THE AUSTRALIAN
modeller
No.5 · 35c

AT LAST! HOLDEN SLOT CAR

SUPER PLANS
- FLETCHER FU 24 CROP DUSTER
- DH4 WWI FIGHTER

ROCKET STABILITY

1969 NSWMRRA Calendar

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Exact equipment used by Dawn Securities' famous racing team — Ian Bannister, Steve Hutchesson and Bryan Hunt, who carried all before them in 1968, including the Dawn Trophy, Driver of the Year, NSW Team Championship, the NSW versus Victoria Frank Matich Cup and an interstate invitation race against Queensland teams.

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Try the Team-Hutchesson series of chassis ranging from the inline sports and GT H-1 and H-2 series at $3.30 retail to the more expensive H-4 sidewinder and H-5, H-6, H-7 and H-8 Angle Winder and Bat Pan chassis.

Also available — Champion bulletproofing kits, 517 and 617 end bells and the famous Champion Arco magnets for small or medium cans.

Also available from Champion — 517 black case motors and shortly available the new 525 thumbprint motors — a sensational development by Rule and Cozine.

Also available from Champion — 507, 607 and 517-5 Kirkwood commutators, Champion shunted brushes, 517-7 and 617-7 armature stak insulators and a variety of new products for 1969.

From AYK — a wide range of brass tubing, including the special 9/32" ODx¼" ID brass tubing for anglewinders and a special series of low cost sidewinder chassis, including the latest brass rod type with movable body mounts.

From Champion, Mura, Associated, Riggen, Universal Accessories and Dynamic — all the latest scratch building accessories, including sidewinder, inline, anglewinder motor mounting brackets, piano wire, brass rod, 1/16" pin-hole conversion bushings, drop arm tongues and the famous Champion 2 gram, 4 gram and 8 gram flag weights.

From Champion, Riggen, Weldun, Calex, Dynamic and Cox, a full range of crown gears and pinions in all sizes, including special spur gears for both sidewinders and anglewinders and the Weldun 64 pitch sidewinder and anglewinder range of spur gears and pinions.

From Riggen, AJ's and Associated, a wide range of microcel tyres and wheels for sidewinder, anglewinder and inline chassis, in colors of black, grey, blue, green, olive, fawn and white.

Also available — a wide variety of open cell and solid rubber tyres and tyres and wheels from Cox, Mila Miglia and Dynamic at discounted prices.

From Lancer and Dynamic — a wide range of 1968/69 24th scale 10 thou' super competition and handling bodies, including Mercury Cyclone, Dodge Charger, Ford Torino, McLaren Mark 8A, Lola T-160, McKee Can-Am, Ferrari 6.3 litre Can-Am, Matra GT, Porsche 908 and Alfa T-33.

From GT Models (England) — Gordon Tapsell's most comprehensive range of 1/32 scale bodies in the world, including all the new 1968 and 1969 bodies in both touring car, Group 7, Sports/GT, Formula 1 and Indianapolis.

Shortly to be announced — a new range of moderately priced 10 thou' plastic bodies, including various makes of the Australian Holden and many others.

From Mura — a wide variety of products, including the new phenolic unmeltable end bells, 8 thou' semi-can, versitec type magnets, small OD commutators and the new series of Mura motors, including the Stock Production D, the new Magnum 1000-A and the new Cukras' Playboy Pink "Team OO7" motor.

Still available — a selection of discounted 32nd scale and 24th scale kits from Tamiya, Revell, Cox, Atlas and Strombecker at give-away prices.

Note in particular — we still have a large supply of various makes of the famous Tamiya sidewinder kits with both 36D and 26D motors.

Our range is the ultimate — we can supply both the beginner and the professional with the latest gear from the United States, England and Japan.

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DAWN SECURITIES PTY. LTD.

WHOLESALE ONLY

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THE AUSTRALIAN modeller editorial

Australian Modeller is now almost a year old. With the passing of 1968 and the start of a new year it is a good time to look back and review what we have achieved.

As many of our readers will know, this magazine started as a model car mag., and went from strength to strength whilst the model car business was booming.

Alas the inevitable happened and the bubble burst. Slot car tracks all over the country closed down and many people predicted that the model car business was finished. For some it was, but most of them should not have been in it in the first place. They were not modellers, they were speculators out to make a fast dollar and they turned a good hobby into a mad craze that could never last.

Now the model car hobby has settled down to what it should have been in the first place . . . good, steady branch of the modelling field, run, supervised and catered for by genuine enthusiasts.

This brings us to our first editorial point . . . The magazine is run on a basis whereby we try to cover the complete modelling field in this country. Many people have criticised this policy and have requested that we concentrate on one branch of modelling. (Naturally it is the particular hobby that THEY are interested in!)

If this were possible we would run a magazine for each and every type of modelling activity and be more than glad to do so. However, many attempts have been made in the past to do such a thing and in spite of all the enthusiasm and hard work that have gone into these efforts, all have failed.

The answer is a simple one—at the present time there is no one branch of the modelling field that is strong enough to support a magazine of good quality that can pay its way and survive.

This is why Australian Modeller must be what it is, a magazine devoted to all types of modelling.

Now in this respect we can only be guided by the reaction of the readers themselves, and this comes in the form of mail. In the last issues there was a lack of car material and this brought forth a considerable amount of correspondence. The result . . . a lot more car material in this issue!

So let us know what you want and we will do our best to give you a good all-Australian modelling mag. However, just one thing . . . we cannot answer readers' letters individually as much as we would like to, but rest assured that all are read with interest and action taken wherever possible.

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letters to the editor

Sir, — As a regular reader of your magazine I am always interested in your articles on the different types of modelling. However, my main interest is in military models, and I would like to try my hand at scratch building tanks, etc. However, I am puzzled as to just what Plasticard is. What is it and where can I buy it?
—Dale Morris, Crookwell, NSW.

Dale, — Plasticard is just what its name implies. It is plastic in sheet form. It is available in varying thicknesses and can be purchased from Fantastic Hobby Shop, Sydney. You will find their address in this issue. Sizes and prices are as follows: Ten thou 25c, 20, 30 and 40 thou 30c, 60thou 35c. Postage should be about 10 cents.

Sir, — I am planning to build a 1/24 slot car track in my home and I would like to know where I can purchase suitable braid by mail order. Also, what would the price be?
—N. Saunders, Canberra, ACT.

Mr Saunders,—Write to Hobbyco, 561 George St, Sydney. They have stocks of good quality copper braid that would suit your purpose. Price is 25 cents per yard plus postage.

Sir, — Recently I purchased an OS rudder servo and when I wired up the circuit, according to instructions, I found that the servo just kept turning around in an anticlockwise direction. I am using an OS Pixie-type receiver. Can you give me any help on this matter?
—A Mountford, Mt Isa, Q'land.

Mr Mountford, — It is very difficult to diagnose problems such as this by post. I suggest that you contact Model Dockyard, Melbourne, who are the agents for OS equipment. However, you might like to check one thing first that just could be the answer to the trouble. If you are using batteries such as the Ever Ready leakproof type, cut off the bottom of the outer case and solder the wires to the zinc inside casing. These batteries are designed to operate in torches, etc, that have spring-loaded contacts and without this tension the electrical contact can be doubtful.

Sir, — In your July-August issue you published a plan of the Nazi Elephant. Could you please tell me if there is a kit available of this tank? Also in the same issue was a kit advertised for the Airfix Angel Intercepter. Where could I buy one of these by mail?
—Dale Morris, Crookwell, NSW.

Dale, — Another letter from you? You are a busy lad, aren't you? However, we are always glad to hear from our readers and give any help that we can. Unfortunately, however, we can't help you with the tank problem. There is no kit made of this type to date. The Angel Intercepter can be purchased from Levenson's Hobbies, Sydney, and the price is 90 cents plus postage. They will send you catalogues if you ask.

Sir, — I am interested in the rocket motors mentioned in your No. 4 issue. Are they available in Brisbane? Also, could you publish plans of rockets?
—Malcom Barnes, Brisbane, Qld.

Malcom, — We will be featuring plans of rockets in future issues and you will find in this issue a very interesting article on rocket stability. This should give you some clues on designing your own rockets. For information on motors and other components get in touch with Chris Vine, PO Box 315, Bankstown. He is the agent for Estes Industries and can supply you with anything you require.

We do not make a habit of advertising on our front page, but we were so carried away with Airfix's latest catalogue that we shamelessly stole a page. Not only is it a catalogue of the finest quality, but it is also a most useful source of reference, as it shows color schemes of military and civil aircraft, as well as insignias and registration schemes. This is a book that should be on every plastic modeller's shelf. By the time you read this you should be able to purchase a copy in your local model shop for 30 cents.

Sir, — I would like to enquire about an article in your No. 4 issue titled ABC of Rocketry. Are these rockets available and if so, where can they be obtained?
—Douglas Stewart, Toowoomba, Qld.

Doug, — The previous letter will give you the information you require. I suggest that you write to Chris Vine also. He is president of the National Association of Rocketry and could help you in forming a Queensland branch of the organisation.

Sir, — I have often heard reference to a modelling material called King Billy Pine. I believe that it is used for model aircraft building. Could you let me know if this is obtainable in the Sydney area?
—Robert Thomas, Ashfield, NSW.

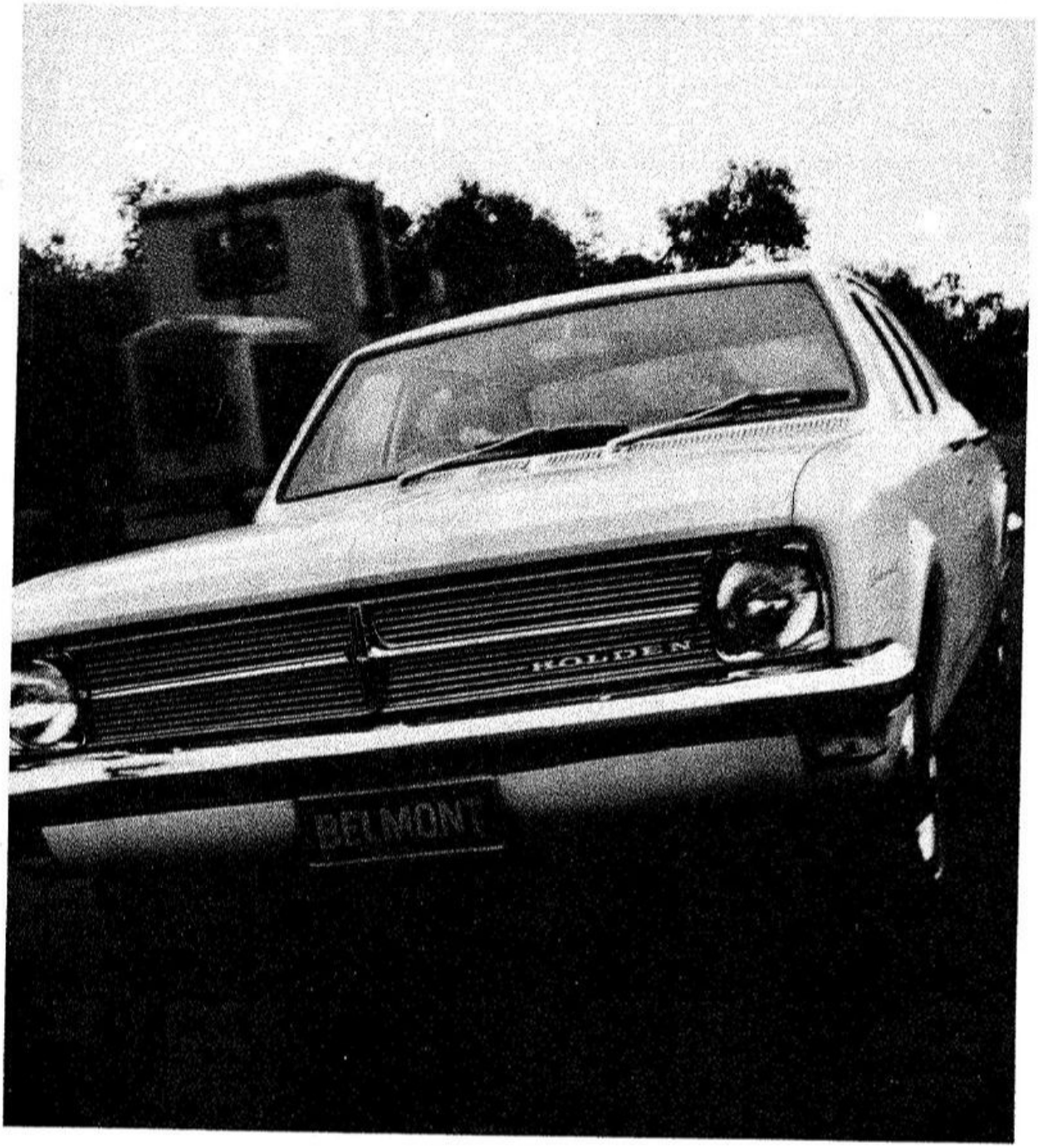
Bob, — You can buy this timber at Walther and Stevenson, George St, Sydney. Its correct name is King William Pine and comes from Tasmania. You will find it excellent for such things as wing leading edges or chuck glider fuselages. It is available in 36" and 48" lengths and although you will have to enquire yourself for sizes available, I can tell you as a rough guide that it is about 10 cents a length.

Sir, — My son and I each have a model glider. One is an Aero Flyte Nimbus, and the other a Cirrus. While the glide on both models is excellent we are having trouble with launching. We find that they climb almost vertically when being towed, and the result is, of course, a stall and subsequent dive. The tow hooks are in the position as shown on the plan. We do not want to change the trim, as it will spoil the glide. What is the answer?
—Rev R. F. Atkins, Gordonvale, Qld.

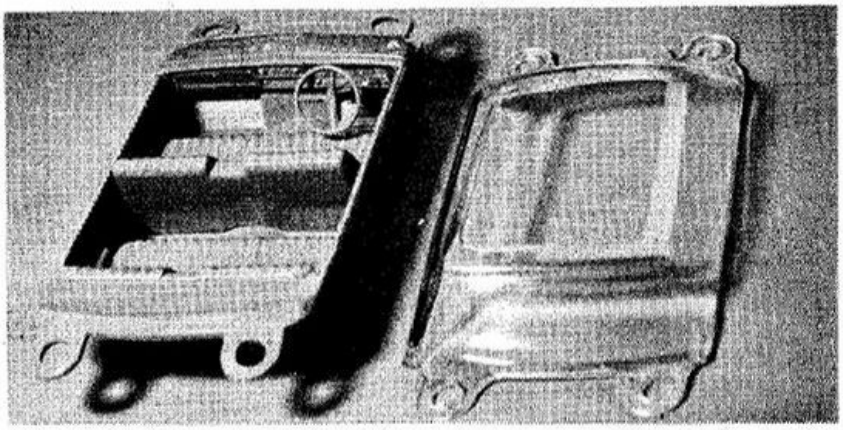
Mr Atkins, — The simple answer to this problem is to move the launching hooks forward regardless of the plan. To save tearing into the fuselage try soldering another hook to the existing one, but moving it forward about 1½". You will have to experiment a little to get the exact position, but this is certainly the cause of your troubles.

AT LAST HERE'S A HOLDEN!

DETAILS OVERLEAF



HERE'S A HOLDEN!



IF ALL the letters from readers requesting information on where to buy Holden bodies for slot racing were put end to end it would make a line longer than any track in Australia.

From time to time various concerns have advertised that such bodies are "on the way", but never has anything eventuated.

Now, however, at long last, we have the answer in the form of a very detailed injection moulding of the current model.

This body is not the product of a company concerned in the model business but is in fact a friction toy produced by a Melbourne company under licence from GM-H. It is to 1/25 scale which is generally accepted as being close enough to the usual 1/24.

It has the good and bad features of any injection moulded body . . . superb detail on the good side and weight on the bad side. The detail is as good as anything seen in the model car world to date, with chrome grill and bumpers. The other parts that would be chromed such as door handles, window trims, etc., are so well defined that it is a very simple matter to pick them out with silver paint.

The transparent areas are moulded into one piece until that locates on four pegs in the roof. This is a perfect flush fit and leaves no gaps around the window or windscreen.

Also supplied is a beautifully detailed interior showing all upholstery seams and inside door trim, as well as floor mats, pedals and a fully detailed dash. The dash detail includes radio, all instruments, and you can even read the word Holden on the glove box!

Now to the problems of converting into a slotting body. Actually there is only one snag and that is the weight. As in all injection moulded bodies we pay for detail with extra ounces and we must put our car on a diet to achieve any sort of performance.

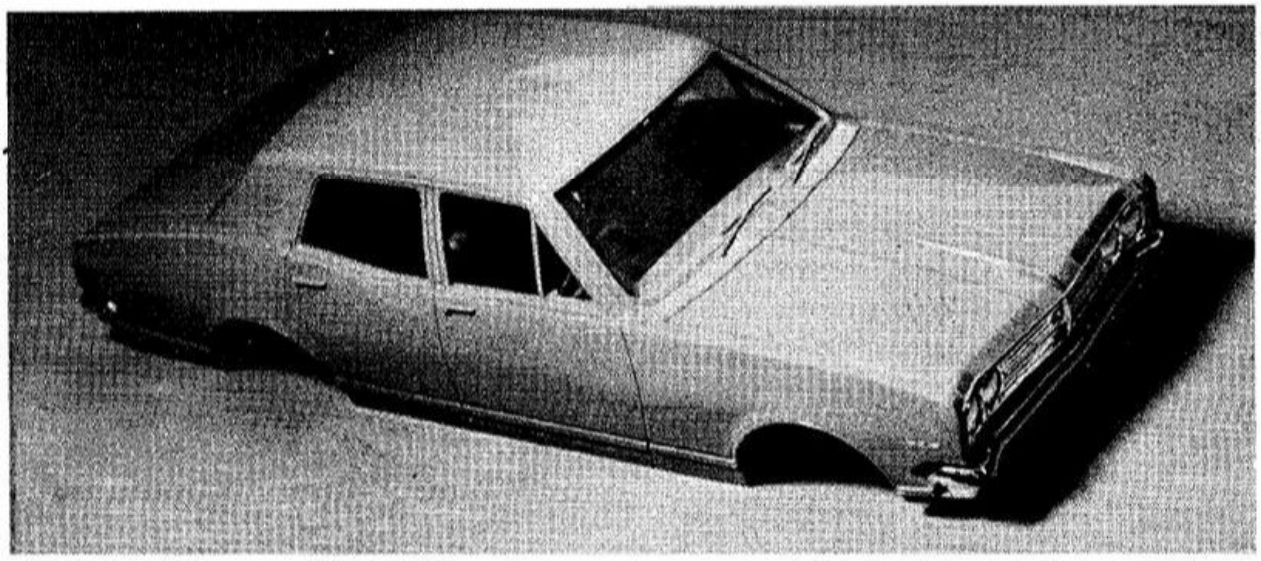
First thing to go of course is the interior (pity). This is replaced by a card decking carrying a "head and shoulder" driver. The steering wheel from the interior can be used if required as it is removable.

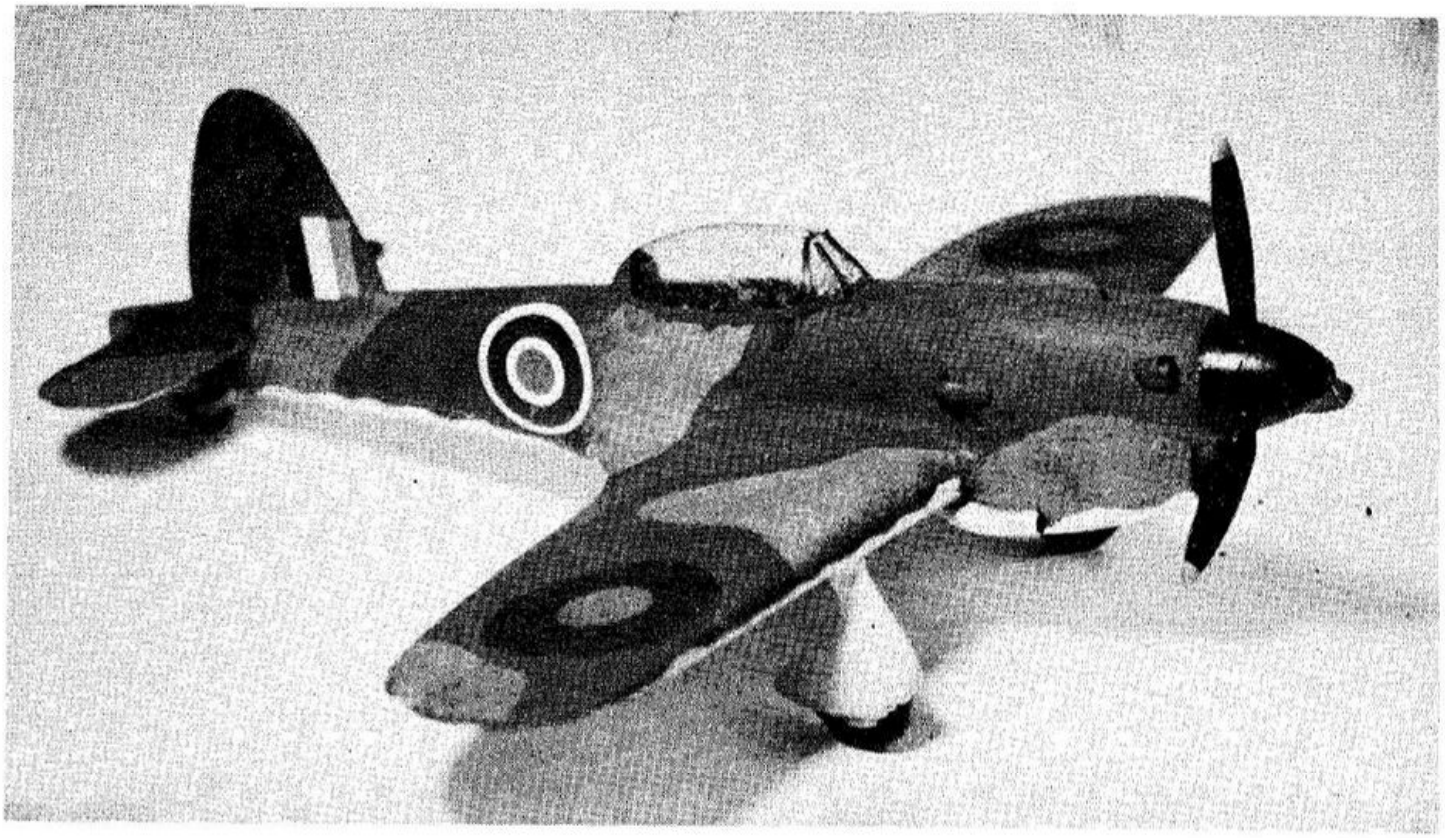
The makers have helped us with the transparent moulding as the top area that goes under the roof has been cut away. However, a little more can be taken off to good effect.

The original mounting lugs can be used to attach the body to the chassis but they must be reinforced with Araldite first. The wheelbase is 4⅜in, which is rather long. However, most adjustable chassis will extend to this. Of course it would be better to scratch build a chassis to suit and this would be a pretty heavy unit to offset the high weight of the body.

The resulting car will never be capable of seriously competing with the out-and-out performance cars, but should be a natural for concourse events.

Where to get one? Walther and Stevenson, 395 George Street, Sydney. The price, $1.85, plus postage.





MILES M20 - THEY ALMOST MADE IT!

MANY aircraft have been developed that should have made their name in the pages of aeronautical history, but in fact did not. Some did not live up to expectations and were promptly dropped. In many cases the design was good enough, but wartime requirements made an otherwise promising aircraft not worth producing.

Even more tragic is the long list of very highly developed aircraft that were emerging towards the end of the war, that in spite of the experience and knowledge that had gone into their development, did not see operational use and in many cases are almost unknown.

It is for this reason we are introducing a series of profiles of some of these aircraft with drawings to 1/72 scale. These will all be of designs that are not catered for in the plastic kit field and will thus be a challenge to the scratch builder.

We start off this series with the Miles M 20, and as this is a fairly simple design from the modelling point of view, we have used this as the subject in a separate article on building from balsa featured elsewhere in this issue.

During the Battle of Britain, the Miles Aircraft Company saw the possibility of a grave shortage of fighter aircraft. With this in mind F. G. Miles designed a simple fighter aircraft using as many components of existing aircraft as possible, and of all-wood construction.

This design was submitted to the Ministry of Aircraft Production and was immediately accepted. Nine weeks later the prototype was finished, and was test flown two days later, truly a remarkable piece of work.

In the design everything was sacrificed for speed of production. The power unit was a standard Merlin engine and nacelle as being used in the Lancasters, while all hydrauliess were eliminated by the use of a fixed spatted undercarriage.

Construction of the airframe was all wood, with ply covering. The controls were fabric covered. The then standard armament of eight Browning .303 machine guns gave the M-20 an equivalent fire power to the Hurricane and Spitfire, while carrying far more ammunition than either.

A very advanced feature of the design was the "tear-drop" canopy. In fact at the time this was a complete innovation, and was later to be copied by almost every manufacturer in the world.

Upon testing, the M-20 was little short of a miracle. Its speed of 345mph at 20,000ft made it faster than the Hurricane, and only slightly slower than the Spitfire of that time. Its range of 1,200 miles (economical cruising) was over twice that of the Spitfire.

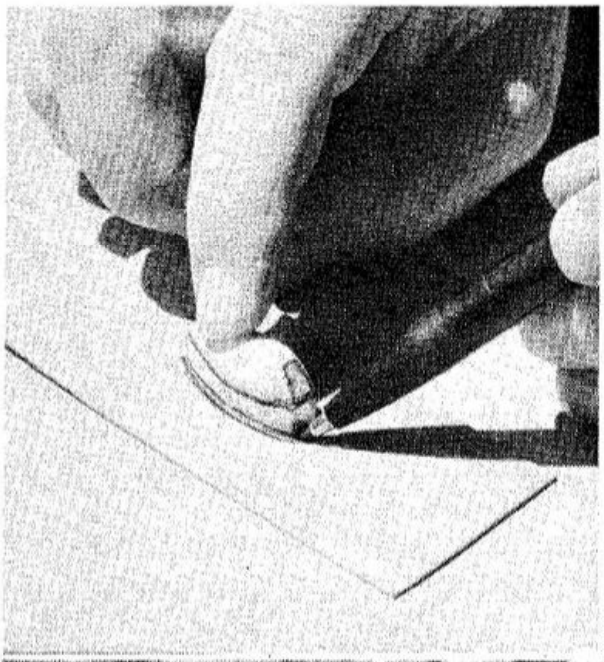
Aerobatically the M-20 impressed all the pilots that flew it and this included many experienced operational types. Particularly impressive was its fantastic rate of roll owing to the short span.

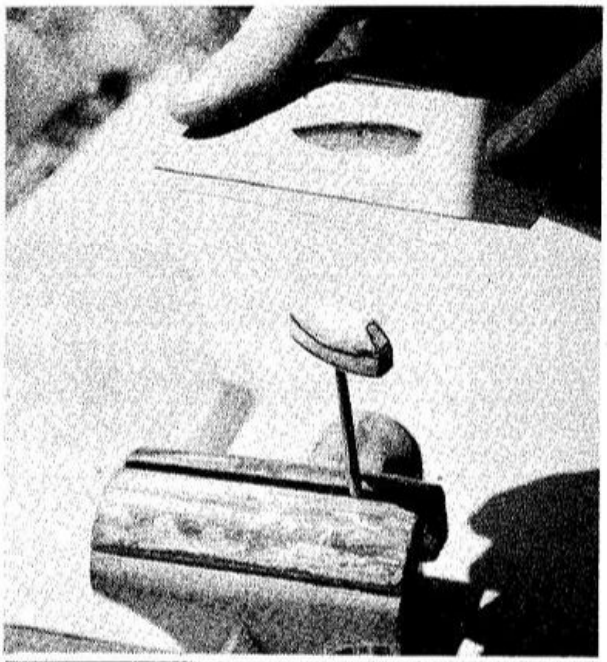
As the shortage of fighters did not eventuate, further development of this interesting design did not take place and we are left to conjecture just what would have happened had the M-20 taken its place in the squadrons against the Messerschmitts of the Lufftwaffe.

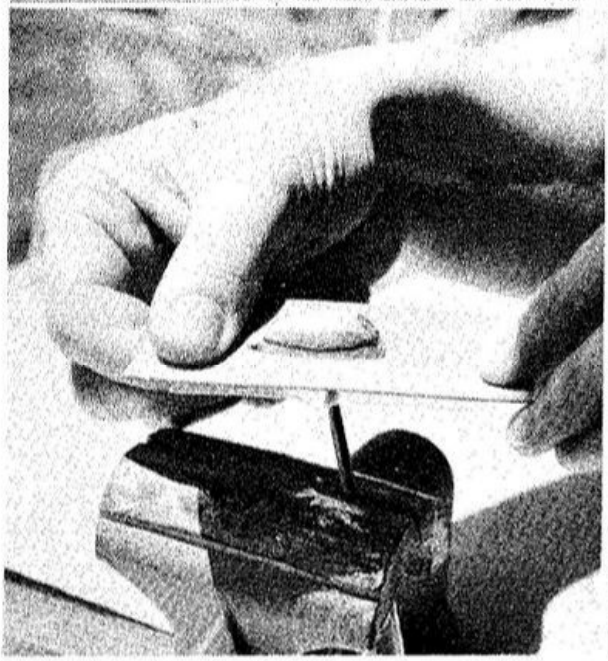
—RAY SMITH.

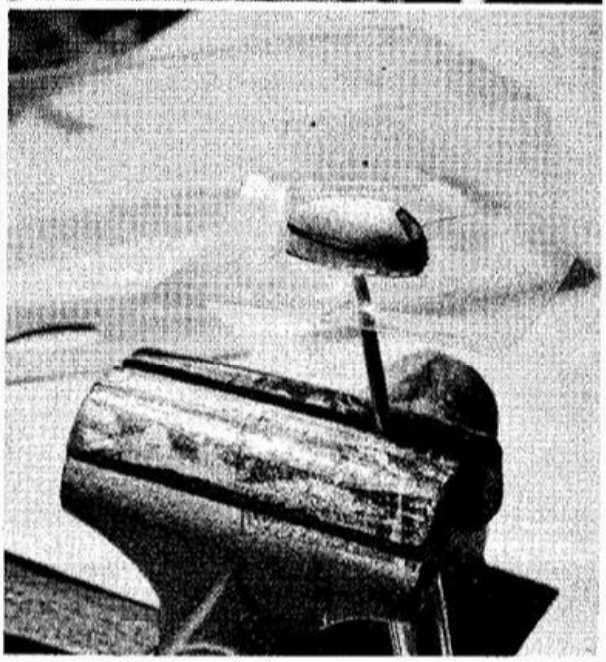
Custom Canopies

To make your own canopies is quite an easy task. Firstly, you make a wooden replica, allowing extra depth as shown. Use this as a template to mark out the plywood, allowing about 1/16" extra all round. Mount the wooden canopy on a rod as shown. Hold the plastic together with the plywood cutout over a candle flame until the plastic shimmers slightly, then quickly move over to the solid canopy and push the cutout down over the solid. It may take one or two tries to achieve perfection but once the timing has been mastered you will find it easy to turn out a good job every time. This method is not limited to canopies only. Such things as tank turrets, etc, can be made the same way.









22nd NATIONALS FULL RESULTS

A/2 Sailplane
1st L. O'Reilly (SA) 746
2nd R. Summersby (NSW) 659
3rd M. Starick (SA) 626

Open Power
1st R. Summersby (NSW) 719
2nd A. Coppolk (SA) 515
3rd A. Holmes (NSW) 508

Old Timers
1st R. Lloyd (Vic) 526
2nd R. Smith (Vic) 452
3rd R. Greenhill (Vic) 272½

FAI Combat (Open)
1st I. Bristow (SA)
2nd E. Denzler (NSW)
3rd T. Stowe (NSW)

Combined Speed
1st L. Buck (SA) 171.4mph
2nd S. Harmati (SA) 169.7mph
3rd R. Neville (ACT) 163.7mph

Wakefield
1st D. Wotton (SA) 979
2nd A. Edwards (NSW) 949
3rd D. Hegarty (NSW) 818

Class 1 Power
1st D. Blackham (Vic) 681
2nd R. Summersby (NSW) 638
3rd R. Lloyd (Vic) 630

FAI Power
1st R. Summersby (NSW) 963
2nd R. Lloyd (Vic) 930
3rd L. O'Reilly (SA) 792

Motor Seglar
1st G. Stringer (SA) 864
2nd R. Templeton (Vic) 623
3rd A. Coppock (SA) 298

FAI Stunt (Round 1)
J. Tidey (NSW) 858½
T. Woolnough (Vic) 843
J. Gadsden (Vic) 755
W. Sutton (NSW) 696
D. Simons (NSW) 684
L. Follett (Vic) 649
R. Nyberg (NSW) 614½
N. Egan (NSW) 429½
P. Smith (ACT) 410½
G. Bourne (Vic) 383½

FAI Combat (Junior)
1st P. Green (WA)
2nd M. Cook (Vic)
3rd E. Denzler (NSW)

FAI Speed
1st R. Lee (NSW) 133.1mph
2nd Bertina/McPhee (WA) 128.5 mph
3rd L. Buck (SA) 127.1mph

Class 3 Radio
1st O. Badcock (Tas) 11191
2nd S. Ralph (Tas) 10777
3rd J. McGrane (Vic) 10749

A/1 Sailplane
1st T. Prosser (NSW) 621
2nd M. Beilby (WA) 616
3rd A. Coppock (SA) 592

Junior A/1 Sailplane
(only 4 entries received. Event declared "no contest".)

Good Year Pylon Race
1st D. Murray (WA) 2-50.8
2nd K. Follett (Vic) 2-53.1
3rd S. Ralph (Tas) 2-59.0

½/A Team Race
1st Pring/Dowling (SA) 10-51.1
2nd M. Newcombe (SA) 11-31.4
3rd R. Neville (ACT) 13-25.2

CL.2 Team Race
1st A. Kerr (NSW) 7-38.0
2nd Reichardt/McKenzie (NSW) 7-48.3
3rd Curry-Tidey (NSW) 9-04.2

FAI Team Race
1st R. Lee (NSW) 11-27.1
2nd Tilley-Shing (NSW) 12-34.5
3rd House/Adler (WA) 13-26.6

Grundig Trophy
1st O. Badcock (Tas) 11971

Class 2 Radio
1st O. Badcock (Tas) 11970
2nd S. Ralph (Tas) 7662
3rd R. Bennet (NSW) 7025

Open Combat
1st R. Neville (ACT)
2nd I. Pearson (Vic)
3rd J. Gadsden (Vic)

Combined Scale
1st M. Mitchell (ACT)
2nd B. Healy (NSW)
3rd M. Mitchell (ACT)

Best Control Line — M. Mitchell (ACT)

Best Free Flight — R. Greenhill (Vic)

Best Radio Control — B. Healy (NSW)

Junior Hurl Glider
1st M. Cook (Vic) 89
2nd I. Corner (NSW) 65
3rd B. Parker (Vic) 58

Open Hurl Glider
1st A. Holmes (NSW) 143
2nd R. Summersby (NSW) 128
3rd D. Boughton (Vic) 115

FAI Stunt Round 2
L. Follett (Vic) 540
J. Gadsden (Vic) prang
W. Sutton (NSW) 788½
D. Simons (NSW) 794½
G. Bourne (Vic) 603
N. Egan (SA) 827
J. Tidey (NSW) 843
R. Nyberg (NSW) 724
K. Taylor (Vic) 918½
T. Woolnough (Vic) 771
P. Smith (ACT) 16½

FAI Stunt Round 3
W. Sutton (NSW) 779
D. Simons (NSW) 821
G. Bourne (Vic) 583
N. Egan (SA) 826
J. Tidey (NSW) 840
R. Nyberg (NSW) 671
K. Taylor (Vic) 893
T. Woolnough (Vic) 239½

FAI Stunt Final Scores
1st K. Taylor (Vic) 1811½
2nd J. Tidey (NSW) 1701½
3rd N. Egan (SA) 1653

Open Rat Race
1st Birkin/Georgiadis (Vic)
2nd S. Ratten (Vic)
3rd Curry/Tidey (NSW)

2.5cc Rat Race
1st I. Bristow (SA)
2nd Birkin/Georgiadis (Vic)
3rd G. Bourne (Vic)

Open Rubber
1st D. Wotton (SA) 525
2nd R. Greenhill (Vic) 467
3rd R. Smith (Vic) 229

Power Scramble
1st K. House (WA) 698
2nd A. Coppock (SA) 531
3rd L. Follett (Vic) 453

Amendment to Class 3 Radio
1st O. Badcock (Tas) 11193
2nd J. McGrane (Vic) 11049
3rd S. Ralph (Tass) 10785

FRANK MATICH TROPHY

ROUND 2 REPORT

ROUND II of the Frank Matich Cup was held recently at Moonee Ponds Raceway in Melbourne. The four Sydney teams--Testor, DBR Earlwood, Redline Trident and SSME who participated in Round I in Sydney—ventured to the southern State to attempt to beat the four Victorian teams—GP Mini, Moonee Ponds, Tom Thumb and MMCRC—on their home ground. In typical fashion they turned on some of their best weather (very wet and cold) but their hospitality was very warm. More about this later.

The long straights, large banked turn and also many flat bends made this track a true test of driver and car.

Steve Hutchesson, from Team Testor, hit Melbourne on Tuesday, determined to bend a few egos down south.

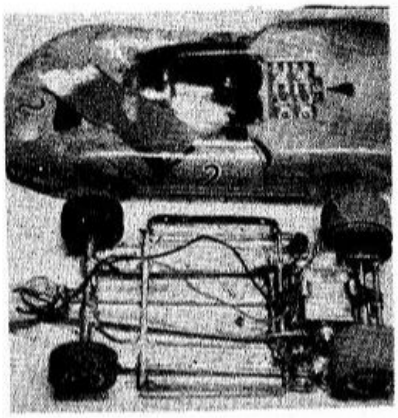
Bob Cox and Garry Grant for DBR Earlwood, Tony Thomas and Ritchie Hanley for SSME, arrived on Saturday morning and both started working on their cars for the afternoon trials.

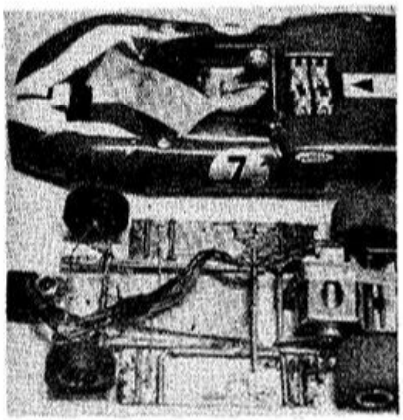
Team Redline Trident made a late arrival early Sunday morning, bringing the "Old Maestro" Ian Bannister with them. Everybody thought that their late arrival could spell the end to their chances in the race but this was later to be disproved.

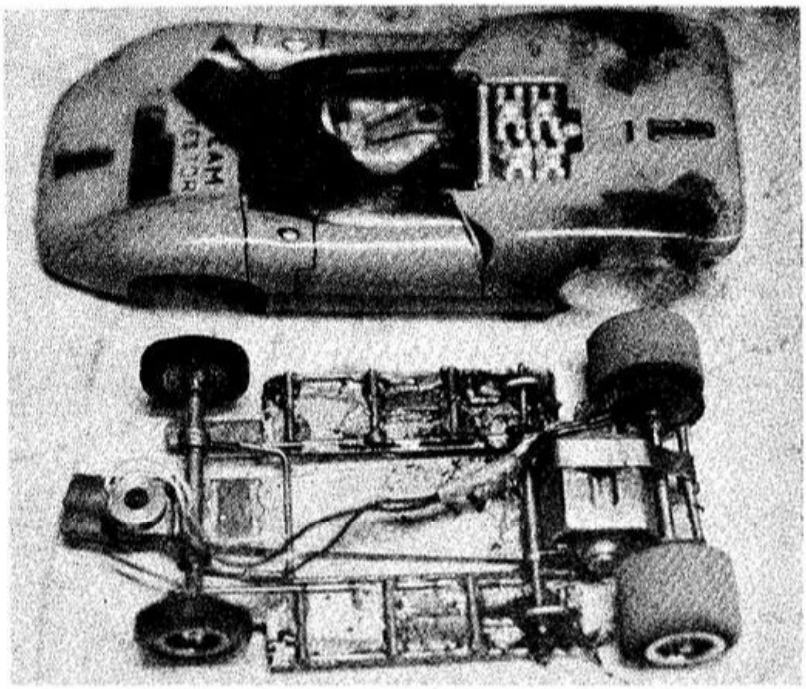
Race morning the cars were presented to the scrutineers for the Concours judging, which was won after long deliberation by DBR Earlwood with an immaculate 2G Chaparral.

The race got under way and DBR went to an early lead of about 50 laps in the first two brackets, but Testor, with a well prepared car and an extremely fast Team Hutchesson motor, pulled from fifth place to first in a matter of 90 minutes, and were never headed for the rest of the race. As for the rest of the field, motor blowups and accidents caused the position of each team to change so frequently that it was impossible to try to predict the minor places.

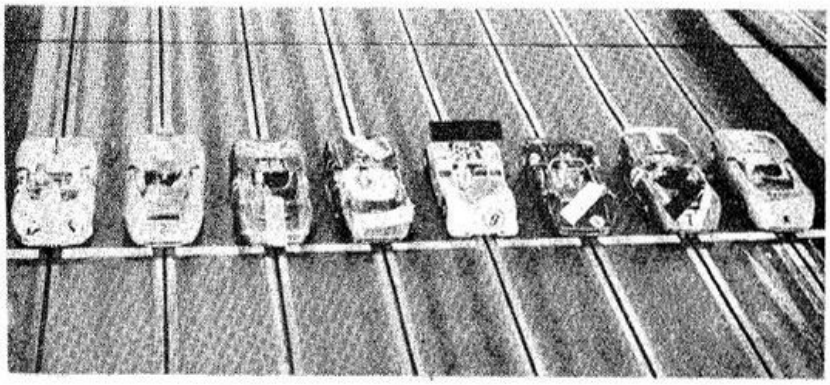
Credit cannot be taken away from the Victorians, for with great courage and determination the GP Mini team fought their way from nearly last place early in the race into second place, a not so comfortable 15 laps in front of the fast-finishing Redline car, which had managed to get really going despite its late arrival thanks to







ABOVE: Team Testors' winning "Batpan" sidewinder Lola 3B, Lancer body. TOP LEFT: Team Trident semi perimeter sidewinder Lola 3B, Lancer body. LEFT: Team GP Mini's sidewinder with hinged side-mounts-Lola 3B, Lancer body.



mechanic Jim Light.

It was obvious that Redline team was out to win this race, as with a first place in Round I, another first or second would give them an outright win over Testor and DBR, but try as they might, they could not catch the GP Mini team and the race finished a dead-heat between Testor and Redline Trident.

Placings, with points for Rounds I and II:—

Testor, NSW (S. Hutchesson, I. Bannister), NSW 16 points, Vic 30, total 46; GP Mini, Vic (W. Deeker, D. Burn), 13, 21, 44; Redline Trident, NSW (M. Pearson, B. Titheridge), 30, 16, 46; DBR Earlwood, NSW (B. Cox, G. Grant), 21, 13, 44; Moonee Ponds, Vic (G. Lyons, G. Leahman), 7, 11, 18; SSME, NSW (T. Thomas, R. Hanley), 11, 9, 20; Tom Thumb, Vic (G. Bartling, G. Lucky), 9, 7, 16; MMCRC, Vic (J. Strongman, N. Parker), 5, 5, 10.

It might be noticed that all teams ran variants of the 617 medium can motor and all but one ran various arrangements of the Hutchesson type perimeter sidewinder. The add one out tried his hand at an anglewinder.

All motors performed well until the power sag fault was rectified and then the heavy gauge winds took over and proved superior. First, third and sixth ran 40 of 26, fifth and eighth ran 45 of 27, second ran 45 of 28, fourth ran 50 of 29, seventh ran 70 of 30.

It may also be of interest to note that first and second place chassis were variants of the hinged Batpan sidewinder.

A pat on the back must go to the wonderful hospitality and sportsmanship displayed by the whole Victorian contingent and the excellent manner in which the race was run (not a single protest during the whole race). Ray Grieg and Jerry had a helping hand to offer to anyone in difficulties preceding the race, such as staying open till all hours of the night for competitors to do final preparation to their cars. Also thanks must go to the VSCA, namely Graham Spurrell and Bayden Hopgood, for throwing their homes open to the NSW contingent for the weekend.

A sour note to a wonderful weekend was the unforunate disqualification of DBR, who after a rapid wheel change in the latter stages of the race, failed to realise that the new tyres were narrower than the first set, and in scrutineering after the event did not comply with the rear track tolerance.

CONTROL LINES

SINCE the last issue there have been some very good competitions held in and around Sydney, and here are the details:

The first annual Sydney control line championships were held at Centennial Park on October 6 and 7, and were successful, both competitively and financially. The weather was not too good as there were gusty winds blowing for the two days, but the flying was of a very high standard and all competitors were able to cope with the conditions. Andy Kerr put up a phenomenal speed of 170.6mph in the B Class speed event, which, if accepted by the Association, will be a new Australian record.

Here is the complete result sheet:

1/2A Team Race: R. Neville 9.37, W. East (jnr) 10.48.

FAI Team Race: W. East (jnr) 12.38.

B Class Team Race: Shing/Tilley 7.56, D. Currey.

FAI Speed: W. Logan 124mph, R. Lee 118mph, T. Goldsmith 112mph.

B Class Speed: A. Kerr 170.6mph, W. Logan 133mph, M. Bell 131mph.

C Class Speed: R. Neville 152mph.

Proto Speed: Shing/Tilley 104.6mph.

Junior Combat: E. Denzler 1, R. Wilson 2.

FAI Combat: W. East (jnr) 1, M. Bell 2.

Open Combat: M. Bell 1, W. East (jnr) 2.

Stunt: R. Towell 1, S. Shelock 2.

Best Junior: D. Masterton.

Stunt: J. Tidey 1, R. Towell 2, D. Currey 3. C. Jones best junior.

Open Combat: R. Neville 1, N. Clark 2.

FAI Combat: B. Wilkinson 1, R. Summersby 2.

FAI Team Race: R. Lee 11.02 1, Tilley/Shing 2, R. Neville 3.

B Class Team Race: D. Curry 1, D. and L. Kennedy 2.

B Class Speed: A. Kerr 152mph 1, D. Curry 2, J. Tidey 3.

The following results of the Mattara Contest were forwarded to me by Col Hirst, of the Newcastle Model Aero Club (thanks, Col).

I was pleased to receive reports from two very good friends over in West Australia, but unfortunately the reports arrived just too late for inclusion in the last issue. Although this means that they are a little outdated now, I am sure that they will still be of interest.

From Ken House: Well known control line flier Hans Bertina is due to return home after almost 12 months in Britain. We hope to hear some of his observations on modelling in that country.

The Northam Model Aero Club celebrated its first birthday on September 2, with a membership of almost 40. This is a really keen and active group. Here is the club directory in West Australia.

MERCS, central and general area, contact R. Spackman, 652710, Causeway Mundijong flying location.

WARM, general, all radio, R. Farren 644473, Canningvale Jandakot.

Melville Southern, R. Hocking 644175, Tomkins Park.

Floreat, western, J. Graham 874951, Stevenson Ave.

Midland-Guildford, eastern, T. Merrifield 792069, Jubilee Reserve, Eden Hill.

ACT (ACT cadets only), L. McKay 244043, Hamilton Square.

Northam, Northam, G. Samual 222177, Jubilee or Henry St Ovals.

From MIKE BEILBY

The WA Open Combat Championships were held at McCallum Park, Perth, on September 15. Director of the meeting was Fred Adler.

The weather was almost perfect and the eight entries included two from the new country club of Bunbury. The standard of flying was really high and far more cuts were made than in any previous contest.

Lang and Markwell appeared to be both knocking on the ton and the Bunbury boys' win was a first

for the club. Let's hope that this will give the southerners lots of encouragement!

OK, so we have at last heard from the West, and good it was, too. I wonder what the other States are doing?

Now back to the Sydney scene. The 1000-lap team races held by the Eastern Districts MFC have now been completed and the ultimate winner was Ron Lee of the Wakehurst MFC using a modified ETA motor. As there were quite a number of entries waiting for flights in the Endurance Contest, it has been decided to extend the closing date to April 6, 1969.

All competitors have had their troubles but they are gradually overcoming them and the times are starting to go up. The highest recorded time up to December 8 was 2hr 47min 8.5sec.

As the contest has proved so popular it has been decided to run an Australia-wide endurance flight contest under the same rules. To enable interstate competitors to record flights, it will be necessary for them to arrange to have their models, lines and actual flight supervised by an FAI observer or an official from their State Association, who will be required to sign an official declaration that all rules have been complied with and verifying the official time.

Applications for flight date must be made to me three weeks in advance. Any unauthorised flights will not be recognised. The contest will start on May 4 and end at 5.30 pm on October 5, 1969. Hobbyco of Sydney have donated a trophy for the longest recorded flight and I would like to thank them through the columns of this magazine for showing such an interest in our hobby.

Many inquiries have been received regarding our new plans service as mentioned earlier. Glad to report that all is going well, and you can look forward to full details in the next issue. For the time being, good luck and fly safely.

—BILL EAST.

NEW SOUTH WALES MODEL ROAD RACING ASSOCIATION

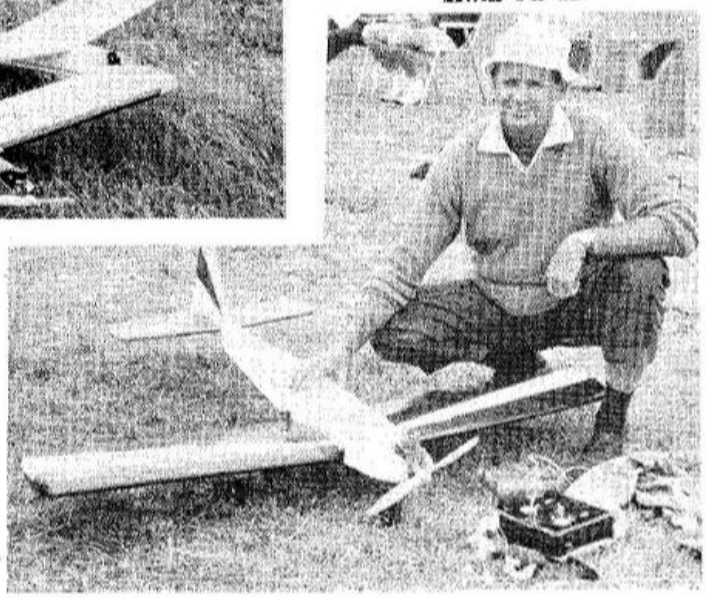
1969 Racing Calendar

26/1/69—Parramatta: Jack Brabham Trophy. CASCRA Class 1(b) post-1961 Grand Prix.
2/2/69—Earlwood: Teams Championship, Round 1: Indianapolis.
16/2/69—Cessnock: Sprint Championship, Round 1: Can-Am Group 7 Sports.
23/2/69—Waitara: Frank Matich Challenge Cup Qualifying Race. Can-Am Group 7 Sports.
2/3/69—Yagoona: Teams Championship, Round 2: NASCAR Stockers.
9/3/69—Waitara: Frank Matich Challenge Cup, NSW Round. Can-Am Group 7 Sports. Date to be confirmed.
23/3/69—Glendale: Sprint Championship, Round 2: Indianapolis.
6/4/69—Victoria: VSCA Total 24-Hour Enduro. Date to be confirmed. Alternate date for NSW Round of Frank Matich Challenge Cup.
13/4/69—Villawood: Teams Championship, Round 3: Formula One.
26/4/69—Alternate date for NSW Round of Frank Matich Challenge Cup.
4/5/69—Parramatta: Sprint Championship, Round 3: Nurburgring Groups 4, 5 and 6 Sports, GT and Sports Prototype.
11/5/69—Earlwood: Teams Championship, Round 4: Can-Am Group 7 Sports.
25/5/69—Glendale: Teams Championship, Round 5: NASCAR Stockers.
8/6/69—Cessnock: Sprint Championship, Round 4: Indianapolis.
15/6/69—Ashfield (SSME): 24-Hour Le Mans Groups 4, 5 and 6 Sports, GT and Sports Prototype.
29/6/69—Parramatta: Teams Champioship, Round 6: Indianapolis.
13/7/69—Yagoona: Sprint Championship, Round 5: Formula One.
27/7/69—Earlwood: Sprint Championship, Round 6: Touring Cars.
10/8/69—Chester Hill: Sprint Championship, Round 7: Can-Am Group 7 Sports.
24/8/69—Villawood: Teams Championship, Round 7: Indianapolis.
7/9/69—Earlwood: Teams Championship, Round 8: Daytona Groups 4, 5 and 6 Sports, GT and Sports Prototype.
21/9/69—Parramatta: Teams Championship, Round 9: BOAC 500 Groups 4, 5 and 6 Sports, GT and Sports Prototype.
5/10/69—Victoria: Frank Matich Challenge Cup, Victorian Round. Can-Am Group 7 Sports. Track to be allocated.
19/10/69—Jack Brabham Trophy State Elimination Round. CASCRA Class 1(b) post-1961 Grand Prix. Track to be allocated.
2/11/69—Glendale: Sprint Championship, Round 8: Sebring Groups 4, 5 and 6 Sports, GT and Sports Prototype.
16/11/69—Yagoona: Teams Championship, Round 10: Le Mans Group 4, 5 and 6 Sports, GT and Sports Prototype.
30/11/69—Villawood: Teams Championship, Round 11: Can-Am Group 7 Sports.
7/12/69—Parramatta: Teams Championship, Round 12: Can-Am Group 7 Sports.

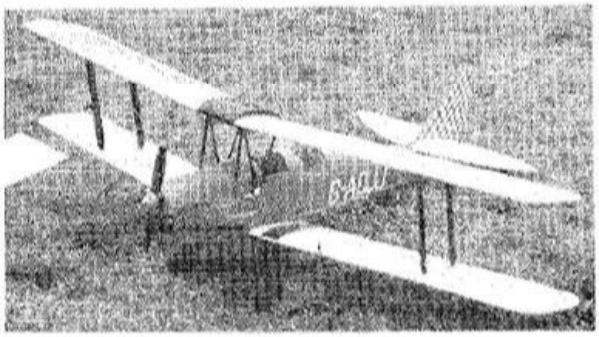
READER'S MODELS
(from the NATIONALS)

The winning trio of Aristo Cats: Left to right: Bob Bennett (NSW) 3rd, Steve Ralfs (Tas) 2nd, Owen Babcock (Tas) 1st.

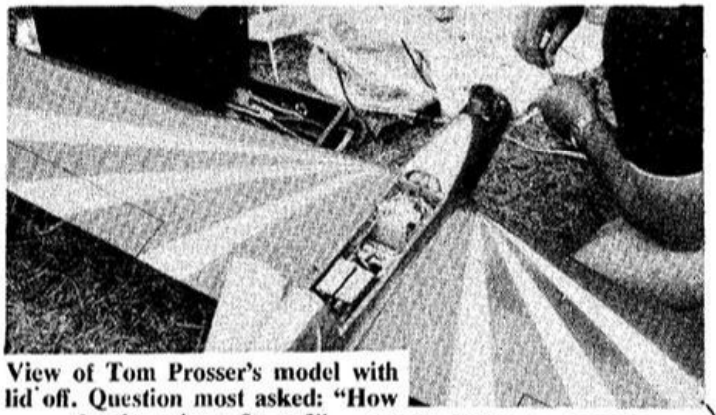
Doug Murray (West Aust) and Kwik Fli III



Bob Bennett's own design featuring retractable undercoat.



Tiger Moth built by Maurice Mitchell (A.C.T.)



View of Tom Prosser's model with lid off. Question most asked: "How do the wings fit on?"

CONTINUED PAGE 40

RADIO CONTROL Pt.4

Flying Single Channel

LAST issue we dealt with the choice of aircraft and equipment in fairly general terms and decided that a 50" span 2.5cc powered model was about the ideal beginners aircraft.

With this in mind a trip to the local hobby shop revealed that the most popular beginners combination in the Sydney area is an Aeroflyte "Invader" kit, and Enya 15-111 TV motor, a Silvertone XPT-800 TX and either the O.S. Pixie RX or O.S. RS-1 Superhet RX. Upon closer examination we found that the Invader was a 50" span, roomy, highwing aircraft, cheap, and a very good performer. This filled the bill nicely and coupled with the above-mentioned equipment gives beginners every chance of success.

From here on we will assume you have taken the bit by the teeth and have purchased your equipment, installed it in your Invader, and are sitting dismally staring out of the window wondering what happened to the still air conditions which prevailed during the week you were painting the model. Here is lesson one: No matter how frustrating it is waiting for calm weather, DO NOT attempt to trim a single channel model in anything but a gentle breeze. A new untrimmed model, a learner driver and a strong wind is a deadly combination.

Use the delay to check rigging angles, motor idle, control freedom and reliability, and making sure all wires are lashed down and glued, to prevent engine vibration fracturing them. Always remember crashes are to be avoided at all costs, as not only do they place a brake on your enthusiasm but crash damage may cause your equipment to become unreliable, causing further crashes and extreme frustration.

Careful planning preparation and a sensible attitude can eliminate 90 per cent of beginners' problems. Finally, the big day has arrived. No wind and a tummy full of butterflies. First things first, so make a careful visual check prior to strapping on the wing to ensure no wires are fouling the servos. Check all plugs in, etc, then follow with a range check. (This need only be done with the TX aerial removed or collapsed fully.) Finally check all controls for reliability and be sure at this point which rudder command comes first (left or right).

You are now ready for a glide test. If you have not already done so check your C of G position to ensure it falls at approx. 30 per cent and that the correct packing is in position under the tailplane.

Glide testing is a little hazardous and may cause damage if done incorrectly, so proceed with caution. Launch the model moderately fast and slightly nose down into the wind. If any tendency to rise into a nose-up attitude is present, pack up the leading edge of the tailplane until the glide path is flat. Conversely, if the model has a tendency to dive, pack up the trailing edge of the tailplane (1/16" at a time).

At this stage any tendency to turn should be corrected with rudder trim. One of the Du-Bro or MK adjustable rudder horn cleavises is helpful here as very fine neutral adjustment may be achieved without removing the wing.

Now the big moment is at hand. Before starting the motor compose yourself and study the field layout. Decide now, upon your landing approach, and study the areas to avoid should panic set in. Work out a very simple flight plan (you probably will forget it 15 seconds after take-off, but no matter), the main points here being (1) gain altitude, and (2) keep upwind of TX.

Before proceeding further I would like to elaborate on flying procedures. One of the most upsetting problems facing the beginner is the apparent reversal of control action when a model is viewed from the front, i.e. when the model is flying towards the TX. A partial solution is to turn away from the model and look over one shoulder. This is a stop-gap answer and considerable practice should be devoted to coping with this problem. It is particularly troublesome on landings when the model is low and no room for error exists. It also applies should the model start to spiral in a tight turn.

Due to the rapid change in direction it is sometimes difficult to tell which way the model is turning and should the wrong control be applied the model is driven into a tighter spiral worsening the situation. The other major problem is recovering from a stall. As you may well imagine with no elevator control very little can be done to raise or lower the nose. At this point an explanation of the effects of the rudder is in order, as it is by diligent use of this (the only control) that stalls may be prevented.

When rudder is applied to a model in level flight it causes the model to yaw (rotate about its central axis in a horizontal plane). This causes the outside wing tip to speed up relative to the airflow and the inside wing to slow down. This causes the model to roll due to the unbalanced lift on the wings (i.e. inside wing less lift, outside wing more lift). Once the model starts to roll it tends to fall sideways (sideslip). This, in effect, means that an airflow is set up at right angles to the fuselage. As the model is designed to always turn into airflow, a turn is initiated in the direction of the low wing. At the same time the nose will drop and air speed will increase.

If sufficient rudder action is used and held long enough, a spiral dive will result. Very high speeds are generated during these dives and severe structural damage may be caused should the model be pulled out suddenly.

Correctly used, the spiral dive is quite a useful preliminary to loops and rolls, as the high air speed is essential for these manoeuvres.

Returning now to our original problem of stall recovery. If a model is over elevated the nose will tend to rise until virtually all air speed is lost. At this point the wing will stall, the nose will drop, air speed will build up and the model will zoom into another stall. This condition is similar to an oscillation and may eventually result in the model looping.

If the model begins to stall at low altitudes it is imperative that corrective measures be taken immediately. The correct recovery

procedure is to turn the model at the bottom of the zoom. This effectively cancels the nose-up tendency, providing the turn is held on long enough. In this manner fairly effective altitude control may be effected and in skilled hands single channel aircraft perform almost as well as multi-channel aircraft. The main weakness with S/C is landing and penetrating a strong wind. Landings can be improved with skill but penetration depends on model design and trimming.

An under-elevated aircraft penetrates well, but is difficult to manoeuvre. An over-elevated aircraft manoeuvres well but has little penetration. Here then is where the really skilful flyer shines. By very careful trimming, preparation and continual flying practice he achieves consistent results in all types of weather. Keeping these points in mind we may now proceed to undertake the first powered flight.

The Invader is a very docile aircraft when underpowered and trimmed correctly and will fly almost hands off in calm weather. With the Enya 15 on full revs and slightly over-elevated, it will perform quite a lot of manoeuvres.

For our test flight a hand launch is advisable with the motor slightly rich. Keep the launch flat and fast and allow it to climb to a reasonable height before signalling. If all goes smoothly, throttle back to half throttle at a reasonable altitude and begin to practice figure eight turns and straight flight. Once a certain amount of proficiency is attained on the button, proceed to practise killing the zoom with rudder and learning to cope with the apparent change in control direction.

Keep your first flight reasonably long as the landings are tricky and require a high degree of familiarity on the controls. Should the model get out of control at any time, immediately try to throttle back to low motor. This gives you time to think and also the model has less tendency to zoom and stall. It is for this reason that I recommend all beginners to fit throttle control and practice the pulsing necessary to obtain low throttle reliability.

It is now time to consider landings and an orderly approach is necessary to achieve predictable results. The best method is to use the rectangular left hand circuit as this allows a high degree of correction during the final approach stages. Presuming the motor cuts at approx. 200ft, bring the model over the transmitter flying upwind allowing the upwind leg to progress well forward of the TX (or landing spot).

A 90 deg. left turn is then executed and a cross wind leg is flown followed by another 90 deg. left turn which puts you on your downwind leg. This runs parallel to your upwind leg and is used as the first adjustment leg for your final approach.

Once past the TX on the downward leg another 90 deg. left turn is required. This is the critical turn as turning here too early or too late places the model either too high or too low. Obviously the position of this turn depends on wind velocity, height, rate of sink of model, etc, and lots of practice is required before an accurate predictable positioning can be made.

Here, however, is where the rectangular circuit shows its real worth as in the event of an error in judgment a final adjustment may be made on the crosswind leg.

If you are too high or too low, the final turn may be delayed or initiated early as indicated. This should then place the aircraft in the best landing position. Once on the final leg, send as few commands as possible, keeping the model over one shoulder.

From here on the model will land itself as no elevator control is available too flair out prior to touchdown. One final word here. On windy days models tend to fall dramatically when about 5ft off the ground. This is due to what is known as the wind gradient. Briefly —air being viscose — it tends to adhere to the surface and slow down. This means that the closer the ground the slower the airflow. If your model is nearly at stalling speed at 10ft obviously when it comes below the wind gradient it will fall like a stone.

Always try to keep windy weather landing a little faster than normal to minimise this effect.

Well, that just about covers your primary training. Once past this stage S/C is a lot of fun and presents a very real challenge. Anybody can fly well with $400 worth of (proportional) help, but only the very skilled make the top bracket with S/C and those that do not, have a ton of fun trying.

—BOB YOUNG.

A MODEL NAVY

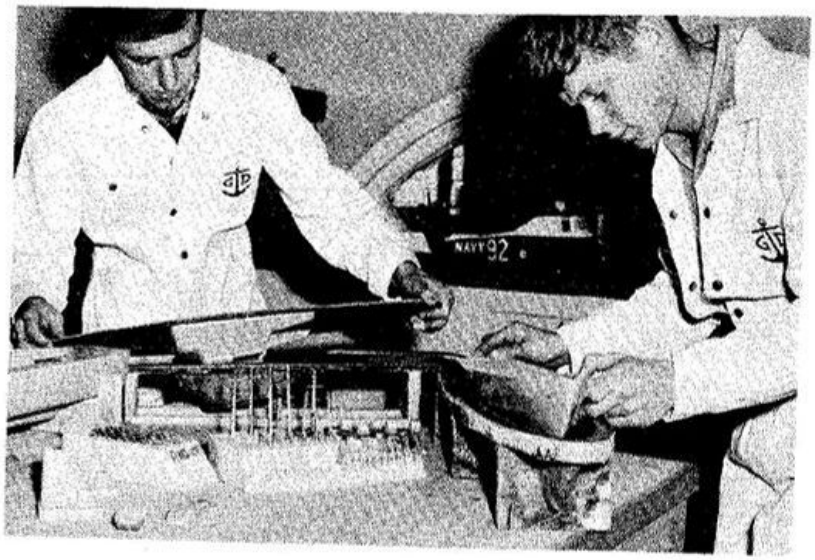
THERE would a more suitable venue for the building of model boats than at Garden Island naval dockyard?

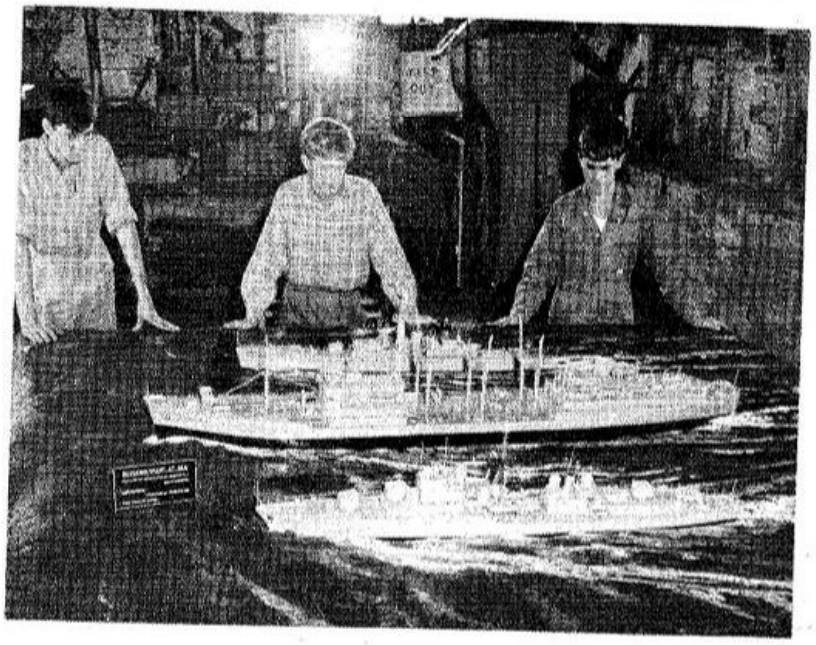
While the welding torches and rivetting guns are busily engaged in building and servicing the navy vessels, there is, in a small section of the establishment, full-scale production going on for yet another navy.

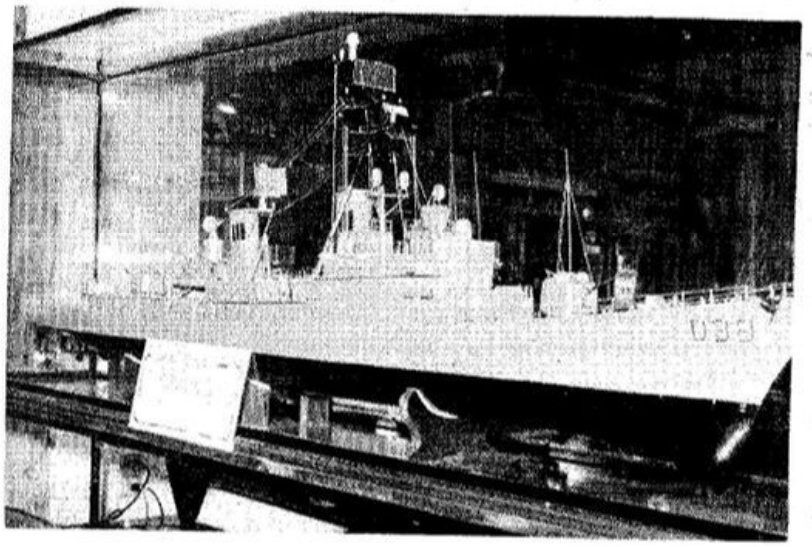
This one is a navy in miniature and consists of a fleet of magnificently built scale models. The work of a small group of apprentices, these models are used for display purposes and recruiting exhibitions all over Australia.

As would be expected, the workshop facilities are of the highest order, with enough power tools to make the amateur enthusiast drool with envy. The result of this is that every part of the models can be fabricated, from the hulls (wood or fibreglass) down to the smallest fitting.

Our pictures show some of the various models turned out to date.







Naval apprentices at Garden Island shown here working on their models. Note the high standard of finish.

CENTURION: INTERNATIONAL BATTLE WAGGON

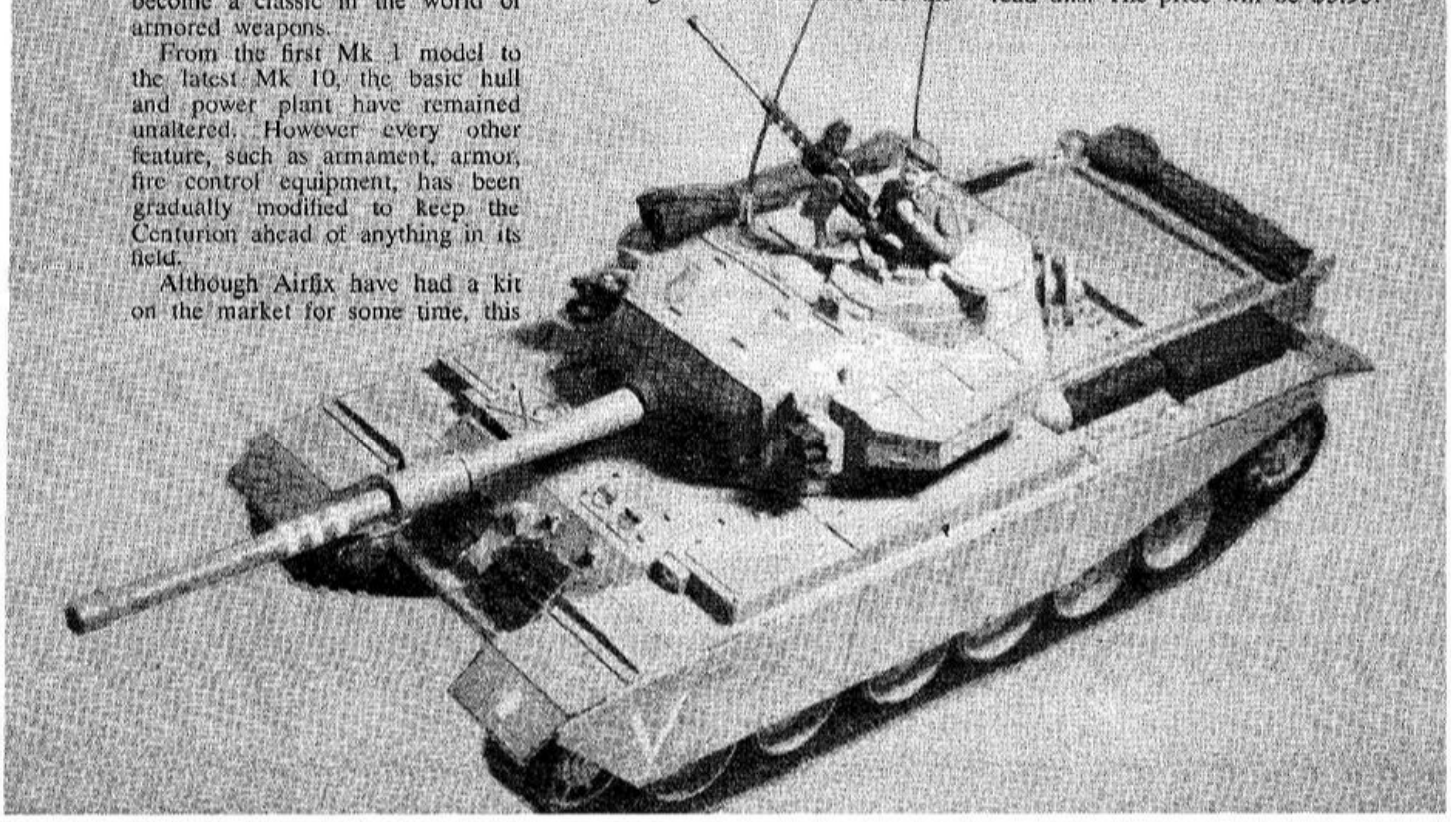
Although born in peacetime the Centurion was destined to see many battlefields. It has fired its guns in anger from the desert of Sinai to the jungles of Malaya and Vietnam.

Incorporating all the knowledge that has been gained over many years of fighting, the British Army devised a fighting vehicle that has become a classic in the world of armored weapons.

From the first Mk 1 model to the latest Mk 10, the basic hull and power plant have remained unaltered. However every other feature, such as armament, armor, fire control equipment, has been gradually modified to keep the Centurion ahead of anything in its field.

Although Airfix have had a kit on the market for some time, this is of an early model and of course is to their constant scale of 00 (actually somewhere between 1/72 and 1/76).

Now, however, we have a large scale kit for the enthusiast who likes the super detailing that goes with large models. Nichimo are the manufacturers, and they have made an excellent job of things as the photos show. The latest improvement in the form of the new 105mm gun is incorporated. Thanks to Levensons Hobbies these kits will be on sale by the time you read this. The price will be $3.95.



COUNTDOWN

OUR COLUMN ON MODEL ROCKETS

MEMBERSHIP HOLDUP

We must apologise for the hold up in mailing out membership credentials. The original Model Rocket Sporting Code had to be reprinted to conform with the FA1 Sporting Code and the metric system of new standards. All members should have received their copies by this issue of Australian Modeller.

ROCKET ENGINES REDESIGNED

The latest supplies of ¼A to C type engines to land in Australia are a little different from the usual one available. Outside dimensions are still the same, i.e. 18mm by 70mm, but they have a larger inside diameter. The engines have been changed to conform with the new FA1 International Sporting Code which employs the metric system of classification. All of the engines have been certified by the NAR for competition use. This larger inside diameter increases the burning area, resulting in high initial thrust, at the expense of a short duration. However, these engines have a lot of snort in them and are sure to produce some new high-altitude records.

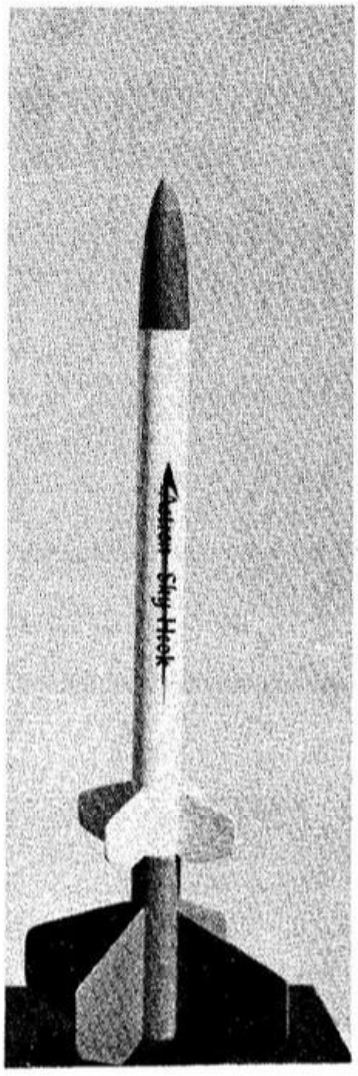
NARRA ROCKET MEET

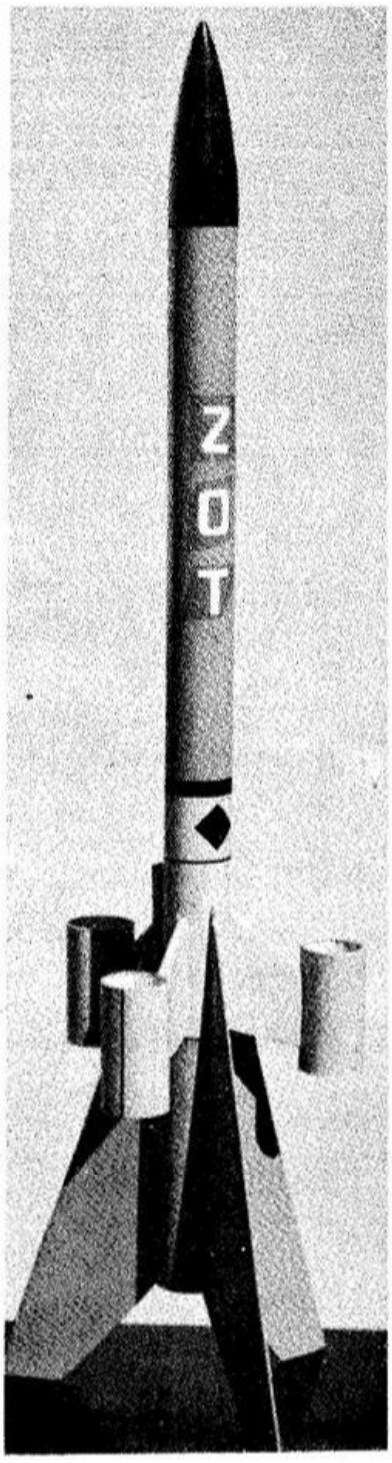
The Newcastle Area Rocketry Association is holding a rocket meet over Australia Day weekend on their 1000-acre rocket range at Hexham, NSW. Contestants will be from all over Australia, to compete in the 10-event, 2-day program. A full report with photos will be in the next edition of Countdown.

NAR DISPLAY

The National Association of Rocketry held a very successful static display in Waltons Department Store over the school holidays. Keen interest was shown by persons of all ages, in the equipment on display. Among the models on display was a scale Saturn V, Saturn I, Gemini-Titan, V-2, Honest John, and many more. Launching and tracking techniques were demonstrated throughout the display. We would like to thank the management of Waltons, Bankstown store, for allowing us to hold this display and for the most generous donation, to help keep the NAR out of the red.

The NAR will hold an Area Rocket Meet on Sunday, March 2, at Orana Park, Leumeah. Entry forms are now available from the Contest Director, 105 Macquarie Ave, Campbelltown, 2560. The contest will be held in accordance with the NAR Model Rocket Sporting Code. All NAR members and non-members are invited to participate in the contest and you should send for entry forms as early as possible.





ROCKET STABILITY PART ONE

Following on the ABC of Rocketry in our last issue, we take things a stage further this month with a complete guide to the very important problem of achieving stabilised flight. Our thanks to Estes Industries of USA who have kindly made available to us the information for this article.

ONE OF THE first principles any rocket designer must learn is that unless a rocket has a complex electro/mechanical guidance system, it will fly only if its centre of gravity (also known as centre of mass) is far enough ahead of the centre of pressure to allow air currents to act against the rocket causing a stabilising effect.

From your science class or other scientific studies you have probably learned that if a rotating force is applied to a free body in space it will cause it to rotate around its centre of gravity. As an example of this, you could take a wooden dowel or uniform stick about two feet long and toss it into the air so that it will rotate end over end (see Fig. 1, example A).

You will notice that regardless of how you throw the stick, vertically or horizontally, hard or easy, it will always rotate about its centre. If a weight is attached to one end of the stick and it is again thrown into the air it will rotate about a new location (Fig. 1, example B). This time the point about which it rotates will be closer to the weighted end. If you take the weighted stick and balance it across a sharp edge you will find that the point at which it balances (its centre of gravity) is the same point about which it rotated when tossed into the air (Fig. 1, example C).

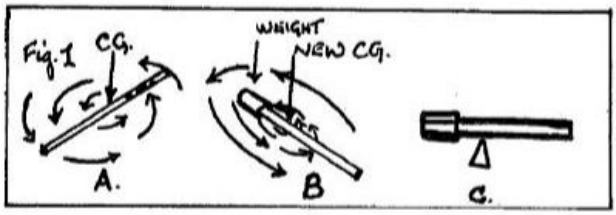
This simple explanation should aid you in understanding how a free body in space rotates around its centre of gravity. A model rocket in flight is a free body in "space". If, for any reason, a force is applied to the flying rocket to cause it to rotate, it will always do so about its centre of gravity.

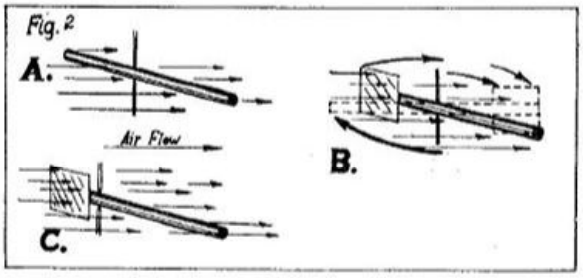
Rotating forces applied to rockets in flight can result from lateral winds, air drag on nose cones, weights off-centre, air drag on launch lugs, crooked fins, engine mounted off-centre or at an angle, unbalanced drag on fins, unequal streamlining, etc. Obviously, some of these factors are going to be present in all rockets. Therefore, since rotating forces will be present, your rocket must be designed to overcome them. If your rocket is not so designed it will loop around and go "everywhere", but end up going nowhere. Nearly all model rockets are stabilised by air currents. By stabilised, we mean that all rotating forces are counteracted or overcome. This means that for each force trying to make the rocket rotate we must set up an equal and opposite force to counteract it.

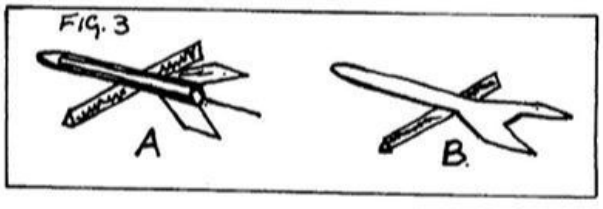
How is this accomplished? Ask any rocket expert and he will simply say to design the rocket so the centre of gravity is ahead of the centre of pressure. From studying our first experiment it is easy to see how we could find the centre of gravity by simply balancing the rocket on a knife edge as shown in example A of Fig. 3. But what and where is the centre of pressure? The following experiment should aid you in understanding more about the centre of pressure of a rocket.

Suppose we take the same 2ft-long piece of dowel used in our first experiment and place it in a low friction pivot as shown in example A of Fig. 2. (The low friction pivot consists of two needle points held rigidly in place on opposite sides of the object by a heavy wire or board framework. The needle points are placed against the object just tightly enough to hold it, without interfering with its rotating on the axis created between the two points.) Then suppose the dowel is held in a uniform air current (wind) of 10 to 15 miles per hour If the pivot has been placed in the centre of the dowel and if the dowel is uniform in size (area) the forces exerted by the air pressure will be equal on both sides of the pivot and the air current will produce no rotating effect. In this condition the centre of gravity and the centre of pressure will be at the same point.

If, however, a vane of 3in x 3in







cardboard is glued to one end of the dowel and it is again put into the air stream with the pivot in the same position, the moving air current will extert the greatest force against the end of the dowel which has the vane attached to it as in example B of Fig. 2. This will cause the dowel to rotate until the end away from the vane points into the wind. If we now move the pivot closer to the vane end of the dowel we will be able to locate the point along the dowel where equal air pressure will be applied to both ends. The air current will no longer cause any part of the dowel to point into the wind. This point is called the lateral centre of pressure. Remember, the lateral centre of pressure has to do only with the forces applied to the surface directly by air currents, and the larger the surface the greater the forces will be.

The ideal way to find the lateral centre of pressure of a model rocket is to suspend the rocket between pivots as was done with the 2ft dowel in Fig. 2, and hold the rocket in a uniform lateral air current. This can be accomplished to some degree of accuracy by holding the suspended rocket in a breeze of 10 to 15mph. The same effect can be accomplished very accurately by the use of a low velocity wind tunnel. However, since most model rocket builders and designers do not have wind tunnels and low friction pivots as described above, other methods must be provided for determining the centre of pressure.

Keeping in mind the fact that the air pressure applied to a surface is proportional to the area of the surface, it then becomes possible to approximate the rotating effect of the action of the air pressure by making a uniform area cutout of your rocket and locating the balancing point of this cutout. To make this cutout, simply lay your rocket over a piece of cardboard and mark around the edges. Next, cut around the lines and balance the cutout on a knife edge as shown in example B of Fig. 3.

This method will determine the lateral centre of pressure (the centre of pressure with the air currents hitting the rocket broadside). If the rocket is designed so the lateral centre of pressure is ½ the body diameter (½ caliber) behind the centre of gravity it will have ample stability under all reasonable conditions. If, however, the rocket's fins are very crooked, set at opposing angles, or if the rocket uses a disc or cone for stabilising, the lateral centre of pressure should be set at least one diameter behind the centre of gravity.

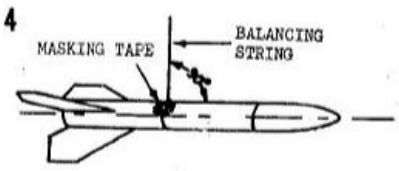
In flight, of course, the rocket will not be travelling sideways, but with its nose pointed into the wind. With the model's nose pointed into the wind, the location of the effective centre of pressure will be affected by the shape of the fins, the thickness of the fins, the shape of the nose cone, location of the launching lug, etc. With most designs this shift is to the rear, adding to the stability of the rocket.

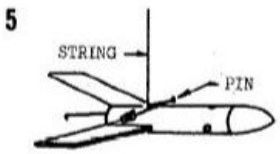
Suppose a model rocket starts to rotate in flight. It will rotate around its centre of gravity. When it turns the air rushing past it will then hit the rocket at an angle. If the centre of pressure is behind the centre of gravity on the model, the air pressure will exert the greatest force against the fins. This will counteract the rotating forces and the model will continue to fly straight. If, on the other hand, the centre of pressure is ahead of the centre of gravity the air currents will exert a greater force against the nose end of the rocket. This will cause it to rotate even farther, and once it has begun rotating it will go head over heels in the air.

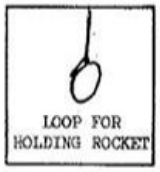
It is easy to see from this why it is best to build the rocket with its fins as far as possible to the rear. The farthur behind the centre of gravity the centre of pressure is placed, the stronger and more precise will be the restoring forces on the model, and it will fly straighter with less wobbling and power-robbing side-to-side motion. Under no circumstances should fins be placed forward of the centre of gravity on a model, as they will add to its unstability tendencies rather than help stabilise it.

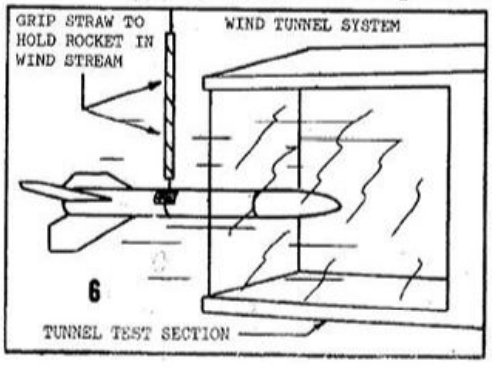
When building high-performance, lightweight rockets, quite often a more precise method of determining the stability margin of the rocket is desired. While the experienced rocketeer will develop an ability to tell, by looking, approximately how stable a rocket will be, any rocket, once constructed, should be checked to determine whether or not it has sufficient stability to be safe in flight. The simplest, least expensive method of doing this requires only a string and some tape.

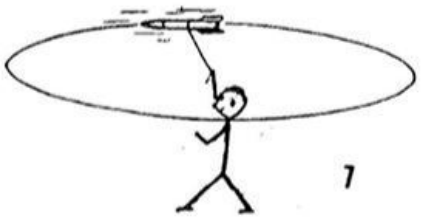
The rocket to be tested (with an engine in flight position: The centre of gravity is always determined with an engine in place.) is suspended from a string as illustrated in Fig. 4. The string is attached around the rocket body using a loop as shown. Slide the loop to the proper position so the rocket is balanced, hanging perpendicular to the string. Apply a small piece of

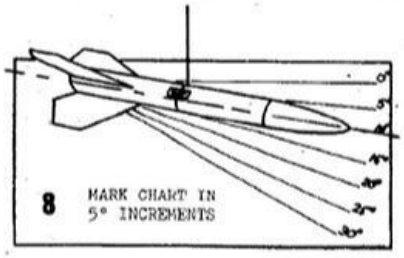










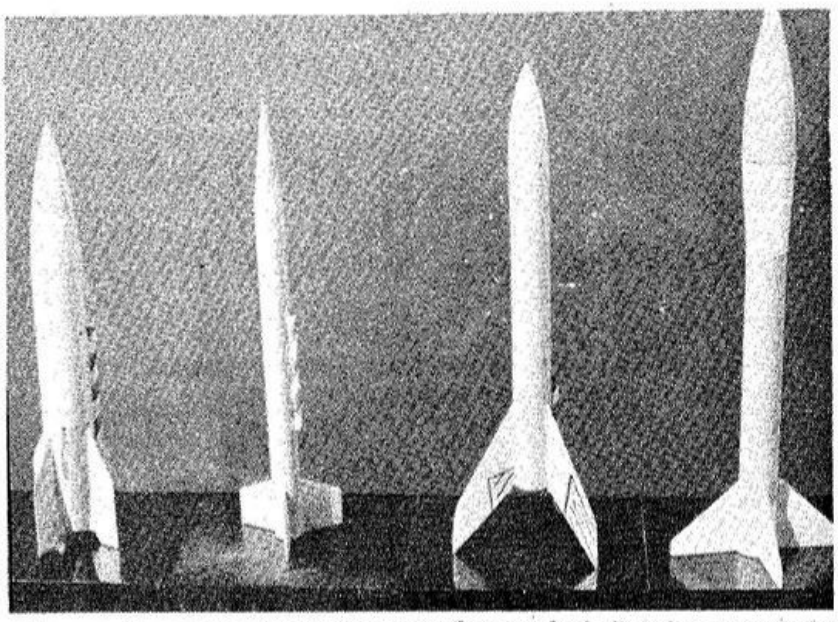


tape to hold the string in place. If the rocket's centre of gravity (balance point) falls in the fin area, it may be balanced by hooking the string diagonally around the fins and body tube as shown in Fig. 5. A common straight pin may be necessary at the forward edge of one of the fins to hold the string in place. This string mounting system provides a very effective low friction pivot about which the rocket can rotate freely.

For the first system slide a soda straw along the string to a position just above the rocket. Then suspend the rocket in a low velocity air stream (wind tunnel or gentle breeze), with the nose of the rocket pointing into the wind, and then turn the rocket approximately 10 degrees out of the wind to see if it recovers. If so, the rocket is stable enough for flight.

The second method involves swinging the suspended rocket overhead in a circular path around the individual, as shown in Fig. 7. If the rocket is stable, it will point forward into the wind created by its own motion. If the centre of pressure is extremely close to the centre of gravity, the rocket will not point itself into the wind unless it is pointing directly forward at the time the circular motion is started. This is accomplished by holding the rocket in one hand, with the arm extended, and then pivoting the entire body as the rocket is started in the circular path. Sometimes several attempts are required in order to achieve a perfect start. If it is necessary to hold the rocket to start it, additional checks should be made to determine if the rocket is flight-worthy.

Small wind gusts or engine misalignment can cause a rocket that



Showing the various types of rockets that can be built using commercial components.

checks out stable when started by hand as described above to be unstable in flight. To be sure that the rocket's stability is sufficient to overcome these problems, the rocket is swung overhead in a state of slight imbalance. Experiments indicate that a single-engined rocket will have adequate stability for a safe flight if it remains stable when the above test is made with the rocket rebalanced so the nose drops below the tail with the rocket body at an angle of 10 degrees from the horizontal (see Fig. 8). With cluster powered rockets a greater degree of stability is needed since the engines are mounted off centre. The cluster powered rocket should be stable when imbalanced to hang at 15 degrees from the horizontal. Heavier rockets which accelerate at a lower rate require a similar margin of stability.

Caution should be exercised when swinging rockets overhead to avoid collision with objects or persons nearby. Velocities in excess of 100 miles per hour are possible. This is sufficient to cause injury.

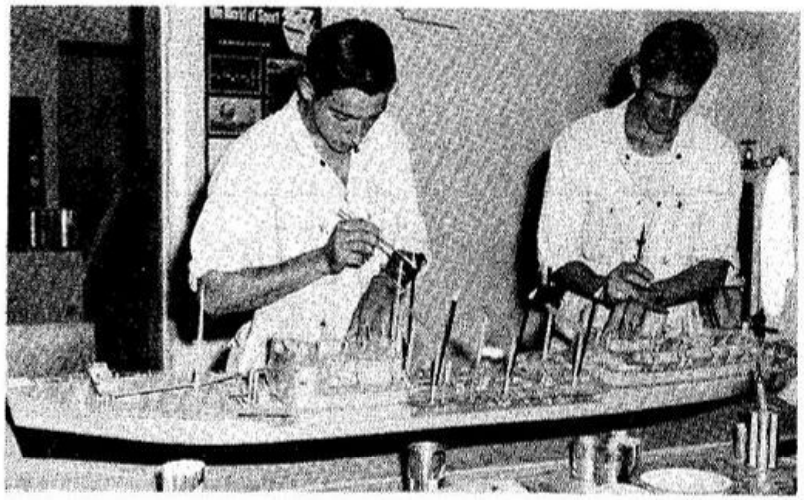
Suppose you construct a rocket and find that it will not be stable. Do not try to fly it. Corrections must be made. Tests have been made where the stability of the rocket was in question. If it was completely unstable it would loop around in the air, seldom reaching over 30ft in height and never reaching a velocity in excess of 20 or 30mph. However, occasionally one of these rockets would make a couple of loops, suddenly become stable due to the lessening of the fuel load, and make a bee-line straight into the ground. Had anyone been standing in the wrong place a serious injury could have resulted.

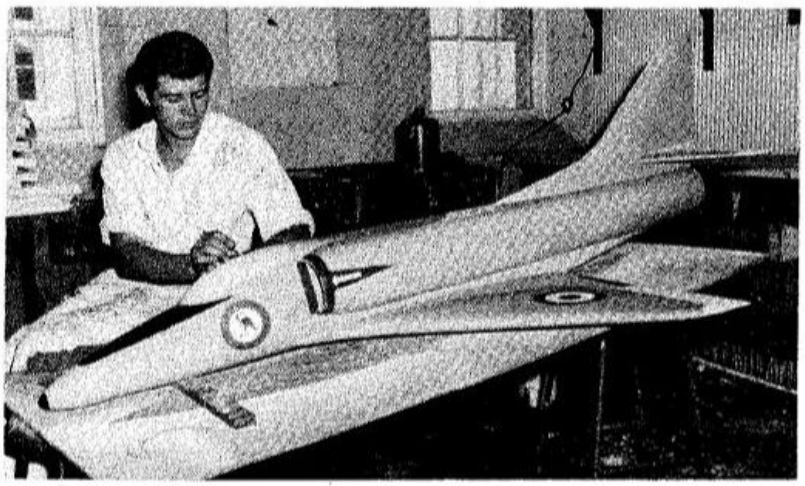
If a rocket does not show the degree of stability require for safety it can be easily altered to conform either by moving the centre of gravity forward or by moving the centre of pressure rearward. To move the centre of gravity forward, a heavier nose cone is used or a weight is added to the nose of the rocket. To move the centre of pressure rearward, the fins may be made larger or moved farther back on the body tube. With the Astron Scout rocket and many other designs, greater stability is obtained by constructing it so that a large portion of the fins project beyond the rear of the rocket body.

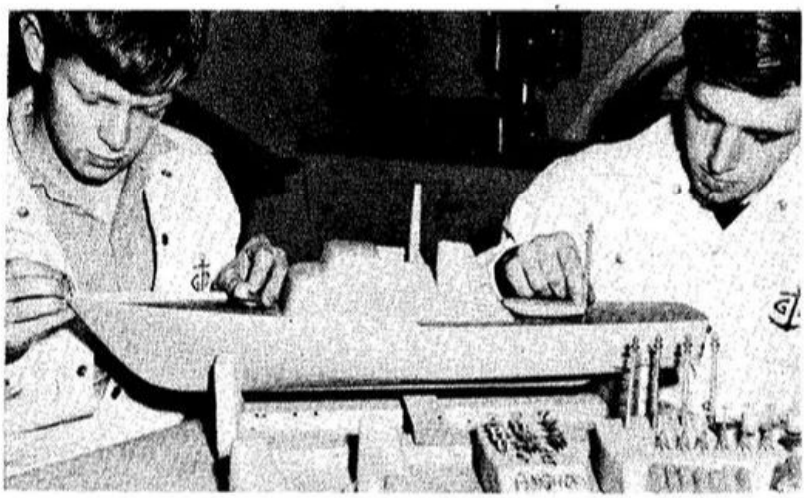
TO BE CONTINUED

A MODEL NAVY- CONTINUED

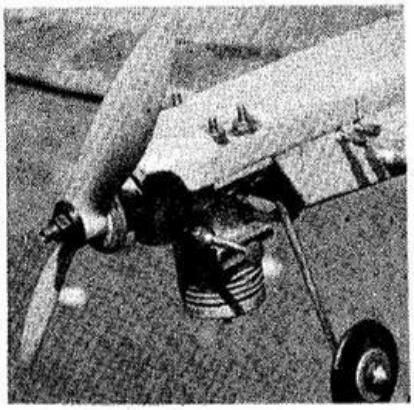
More models from the naval workshop at Garden Island.

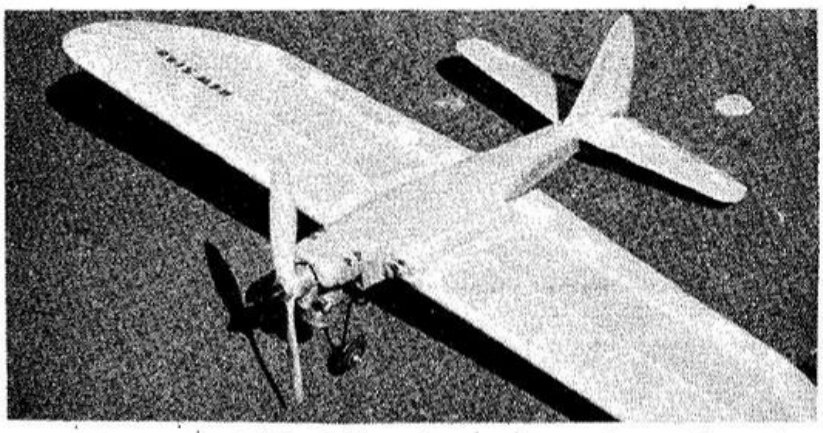






SUNDANCER - TOP





THIS MODEL has won more than its share of contests and has proved that a fast model can be easy to fly. It is of particularly rugged construction and apart from the mightiest of prangs should survive a season without any trouble.

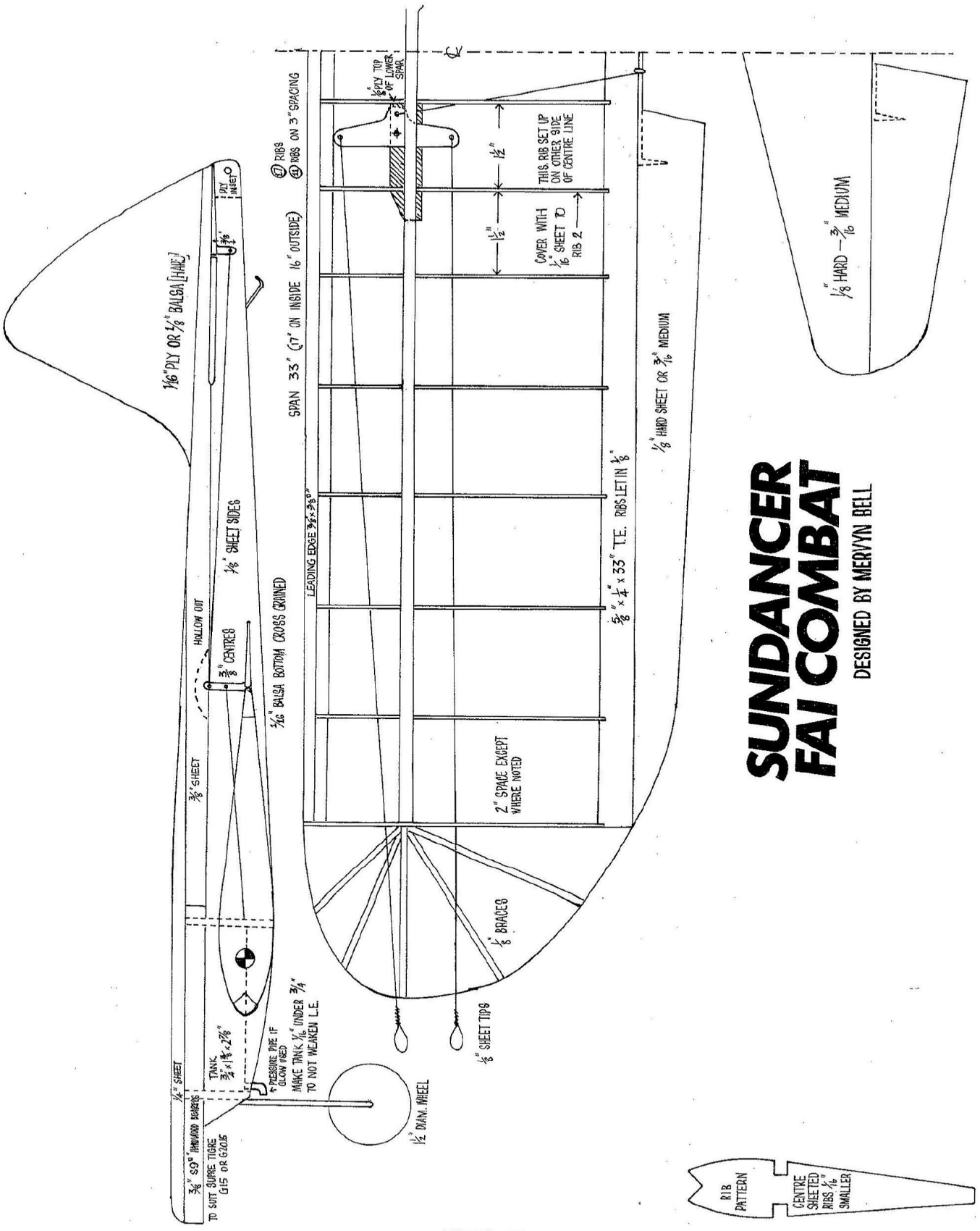
Construction is conventional and follows accepted principles. However, it will be noted that the bellcrank is situated in the wing instead of the fuselage. On most combat models the wing leading edge is cut away to accommodate the fuel tank, and this is the model's weakest point. In this design it will be noted that the leading edge continues right through the fuselage thus eliminating the problem.

Engine bearings are level with the fuselage sides as can be seen in the photo, and this helps to keep the fuselage width down. However, remember that the ply formers have to be cut ¼in undersize.

Take care in making the fuel tank as it is a very tight fit, but if made to the exact size shown it will go in without any trouble. The original model flies well with the Super Tigre G15, but it will perform well with an OS-15 or similar motor, although the speed will be down.

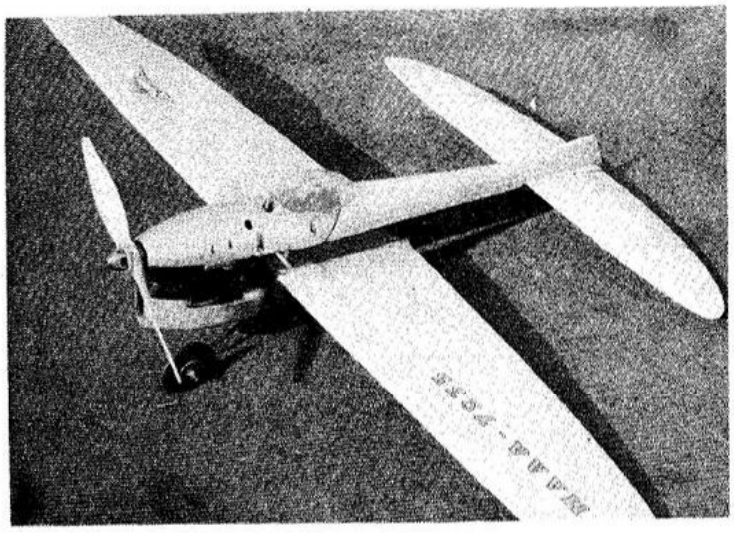
—MERV BELL.

COMBAT MODEL



B CLASS TEAM SPEED

GET IN THE WINNERS CIRCLE



THERE is nothing quite so spectacular to an aeromodeller as the sight and sound of four screaming .29 powered B class team racers hurtling around the circle, haltered only by 60 feet of steel cable. There are pilots straining at the control handle in order to keep their model stable in an attempt to get that extra speed and lap or two.

Class II Team Speed, which is more commonly referred to as B Class team racing, is, as the title infers, primarily a team event, and this point cannot be over emphasised. Perhaps the day of races as described above belonged to yesterday, however, with the calibre of motors available today there is no reason why this class of aeromodelling, with your co-operation, cannot once again be the highlight of a meeting.

I will try to illustrate some team racing points with experience gained over several years of consistent racing with an appreciable margin of success.

Teamwork: It is imperative that the pilot/mechanic relationship be one of complete understanding. It is no good beefing after losing a race about needle settings, etc, as this will ultimately dissolve the arrangements, like a marriage on the rocks. The old saying of practice making perfect really fits the bill in team racing and although you can never be perfect, consistency wins a lot more races than the odd ball performer. Practice will show you the limitations of your model flying under power, and rate of deceleration and glide with power off.

How often do you see your mechanic left not only holding the box, but on the opposite side of the circle trying to make up his mind which way to go. I once saw a mechanic and battery boy arguing about which direction they should run in order to refuel the model, they went either side of the circle and the result was a foregone conclusion. It was a pity, as their model was leading at that last pit stop.

The aircraft: We all have our own ideas and designs, whether proven or not, and the writer is not one for sticking too any given design. You design a basic model, and if the model is stable you are well on the way. Small modifications to following models will result in you coming up with a stable unit which is not only a pleasure to fly but also an example of your ingenuity.

Having used four major power supplies I find that the weight of your model can, to a certain extent, retard the performance and in this regard it is imperative that with certain engines you avoid building a heavy model. The following is offered as a guide.

ETA .29 Mk Vic 24oz limit

Glow Chief .29 Ball Race 24 oz limit

K&B .29 Series 64 26oz limit

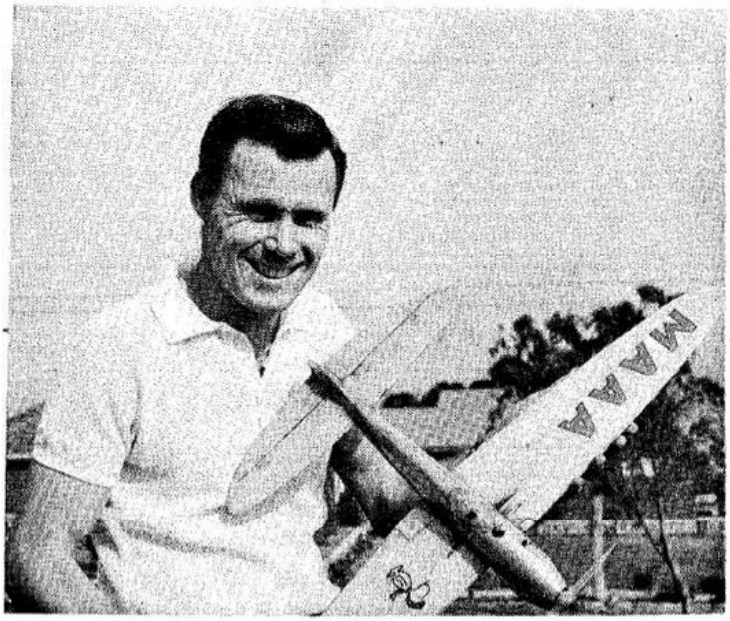
Super Tigre G21.29 and RV 28oz limit

These figures are only given as a guide and I have found with the more powerful units up front, such as the K&B and Super Tigre, that only acceleration is effected by an unduly heavy model.

Do not sacrifice a little weight for strength, as a B team racer has not only to work hard, but also take plenty of rough handling. You will find with careful selection of materials just how much you can reduce the weight of a model. I have found over 2oz difference in weight between two sheets of ½"x4"x36" quarter grain balsa.

I am an advocate of a full-length crutch in combination with an aluminium pan. There are, of course, arguments for and against the use of a pan or a plate. Apart from the ease of construction by using a pan, give some serious consideration to the heat factors of a glow plug motor.

Wing design, along with the gen-



BILL LOGAN—modelling since 1948, current holder N.S.W. B Class record (model is a Super Tigre RU29).

eral trend of basic model shape, has changed dramatically over the years and currently the eliptic and parabolic curved, shaped wing, are favored. A fully symetrical wing, with maximum thickness between 25 to 30 per cent of wing chord is general practice. A 1/3 to 2/3 wing section is coming into favor, but I feel that this particular section has more benefit with an outright speed model. At all times use ½" thick wings. This has proven itself over many models and a hardwood leading edge is virtually essential with a "B classer". King Billy pine will bend to at least three-quarters of the leading edge on the aforementioned wing shapes.

Regarding the wing area, I have found after building models of various shapes and sizes, particularly with a ½" thick wing, that an area of between 130 to 140 square inches is quite suitable in conjunction with a tail plane of at least one-third the wing area.

Fusilage size and shape is an important factor in design and bulky shapes tend not only to make your model look like a barge, but fly like one.

Take care with your undercarriage layout. I have seen them loose, wrapped around a model on heavy landings, resulting in further model damage. Size 10 to 12 gauge wire is essential, and so too is the plywood former, or whatever you may use to locate the wire. Do not spare the thread, whether it be wire or waxed cotton, etc. Be careful of the bends you put in the wire. Sharp bends will ultimately fracture when abused, either intentionally or otherwise.

A very satisfactory method is to use 3-ply appropriately shaped to fit into the underside of the wing, which is grooved to accept the former.

The former is in the centre of the fusilage and running lengthwise with appropriate braces fitted prior to completion of sides and bottom of the fusilage. The wire is fitted on the inside of the former and this will allow a neat plug clearance and the shock upon landing is then absorbed down the model.

OK, so you have built yourself a reasonable model with bushed controls, etc, and a tailplane that does not flap like a bird on the wing. It flys in the groove and can be landed where you want to put it, providing your crew is there waiting for it. Now you would like it to go a little faster, so you get out your best file, etc, and go to town on that engine probably with the result that your groovy 105mph, 50-lap, B-class motor now only does 95 mph for 40 laps.

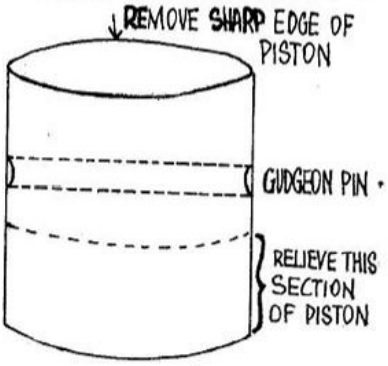
Engine manufacturers are coming up wiith something new all the time and these benefits are passed on to you. You pay for them, so be cautious in your approach to modifying an engine. If you don't know or don't have the equipment, do not touch them. There are plenty of experienced modellers around who will do modifications for you, at a small fee. Today's motors require very little, if any, modification, and mostly performance will increase by just "freeing" up and carefully fitting the components together again.

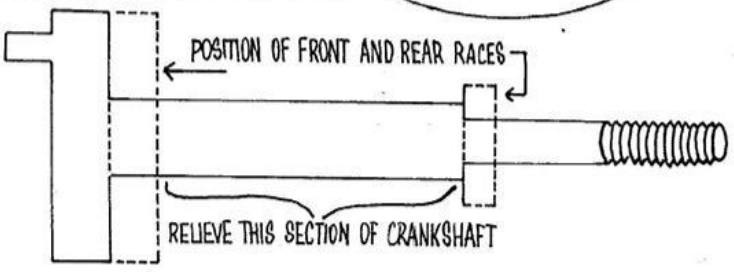
The following is a very brief guide for the novice who may wish to tinker with his engine without getting unduly involved. At all times be clean:

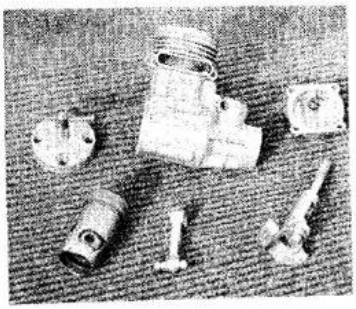
1. Dismantle the engine completely. Methodically lay all the parts out and clean with an appropriate fluid (petrol, for example).

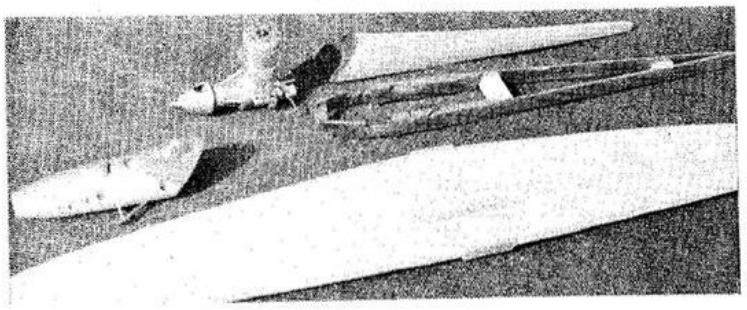
2. Carefully relieve the crankshaft between the ball races by grinding with a high-speed emery stone, etc, and finish off with fine, wet-and-dry paper or emery cloth.

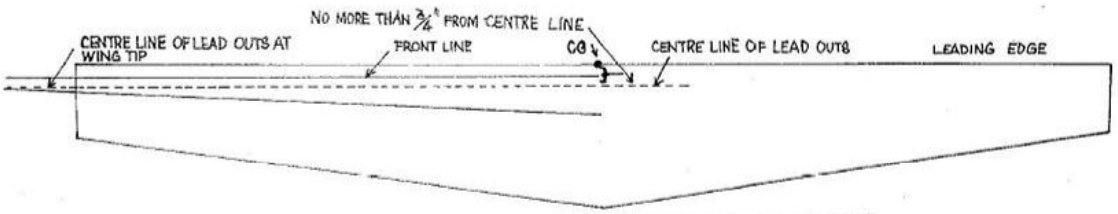
3. The crankshaft should be a











CALCULATION OF CG FOR B CLASS TEAM RACER FOR SPAN 35" TO 36" REGARDLESS OF WING SHAPE

slight, firm, sliding fit into the ball races and should spin freely without any signs of grabbing.

4. Using a carborundum lapping compound (700 grade) just lightly lap the cylinder liner to the crank case. This is to remove any high spots and ensure a firm push fit in order to even out the dispersion of heat from the lever to the crank case.

5. The next job is to ensure a good piston and liner fit and unless the piston has already been relieved then light rubbing with 400-grade wet-and-dry paper on the surface of the piston below the gudgeon pin will remove sufficient metal for this purpose. The extent to which you need to do this work will be evident when you commence the lapping of the piston to the liner which is an exercise involving extreme care and a sense of "feel". The novice should take this aspect in stages until such time as one develops a touch for the fitting as the life of an engine could easily be lapped out in a couple of strokes. A light rub with 500-grade wet-and-dry paper on the top edge of the piston will remove the sharp ridge ott the piston and thus reduce the chance of the piston "picking up" when revving high.

6. The cylinder head can then be lapped to the cylinder liner and all parts once again cleaned.

7. The engine can now be fitted together with a careful check made at all stages to ensure free movement of all parts. Light machine oil should be sparingly used and if the crankshaft is moved so as the piston is just closing the exhaust port off and then let go, the weight of the piston should be enough to cause it to fall to bottom dead centre.

Trusting the engine is now revving higher I would briefly like to touch on fuels in order to increase the lappage output of your combination.

There are, of course, many fuel ingredients available on the market, some in commercial grades and others analytical. The latter are quite considerably dearer and from experience the super fine grade of these chemicals does not warrant the cost when computed against the extra benefit, if any.

There are many fuel formulae, but generally speaking no one brand of engine is fully adaptable to a given fuel, and only time and extensive testing will achieve a satisfactory formula.

The following is a basic long range "brew" which has proven very adaptable to all brands of engines and was initially discovered by Chas. Taylor, noted United Kingdom B Class team race modeller.

Equal parts:

Oil
Benzol
Iso-propyl alcohol
Benzyl alcohol
Nitro Methane.

This fuel has certain characteristics and you will find that the engine will cut out unless it is "free" enough and warmed up, before the plug leads from the battery are disconnected.

Blending with methanol and oil (straight 3 or 4:1) presents no problems and I suggest the novice run extensive series of tests, starting with straight fuel and then adding percentages of the long range "fuel" until a happy medium is achieved.

In many instances some of the chemicals are a little difficult to obtain and of course nitro methane is quite expensive. The addition or blending of a commercially available fuel such as Fox Blast can be used in place of the nitro methane with satisfactory results. There are many other chemicals that can be used to increase the lappage of an engine, such as Cumine, Xylol, etc. However, these chemicals present other problems for the beginner.

I hope this article has been of some benefit to the reader without confusing the issue. I would also like to take this opportunity to thank through this magazine the many modellers whose association with and tireless help and advice I have received on the subject over the past few years.

BILL LOGAN

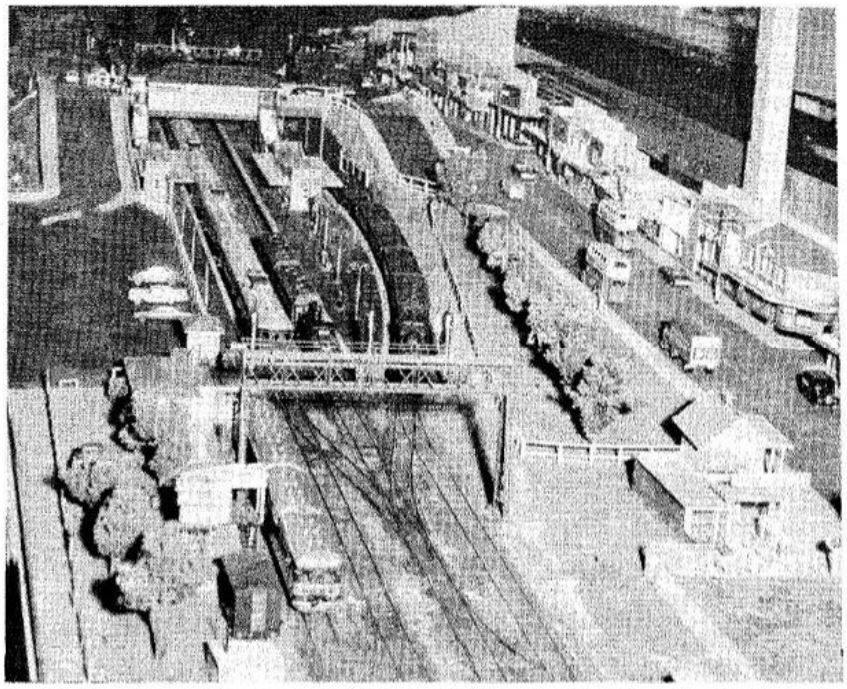
modeller club of the month

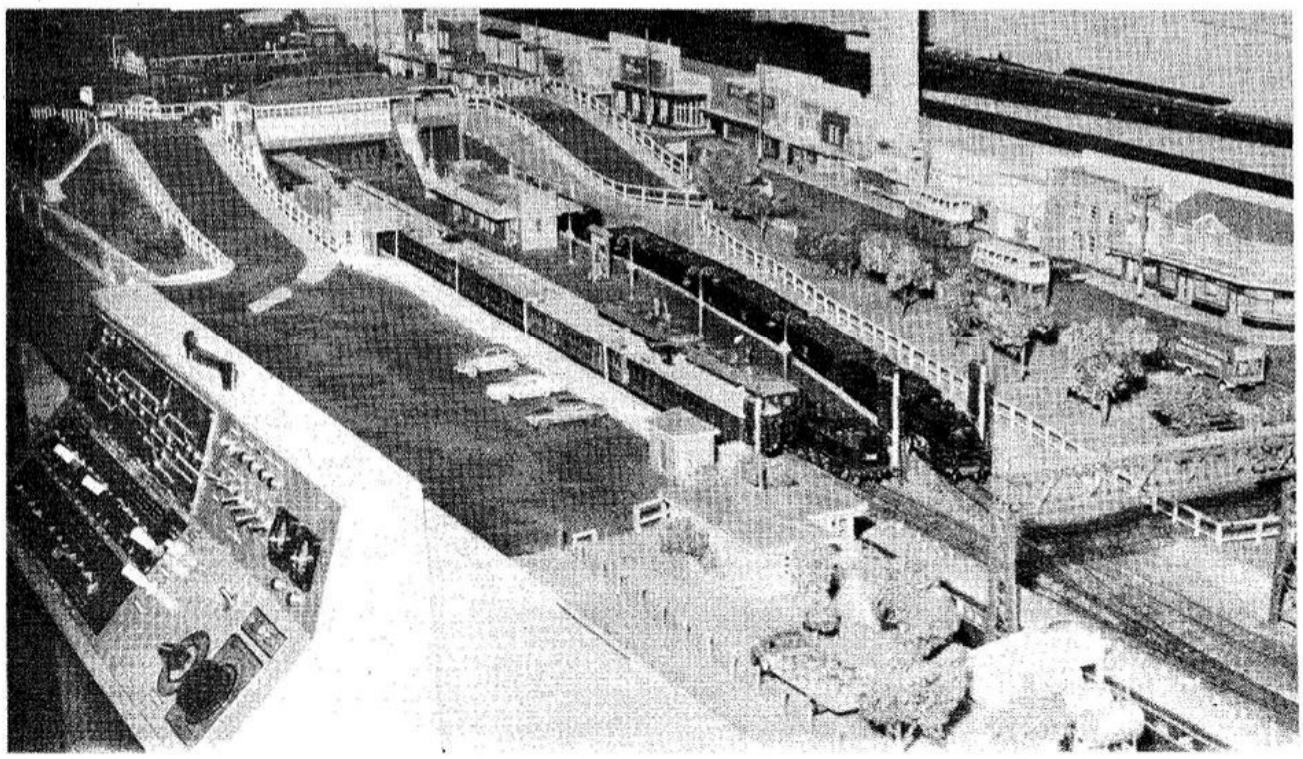
IN THIS issue the Club of the Month section goes over to the field of model railways, with a visit to the Sutherland Model Railway Society at Caringbah, New South Wales.

We were warmly welcomed by the secretary, Mr Lionel Clapham, and were able to closely examine and photograph their magnificent scale layout.

Accurately depicting Sutherland railway station and the adjoining track, the layout measures 30ft x 7ft 6in, and has over 400ft of OO gauge railway line. This track is partly proprietary (Peco) and the rest has been made up by club members to suit the requirements of the exhibit. Signalling is automatic, as in the prototype, and to scale. In all, over 400 relays have been used in the electrical system.

Great pains were taken by the club to ensure an authentic appearance. More than 150 photographs were taken of relevant shops and buildings and even the colorful advertising billboards are to scale from Kodacolor prints of the originals.





NSWMRRA RACING

1968 REPORT

THE last 12 months has seen the Association undertake its most ambitious racing program in the history of the sport, in this State, following the complete integration of all commercial interests and tracks within the Association's control, by the end of 1967, including the joining of an additional 18 commercial tracks.

A well balanced program was drawn up to accommodate both 1/24 and 1/32 enthusiasts and 1/24 scale was divided into a Group 1 program and a Group 2 program. Unfortunately, with the closure of more commercial tracks during the season the program had to be substantially abridged.

In addition, this year has seen the waning of popularity of 1/32 scale and the disappearance of Group 1 (strict scale) as a competitive form of racing in this State altogether. By August, 1968, it became obvious that Group 1 events were no longer popular and at that stage the Association cancelled all remaining 1/24 scale Group 1 events. As can be seen from the new calendar, the only scale (Group 1) 1/24 scale events listed on the 1969 calendar are the Jack Brabham GP titles and the Frank Matich NSW versus Victoria Interstate Challenge series. This step has proved necessary because the sport in this state has proved mainly for Group 2 racing and is in keeping with current trends both in the United States and England, where the popularity of the Dynamic and Lancer handling and super-competition bodies, has virtually eliminated strict scale form of competition from the international scene, as far as 1/24 scale is concerned.

It is anticipated that at some stage this year an attempt will be made by one of the member States of CASCRA (strongly supported by NSW) to completely revise the CASCRA Group I Car Set of Standards and substitute something in keeping with the American USRA Car Model-Champion Arco Rules and Specifications. The substitution of a set of maximum and minimum measurements for 1/24 scale racing in place of strict scale must surely be inevitable as none of the world body manufacturers, either in England or the United States, are producing scale bodies any more and if something is not done some time in 1969, then there will soon be no bodies available, with which to conduct CASCRA events.

The year 1968 has seen the gradual fading of 1/32 scale from the racing calendar and only one traditional 1/32 scale event is listed on the calendar for 1969. Although new clubs have sprung up all round Sydney they are not affiliated with the Association and the Association does need more people on its committee interested in 1/32 scale activities.

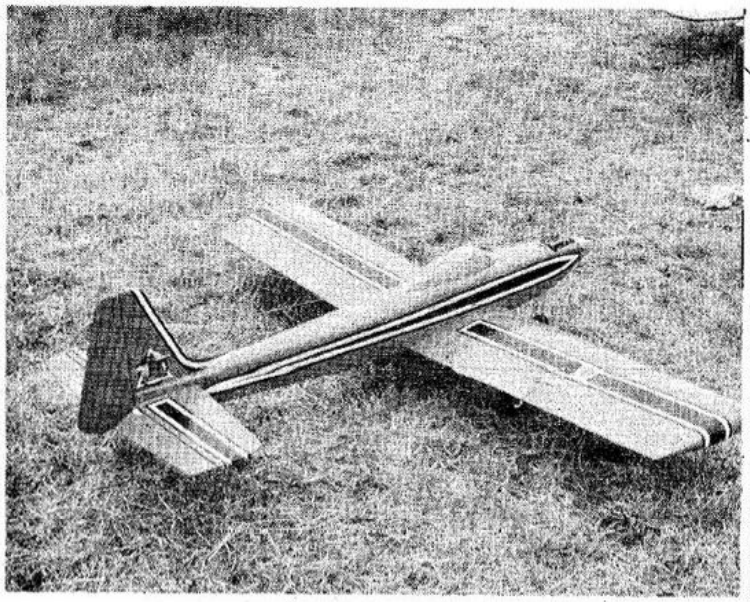
On the brighter side, the Group 2 sprint series introduced for the first time, proved immensely popular. This series was conducted under the Car Model American Repercharge System, which governs the conduct of all sprint events in the United States. The Group 2 series of races are now history, but the 38 entries at Earlwood in April and 44 entries at Mayfield (Newcastle) in April, proved just how popular the sprint series was. Another successful innovation for 1968 was the abandoning of the old classification of events and the listing of races by reference to their one-to-one counterparts, such as Indianapolis, Can-Am, Daytona, etc.

On the racing scene, Ian Bannister and Steve Hutchesson, of the DDS Testor team took home most of the gravy. Steve Hutchesson, in particular, has emerged from relative obscurity to be the leading chassis builder, motor winder and car preparer in the country. Together with their team mates, Bryan and Ron Hunt, Bannister and Hutchesson won the NSW Teams endurance championship for the second successive year after fighting off a mighty challenge by Redline Trident. In addition to their win in the Teams Championship, their convincing win in the second round of the Frank Matich Challenge Cup at Moonee Ponds, Melbourne, on October 6, enabled them to share this trophy with Redline Trident. However, the feature of the endurance racing during the season was the emergence of new teams, such as GP Rockdale, Villawood-DJs and Paul Morris' Glendale Team, each of which won either one or two of the endurance races. In fact, the evenness of the endurance racing during the season was a highlight of the competition and it was only the consistent second placings of the Testor Team that ensured them the championship.

In sprint racing, a new super star emerged in the form of young 16-year-old Don Elmore, of the G&D team, and after an exciting tussle between Elmore, Bannister and Dave (DBR) Rittie, Elmore ran out the ultimate winner, with Bannister in second place. However, Bannister won the Dawn Trophy, donated by Dawn Securities Pty Ltd, for the season's outstanding driver, from his compatriot, Steve Hutchesson, with Don Elmore in third place. Bannister also won the Driver of the Year trophy, which is the last time this series was held.

Another highlight of the season was the first-ever trip by an interstate team, NSW, during the Easter weekend, to compete in an invitation event of another State — the Victorian Annual 24-Hour Total Endurance Classic. This event was won by the New South Wales team of Dave Rittie, Ian Bannister, Steve Hutchesson, Bob Cox and Gary Grant.

June and October saw the birth of the Frank Matich series, which proved immensely popular. This series was also another first, being the first interstate competition under CASCRA rules and car specifications. Despite the overwhelming victory by the New South Wales teams (Testor and Redline Trident) the October race showed a marked improvement in the competition standard of the Victorian teams, with the result that there is now a general evenness in competition between the States.



Basil Healey (NSW) fine Kwik Fli III.

Peter Forton's Bar Fli — monocote finished.

trackside topics

THINGS must be looking up. After missing the last issue (due to the retirement of Barry Backman) our dearly beloved editor has donated the trackside topics to Mr Barry Brotherton and yours truly, Steve Hutchesson.

Now that my stirring arm is back in action, we shall get to a rather distasteful subject, the Jack Brabham Trophy race. The first Brabham race in Victoria was brought almost to a standstill because Ian Dole won the race with grey microcells and because the South Australians ran sidewinders and tried to kid everybody that the exposed gears looked like disc brakes.

The second Brabham in Adelaide turned to a shambles when top qualifier Ian Bannister was disqualified for allegedly using tyre goo. This incident caused the walk-out of the whole New South Wales contingent, bar one. Now in all its brilliance the NSWMRRA has disqualified some of the fastest guys in the country.

Their crime — these guys, not having a strict knowledge of CASCRA specifications, turned up for the qualifying with olive-colored tyres, thinking that they were legal under the dark grey rule. After some behind-the-scenes negotiations and later claims of intimidation by the track-owner (Jeff only bites when he's angry) the presiding officialdom then allowed these guys to run their olive tyres with a proviso that it be written on their entry forms. At a later committee meeting they were disqualified. This not only shows weak decision, but selfish thought by those on the committee who supported disqualification.

Congratulations, Don Elmore, on the winning of the group 2 sprint championship. With only the help of his dear old dad, he got up and beat them all. Good work, lad.

Are you tired of wrapping axles around the wall on your favorite inline? Try a pair of AJ's Brand X set screw wheels on a drill blank axle. They bend fewer axles, and in an enduro they change about four times faster.

On the motor scene the 617 medium can motors still reign supreme, but beware if you haven't got a little can car — you may soon be in for a shock. The number of races won by little cans lately make them a real threat. The going types are Champion, Mura and Lenz.

Have you taken a look at those big, wide Indy bodies by Lancer lately, the Lotus turbine and the Shelby turbine. It doesn't take much figuring to see that an angle-winder will fit completely underneath one. This combination makes inlines look as if they are standing still round corners.

I hear that a lot of people have written to the editor enquiring about black gloss track surfaces and the use of tyre "goo". The three main advantages of the glossy surface are performance, convenience and appearance. An average size track of about 130 feet would have, under primitive traction conditions, a lap time of about seven seconds. With black gloss and the use of goo, lap times should be reduced to about five seconds. This does not mean that a car built for poor traction would be transformed into a rocket simply by fitting microcells and using tyre goo. It does make it possible for cars built for these conditions to go much faster.

From the appearance point of view, a track painted in this manner always looks neat and clean and it is much easier to spot any dirty or irregular patches. Apart from all this there is the big point that the combination of gloss paint and the use of goo gives everyone an even chance from the traction point of view.

Well, fellows, this was my first attempt at Trackside Topics. If I have stirred a few things up or caused comment, this will be a good thing, as it will prove that interest is still keen in our hobby. Bye till next issue.

—STEVE HUTCHESSON.

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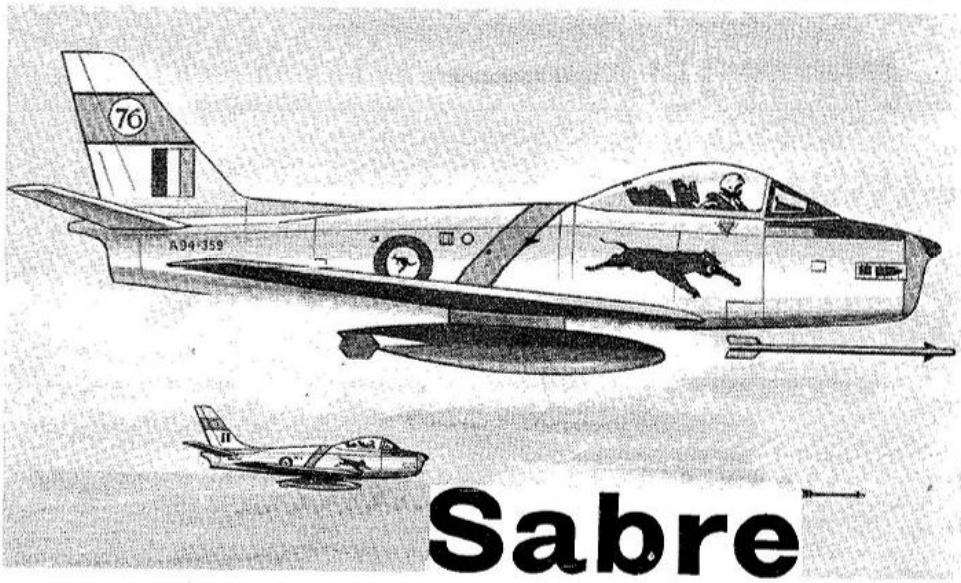
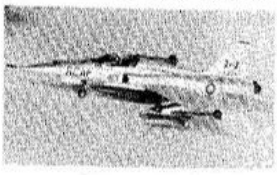
IT'S ANOTHER 1/72 SCALE FROG KIT with AUSTRALIAN MARKINGS



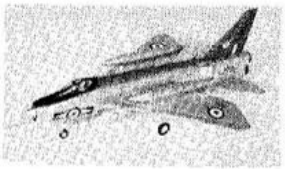
★ Kit contains 34 accurately detailed parts.
★ Kit supplied with full armament.
★ Transfer sheet of high quality containing 36 decals.
★ Authentic transfer sheet of:
Mk.32. No. 76 Squadron, "The Panthers",
Royal Australian Air Force.

The Sabre in its various marks has probably been the most widely used aircraft by the World's Air Forces. Perhaps its most famous role was that of preventing the Russian built MIG 15s from gaining total air supremacy during the Korean War.

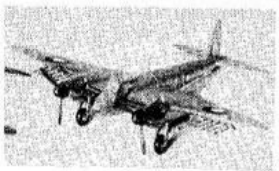
FROG IS PRESENTED IN COLOUR SERIES ALL IN 1/72 INTERNATIONAL SCALE



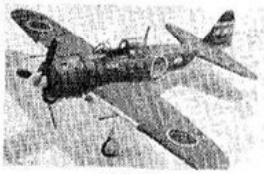
FREEDOM FIGHTER
Red Series



B.A.C. LIGHTNING
Orange Series



MOSQUITO
Green Series



ZERO
Black Series

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Revell release exciting, new models each month

The Charles W. Morgan was the greatest whale hunter of them all, taking no less than 61 whales on her maiden voyage. A beautiful 16" model, exceptionally detailed with brick try works, deck fixtures, preformed sails and ratlines, rigging thread and rigging instructions, seven whale boats, and colorful flag sheet. Kit contains cement.

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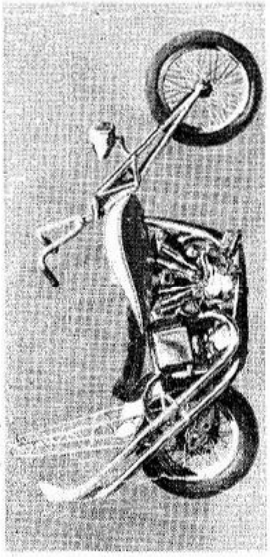
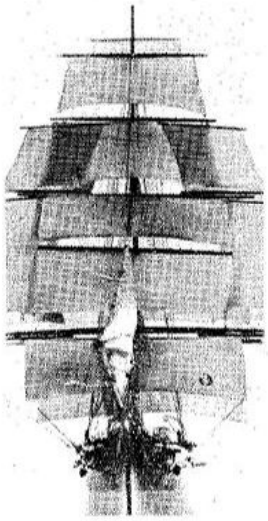


HOG

The classic Harley Davidson "hog" stripped to brute force and radically redesigned! And the features are super boss! Detailed all-chrome engine, engine wiring, fuel lines and control cables, exposed primary drive. Rear suspension with modified Chevy II springs. Custom forks on 45 per cent rake. Ape hangers high over steerable front wheel. Custom tuck and roll seat. Wrought iron 'sissy bar', with intra-tube scroll work. Floating tail light. Cibie headlight. A symetrically-designed gas tank.

Cutty Sark



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