. Crowhurst, a keen young flyer was extremely close to the winner. At the moment club officers and senior members are trying to stir new interest among juniors feeling that without keen juniors, no serious competition work can be executed in the future.

Richmond & D.M.A.C.'s Christmas Dance was their most successful yet, actually making a small profit to boost club funds. Plans for 1963 include rally visits and they hope to repeat their last year's Nationals accommodation booking, an entire hotel. New members are always welcome at The Wigon Hall, North Warple Way, Sheen, on Friday evenings.

Radio Control in the **SOUTH EASTERN** Area. That's the story from **North Kent Nomads** where 90 per cent. of R/C gear is home constructed, successfully too, thanks to their boffins, in particular, Eric Hook, a wiz with transistors. I. R. Bittle is club champion for the third year in succession with Messrs. Hubbard and Parker second and third, while Eric Jarrett is current junior champion. Geoff Chapman holds the Dance trophies for both single and multi and George Hattemore is their top Galloping Ghost man, flying a battered Rattler to log more air time than many spend tinkering. Club meetings are held on the second Monday of each month at the "Travellers' Home," Long Lane, Bexleyheath, where any unattached free flight or radio modellers will find a welcome.

Mr. Gordon Wilson has been voted the most outstanding member of **SOUTHERN AREA's Woking & D.M.A.C.** Joining them early in 1962 without any experience of powered modelling whatsoever, he has learnt from other club members and achieved 2nd place in the senior section of the championship; quite an effort.

Here's a little idea from **MIDLAND AREA's Leicester M.A.C.,** planning a general get-together session at their Community Centre, to include a novelty event. All must bring a razor blade and tube of balsa cement and by paying 6d. they are given a chunk of balsa with which to construct a Chuck Glider. Flights by these creations will then be timed and the winner takes the kitty. A planned trip to London concerns a visit to the Imperial War Museum and Aeronautical Section of the Science Museum. Should be a feast for the scale fans. Radio enthusiasts in the club appear to be finding the R/C waveband conjested and consideration is now being given to the possibility of obtaining a signal monitor as part of club equipment.

Active now for two years in the **NORTH EASTENR AREA, Ashington M.A.C.** have worked hard to achieve competition standard flying and have already recorded successes in Combat. Interest is now turning to control line Team Race, Stunt, and Free Flight. Recently the local welfare community took the club under its wing and members are now blessed with a flying field and club hut. Fastidious building consumes their time in anticipation of the better weather to come.

West Hartlepool M.F.C. has a regular membership of 15, but would certainly welcome an influx of recruits. Anyone interested? If so write to I. N. Nicholson, Lynnfield School House, Pease St., West Hartlepool. Flying continues at Thornaby Aerodrome, but since multi storey buildings are to be erected flying activities there will eventually cease. Interest continues to sway from C/L to R/C, with two *A.P.S. Timbers*, an *A.P.S. Six Gun*, a *Veron Skylane* and some others in the air. Tony Oliver's Timber is equipped with skis to cope with the snow. He's not the only ski conscious member either for the control line enthusiast secretary has a ski equipped *Stunt Queen*. The Team Race fans, all juniors, have a 100 m.p.h. "A" racer and a "B" racer too. Already preparations are being made for the Nats, where they hope for a good turn out. One enthusiast recently built his own radio gear but this has yet to be fitted into a model. Little control they report, but the Light Programme is worth listening to!! Somewhat belated (due to press dates and production periods and all that) the lads from West Hartlepool wish their fellow modellers throughout the country a happy new year.

Club organised rallies are great stimulants for free flight contest types' These further flashbacks to the Rush Trophy event at Thornaby show John Parrott (of Whitefield) who placed third. Model has Webra BB. 2.5, Acada timer, red fuselage and yellow surfaces. Below is Mr. Lee (of Novocastria) launching his son's *Maverick* A/2 (Tatone DT system)

A. Collinson of Bradford and familiar yellow and black *Charger*. 48 ins. span for K & B 15 R/C with E.D. Single channel receiver and Bonner Varicomp, it is a popular choice for those who like a model that will fly straight when wanted. Review of the Ambroid Charger, with hints appeared in *Radio Control Models & Electronics* for January 1963

NORTH WEST now to **Whitefield M.A.C.**, invited to attend a dance given by their local youth club. Those attending were pleasantly surprised when treated to a display of hot jiving by Shirley Jolley and John O'Donnell. Winter trimming has been the pastime of the more hardy members, in readiness for the winter rallies. Club new year resolution (that's a new angle) is to organise a control line display team, the object of which being to boost interest in club activities.

Sharston M.A.C. are at the moment preparing for the commencement of the new flying season and some better weather. They meet each Friday evening at Sharston Hall, Altrincham Road, around 8 p.m. where all are welcome.

News now from the **SOUTH OF SCOTLAND AREA COMMITTEE**, which since June 1961 has been an amalgamation of the West and East of Scotland Committees. The position of the S.o.S.A. has been strengthened by the duplication of membership between this and the **Scottish Aeromodellers Association** during the past year and these bodies have, therefore worked hand in hand. Flying field situation has not improved. Spectators are banned from Abbotsinch, the only available airfield, the resulting loss of publicity being one of the reasons for loss of the much valued Pan Am contest.

Scottish Aeromodelling is the news sheet of the S.o.S.A. and the S.A.A., provided to keep modellers informed of Scottish model flying activities and occasionally includes plans (courtesy of N.A.N.). In the grip of the season for talking rather than flying, representatives from **Edinburgh, Paisley, Prestwick** and **Glasgow Hornets** clubs, all area committee members, attended the S.M.A.E. A.G.M., taking considerable time to make their views known. But at their own Area A.G.M., held at Stirling, these gentlemen found the tables turned when they were criticised for having anything further to do with London (the old story). After many years John O'Donnell (*their* J.O'D) resigned as F/F Secretary to be replaced by Bill Douglas. This change gives the former more time for model flying. A first class Dinner and Prizegiving followed this A.G.M., where Edinburgh clubman Urland Wannop's Gutteridge Trophy win not going unmentioned.

The Second meeting in the area T/R League programme was held in December under conditions reminiscent of the Scottish Gala, only colder. Although the contest is open to all insured flyers in the Area, support so far has not been great. Present leaders, by virtue of having attended both meets are **Glasgow Hornets**, with **Cadzow** ollowing.

Pen Pals

For Janusz Szlubowski, Aleksandrow-Kujawski, Al. Wojska Polskieg, Dom Kol. nr. 8 who wishes to correspond in English with a modeller in this country interested in exchanging magazines. For Joergen Larsen, Siimvej 19, Ry, Denmark, a keen A/2 glider flyer who placed third at the 1962 Danish Champs. Would like to correspond with an Austrian, German or Swiss modeller with similar interest.

THE CLUBMAN.

CLASSIFIED ADVERTISEMENTS

PRESS DATE for issue APRIL, 1963, FEBRUARY 21, 1963

ADVERTISEMENT RATES:

Private **Minimum 18 words 6/- and 4d. per extra word.**
Trade **Minimum 18 words 12/- and 8d. per extra word.**

Box Numbers to count as six words when costing.

All replies to be sent care of Advertisement Department, Model Aeronautical Press Ltd., 38 Clarendon Road, Watford, Herts.

Copy received after first post on the 21st will be held over until the next issue, unless cancelled in writing before 10th of following month.

FOR SALE

Giving up! Enya 29 III mod., fast. Old K & B 15R. Highly tuned Fox 15X Many odds for callers. £10 lot. Arnold, 95 Lingfield Crescent, Eltham, S.E.9.

ETA 19, £4; Frog 150, 25s.; Cox Babe Bee; AEROMODELLERS August 1958—August 1961, offers? Arrand, The Haven, Quarry Farm Road, Pool in Wharfedale, Yorkshire.

A.M. 35; Ripmax Radio Tx and Rx.; Cox Olympic; all in perfect condition. Offers! Crook, Patrington, Hull, Yorkshire.

2 Sea Commanders, one powered by a Taplin Twin and radio controlled including transmitter, receiver, actuators, batteries—£5 and £20. Also Deans Reed Bank Jaico relays etc. S.A.E. to 2 Tudor Road, Beckenham, Kent, for list—Beckenham 1239.

Berkely kit B25 Mitchell, 45 inch span, C/L handles, props, wheels, spinners. Also E.D. Racer. £6 o.n.o. Books, Spitfire, Japanese aircraft etc. Aeroplane Spotter bound volumes 7, 8, 9. Offers. Foster, 16 Weston Avenue, Leighton Buzzard, Beds.

Altair 10 channel servo switcher pack, £17 10s. 0d. o.n.o. Kent. 9 Scarle Close, Lincoln, Tel: 22573.

AEROMODELLERS, 1957/59, Model Aircraft 1959/61, 6d. each; AEROMODELLER Annuals 1957/59, 6s. each; Allbon Spitfire, 20s. S.A.E. enquiries, Oldfield, 40 Pine Avenue, W. Wickham, Kent.

Cox Tee Dee .15 boxed with spanner, £4 o.n.o. J. D. Newstead, 9 Woodlands Grove, Stockton Lane, York.

Semi-finished Slicker kit, immaculately built, plus brand new A.M.10 Bee, Dart, Amco 87. suitable for spares. New Pee-Wee plus 2 models. Assorted accessories. Offers? Box No. 683.

E.D.8 Tx. Rx ; 2 Bonner multi servos: £25. Foster, 11 East Avenue, Bracebridge Heath Lincoln. Tel 20775.

All new: Mills .75, 40s.; Enya 15D Mk. II, 80s.; Elmic Commander, 45s.; Ivy A/M transmitter, 40s.; P. F. Ralph, Benarth, Llanrwst Road, Glan Conway, Colwyn Bay, Denbighshire.

For Sale: R.E.P. Unitone Tx and Rx., brand new, £13 10s.; Graupner Unimatic servo also brand new, £2 10s.; E.D. Racer, never used, immaculate condition, £3 10s.; Graupner Satellite 48 in. span R/C, good condition, £1 10s. o.n.o. Telephone FORest Hill 5526.

Multi servos: Remtrol-Olsen, 45s.; Powertrol, 50s.; Fox 15, 30s.; F/R 2 pawl clockwork, 20s.; Ominiac, 20s.; Warren, "Copplestones", Wilsom, Alton, Hants.

Frog 3.49 plain-bearing, loose prop-driver, repaired Frog Tempest. Offers? Would exchange for any T.D. engine. Gray, 91 Exeter Road, Wallsend, Northumberland.

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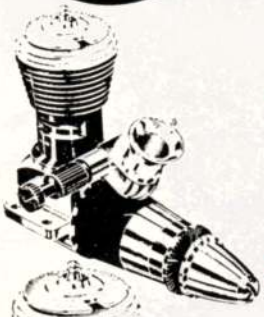

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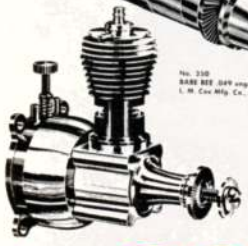

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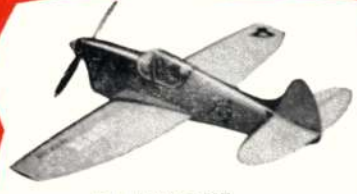

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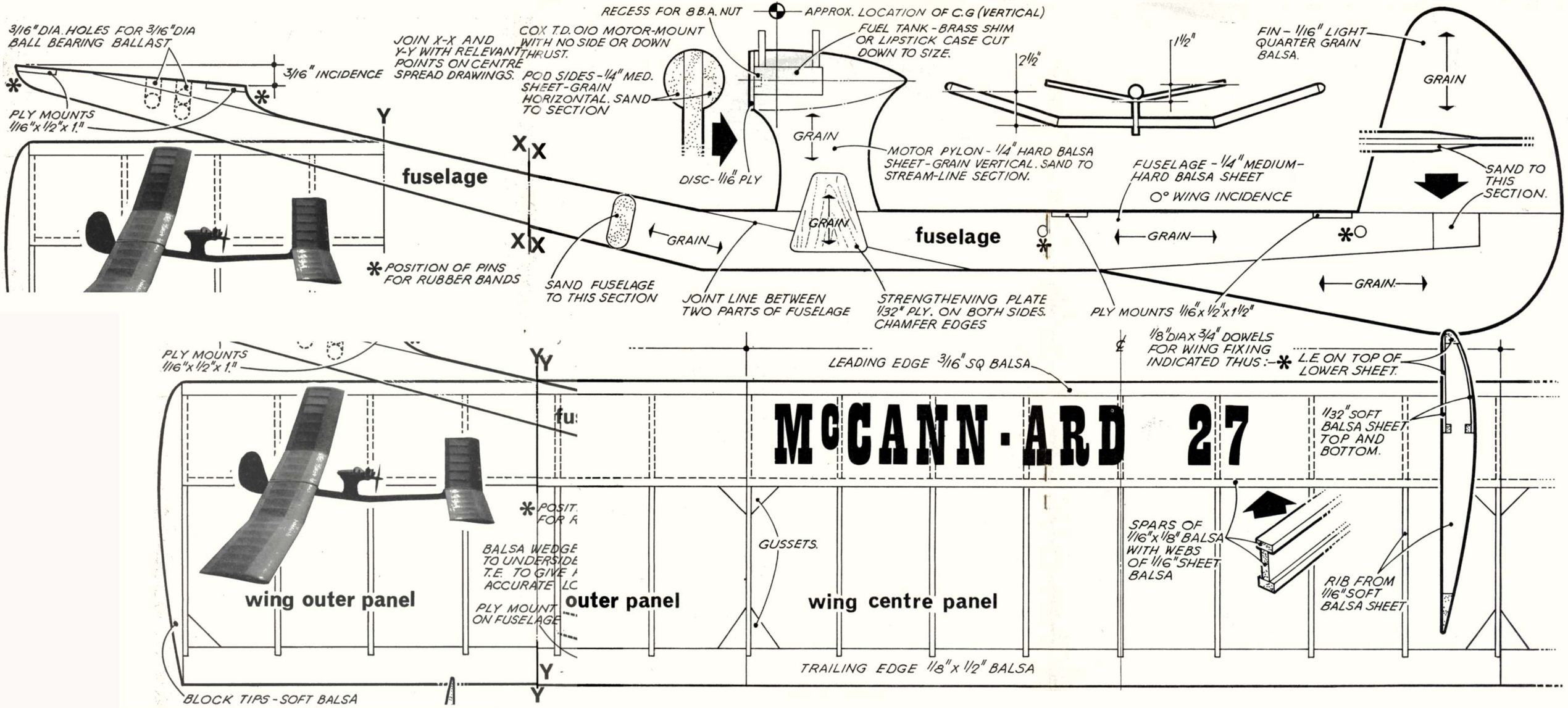
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