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MODEL PUBLICATION

Model Cars Monthly

1/8th OFF-ROAD EURO-CHAMPS REPORT

~when the going got tough, the tough got going

THE SET-UP

~1/12th scale chassis tuning

TRACK TEST

~the AYK SIDEWINDER strikes out

WHEN THE GOING GETS TOUGH
THE TOUGH GET GOING

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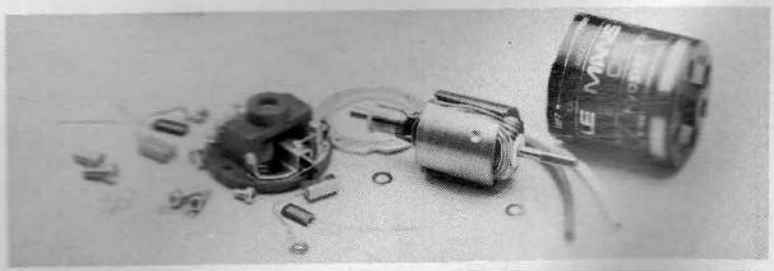

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Model Cars Monthly

October 1984
Volume 4 Number 9

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Cover
The 1/8th scale Off-Road European buggy Championships provides the basis for our front page. Main picture: a tense wait for the start of the main final. Inset: Pedro Martinez's almost 'Yankee' car – did it win? Move on to page 28 for the result.

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Stop Press

Although the Olympics are over the American goldrush continues at the Danish 1/12th Scale World Championships. News has just reached us of the Standard class final results with an 'upset' win by Buddy Bartos. Buddy works and drives for *Parma International* and so adds this title to the Euro-Champs win for *Parma*. Stalwart British fans can take pleasure in knowing what Nigel Hale and Mickey Booth were placed second and third respectively. In fact British drivers were the most numerous in the semi-finals, and remember, the *Parma* 'Panther Euro' car is a British design. For the modified class results you will have to wait until next month.

In the 1/8th Scale European GT Championships held at Brugg, Switzerland we went one better with Steve White taking the title. Once again we Brits stole the limelight, outnumbering the rest of Europe in the semi's.

We hope to have full reports of both these meetings in the next issue of 'Model Cars' — *don't miss it.*

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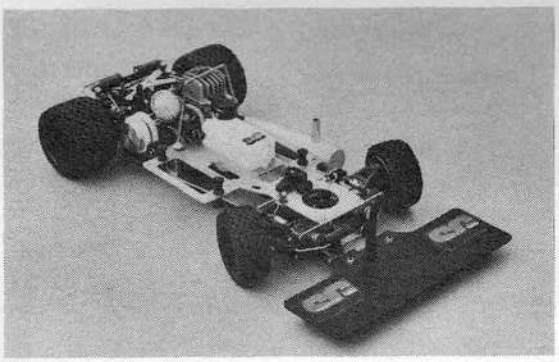

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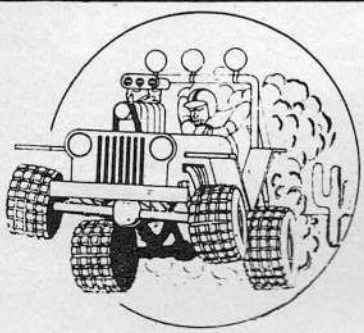

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EVER READY

Ever-Ready sponsorship

A most welcome sponsorship deal has just been fixed between the BRCA and *Ever Ready* to promote 1/10th scale electric Off-Road racing in Britain.

In a letter to Off-Road Secretary, Derek McLarney, John Breckon of *Imperator Sports Ltd.*, who represent *Ever Ready*, confirmed that the sum of £500 would be made available to promote the remaining BRCA national meetings for this year.

Depending on the success of this venture a further deal will be worked out for the 1985 racing season.

Returning to this year, the remaining meetings will each benefit from the sponsorship deal, each meeting will be entitled: BRCA/*Ever Ready* Championship Meeting. The entire Championship will now be known as the BRCA/*Ever Ready* Off-Road Series.

At the present the BRCA Off-Road Committee is working out how best to distribute the money. Club's who are running National Meetings are advised to contact Derek McLarney, 38 Henlow, Kirkby, Liverpool L32 9RW. Tel. 051-546 8983.

Stoke Mandeville International Model Exhibition

This is the 6th International Model Exhibition to be staged at the Ludwig Guttman Sports Centre for the disabled, Harvey Road, Stoke Mandeville, Bucks. The event is being staged in aid of the disabled and features all types of models and over 500 exhibitors.

The date of the event is Sunday, October 14th and the admission charges are as follows: Adults £1.50, Child/OAP £1.00. Reduced advance tickets can be obtained from the Event Secretary, 20 New Road, Milcombe, Nr. Banbury, Oxon. Enclose SAE Adults £1.25, Child 75p.

Club Chat

Some very brief details have come our way from Brian Dobing about an R/C Car racing club in the **Canterbury** area. Brian is the Secretary and he tells us that the membership is free. For further information contact Brian at 75 Island Road, Upstreet, Nr. Canterbury, Kent. Tel. Chislet (022 786) 548.

Above: Russell Woodhouse's Tamiya 'Super Champ,' leaps over three marshalls during the Lincoln Rallycross club's display at Ruston's Gala, Lincoln. Photo: T. Sandell-Codd.

Above: also seen at the LRC Ruston Gala display, Roy Racey's Mardave 'Marauder' pulling a very scale-like caravan.

Mike Kirkby, Secretary of the **Wessex Off-Road Models** has written in to tell us of his club which covers the Christchurch, Bournemouth and Poole area. Wessex is the name of the region, hence the name, although isn't 'WORMS' a name already in current usage? Anyhow, the club until recently raced at an indoor venue with artificial jumps but are now moving to an outdoor circuit situated along Iford Lane, Christchurch. This is the site for the old Bournemouth Cycle Speedway track. As such the surface is very fast shale with some slower areas of grass and dirt. Race meetings are held on Sunday afternoons at 1.00pm and Tuesday evening at 7.00pm. Race fees are as follows: Junior and Senior Members 50p. Non-Members (Junior) 50p, Senior £1. For further details phone Steve on Bournemouth (0202) 483186.

Lincoln RCC on display

On Saturday, 23rd June **Lincoln Rallycross Club** put on a display at the Annual Rustons Gala, Newark Road, Lincoln, using both Electric and I.C. Off-Road cars.

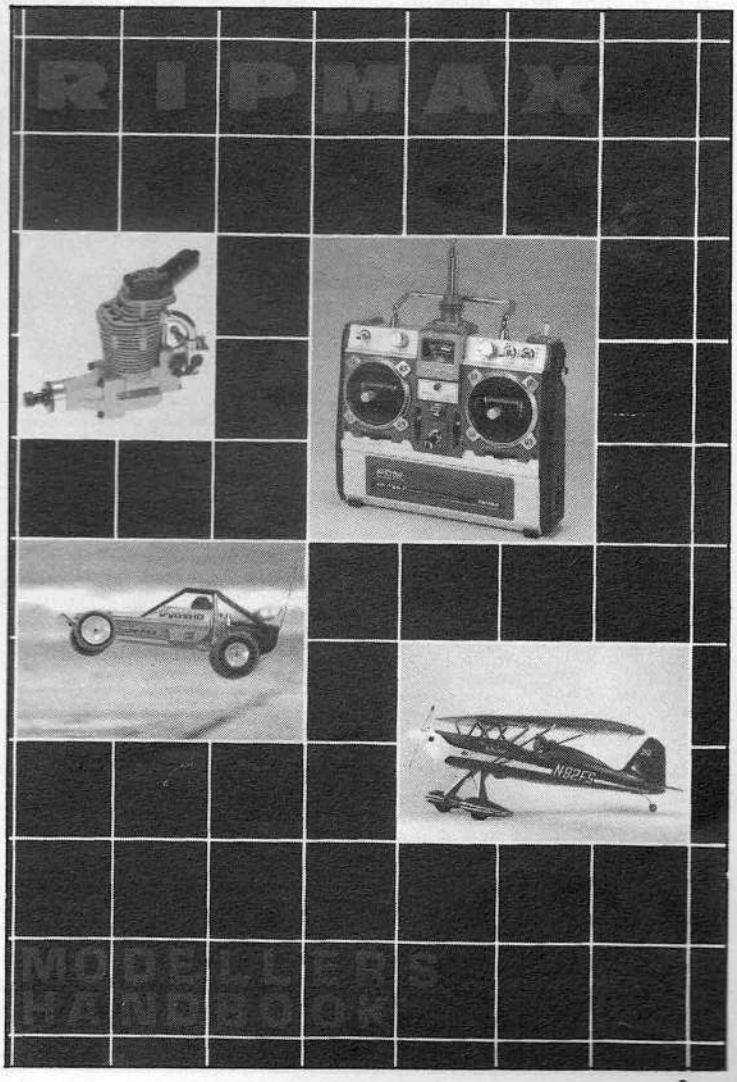
An attempt at a long jump using an electric Off-Roader was made by Russell Woodhouse, who on his third

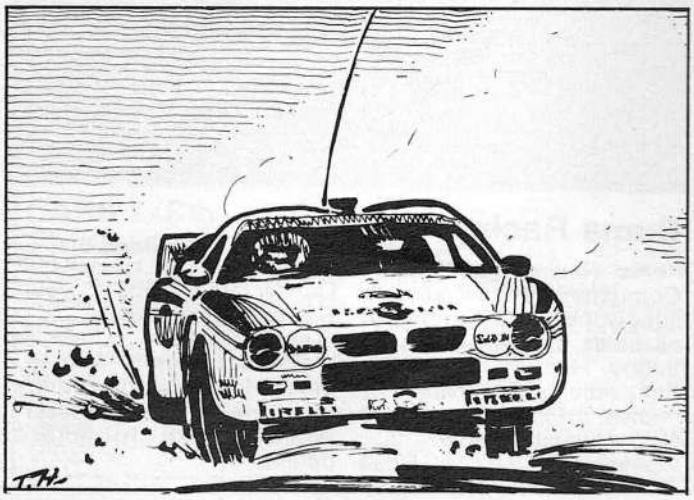
run, cleared 10ft. (3050mm) from a ramp 3½ft. (1067mm) long and 7½in. (190mm) high, from a run up of 30ft. (9150) on grass at a depth of ½in. (12mm) on dry ground. Photograph shows the car leaping over three young marshals.

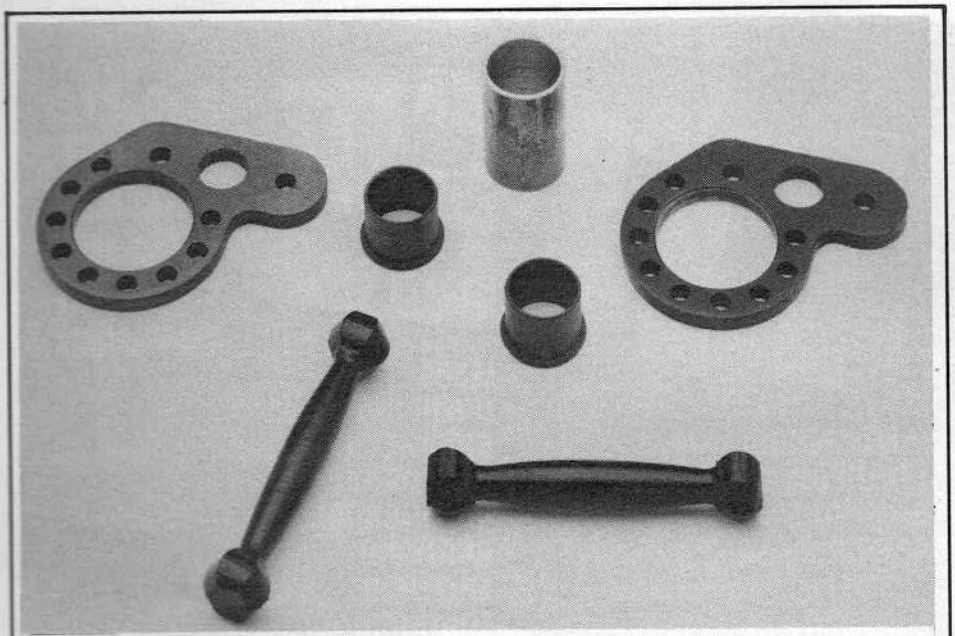
The Secretary of the Club, Roy Racey, presented his *Mardave* 'Marauder' with 'TR7' body which also towed a caravan with great distinction, every one was delighted with the stability of the van over various obstacles. The L.R.C. hope to use the experience gained from this event to form a display team, and put on demonstrations at Fete's and Galas. The clubs next venture will be at the 'Wheels 84' weekend held on the Lincoln Showground 15th to 16th September.

The club meet every other Sunday at the Bowling Green Hotel, Wragby Road, Lincoln from 1-4pm, new members very welcome. □

Right: the front page of the Ripmax Modeller's Handbook for 1984/85. The launch of the handbook coincides with the 35th anniversary of the company's existence. The handbook contains a wealth of interest and information on all modelling activities, much of which has been compiled by the Ripmax staff themselves. Modelling information apart, the Ripmax handbook gives full details of all the company's products, with the addition of full colour. The Ripmax Modeller's Handbook should be available through most model shops price £2.50.

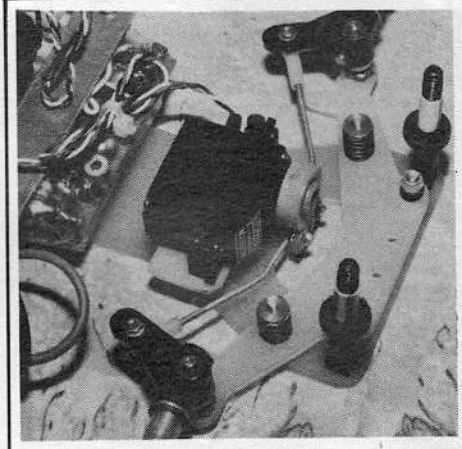






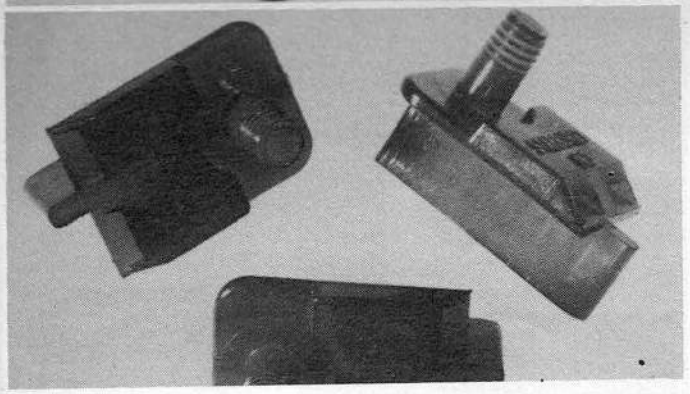
Specialist Turned Parts

Following up the instant success of their rear-end bearing system for the *Tamiya* 'Frog' Off-Roader, *STP* are now producing more tune-up parts. These include injection moulded nylon drive shafts for the 'Frog' which *STP* claim will be a great improvement over the standard items. The *STP* shafts feature full spherical drive contact to give less wear and friction. No lubrication is needed. Price: £3.00 per pair. Contact *STP*, Unit 3, National Trading Estate, Bramhall Moore Lane, Hazel Grove, Stockport, SK7 5AA.



Schumacher 'Clubmans — B'

The 'Clubmans-B' is the designation for the latest *Schumacher* 1/12th scale chassis kit. In fact this car is basically a 'C-Car' but with a trailing beam front-end. This has been produced to replace the *Associated* front-end needed for the original 'Clubmans' car. The Beam system is a three point advantage; lighter, stronger and cheaper. Contact *Cecil Schumacher*, 'Rudge,' Church Brampton, Northampton for further details. Price: £6.50.

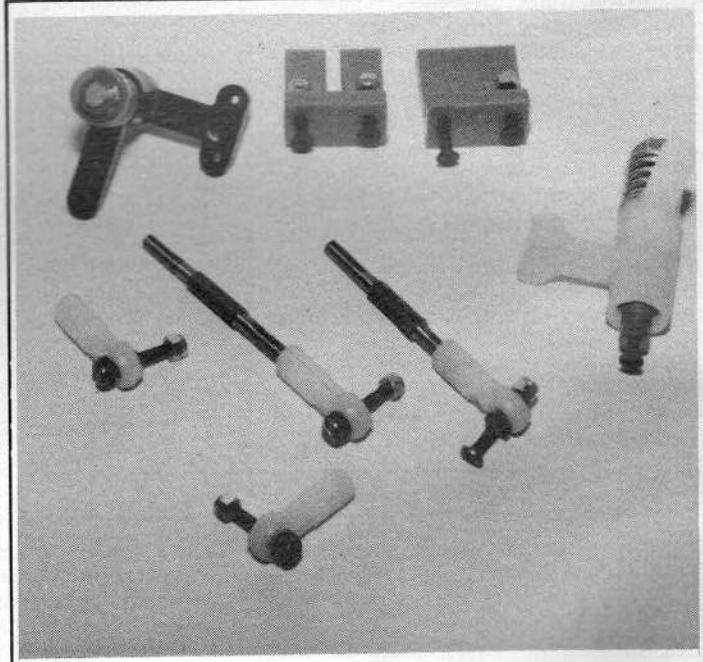


Parma Products

Also on the optional extra trail are *Parma International* with the introduction of their replacement bodyshell for the *Tamiya* 'Frog.' The 'Brandwood' buggy is a direct replacement.

Secondly, *Parma* are re-introducing 'Starburst' threaded slot guides for 1/32nd and 1/24th scale slotcar.

For further information contact *Helger Racing*, 18 Manor Farm Drive, London E4 6HJ.



Puma Racing

Puma Racing, Mail Order Company are now able to supply the following items to all fields of the model cars hobby.

Fully adjustable servo saver £3.00
Non adjustable servo saver £2.50
Ball joint kit with left and right £4.00
Handscrew threads 80p
Servo mounts and screws £1.20

Contact *Puma Racing*, Moat House Works, Kings Coughton, Nr. Alcester, Warwickshire for more details.

Contest Calendar

1/10th Off-Road BRCA Championship series

September 9
CHEADLE Standard class meeting. Details from Kevin Blears, 90 Deans Road, Swinton, Manchester.

September 16
SCARBOROUGH: Modified class at McCain International Sports Site. Contact D. Webb, 60 Newlands Park Grove, Newlands Park, Scarborough, N. Yorkshire. YO12 6PT.

September 23
BRADFORD Modified class. Details from A. Marsden, 91 Wrenthorpe Road, Wrenthorpe, Wakefield, Yorks.

September 30
BASILDON. Standard class. Contact: Jim Stone, 121A Collier Row Road, Romford, Essex, RM5 2AT. (0708) 64319.

1/8th I.C. BRCA Championship

September 2
WEST BURTON Two-day meeting. Formula; Sports/GT at West Burton Power Station Circuit, Nr. Retford, Notts. Contact Keith Davies, 37 Grove Coach Road, Retford, Notts. Tel. (0777) 703527.

September 16
YORKSHIRE Two-day meeting. Formula; Sports/GT at North Bridge Leisure Centre, Halifax. Contact Bryan Denton, 15 Highmoor Lane, Scholers, Cleckheaton, Yorks. Tel. (0274) 877177.

September 30
ALDERSHOT Two-day meeting. Formula; Sports/GT at Badshott Lea Circuit, Nr. Aldershot. Contact Jeff Stokes, 76 Sandhills, Farnborough, Hants. GU14 8ER. Tel. (0252) 46980.

1/12th Electric, BRCA Championship series

September 8/9
DERBY. Standard and Modified class at Rolls Royce Sports Centre, Derby. Entry closing date 8/8/84. Contact Dave Towell (0332) 771805.

September 29/30
LEICESTER. Standard and Modified class at Loughborough Leisure Centre, Leicestershire. Contact Alan Blakeman, 11 Newark Street, Leicester LE2 5SS. Tel. (0533) 898528.

October 13/14
CLEVELAND. Standard and Modified class at Thornaby Pavilion, Thornaby, Stockton on Tees. Contact Tony Wells, 10 Fawcett Avenue, Stainton, Middlesbrough, Cleveland. Tel. (0642) 591239.

October 27/28
RUNCORN. Standard and Modified class at Brookvale Leisure Centre, Runcorn. Contact Paul Hatton, 12 Southdale, Penketh, Warrington, Cheshire WA5 2AD. Tel: (092572) 5883.

1/8th Off-Road BRCA Championship

September 9
BASINGSTOKE 1/8 Restricted.. 1/8 Unrestricted contact S. Pyne.

September 16
BICESTER 1/8 Restricted.. 1/8 Unrestricted Entries SAE to Alec Hudson, Howes of Oxford, 9-10 Broad Street, Oxford. Entry fees £4.00.

September 23
BRADFORD 1/8 Restricted.. 1/8 Unrestricted Entry SAE to A. Marsden, 91 Wrenthorpe Road, Wrenthorpe, Wakefield, Yorks.

Photo-Action Competition

PHOTO 1: A magnificent shot from Mark Sizer of Coventry wins this month's prize. Mark took the photo at the Coventry Club circuit at Ryton and used a Fujica ST705 camera with 55mm lens.

PHOTO 2: Simon Gale of Stanford-le-Hope, Essex, took this stunt/action shot in his back garden using a Zenith EM camera.

PHOTO 3: Shades of 'James Bond' and 'Diamonds are Forever' with this shot from Andrew Potter of Rotherham. The Tamiya Audi 'Quattro' was photographed using a Canon FT6.

How to win a set of radio control equipment

(1) Send Model Cars an action photo that you have taken.
(2) The photo may be of any type of R/C Model Car, the theme is ACTION.
(3) You may send black and white or colour prints (not negatives) or colour transparencies. Maximum size of 'Half Plate' please. Colour transparencies may be either 35mm or 120 size.
(4) Any number of photos may be submitted but please mark the back of the photos clearly with your name and address plus details of the models, the site and the camera used.
(5) If you wish us to return the photographs please include a stamped addressed envelope.
(6) Photographs must be all your own work, no copies of previously printed or published material will be elligible.
(7) The photographs must be your own work – commercial processing is allowed.
(8) Entries will be judged by staff of MAP. No correspondence or telephone conversation can be entered into about entries.
(9) The judges' decision is final.
(10) Model Cars retains the right to publish winning entries plus selected runners-up in any form it sees fit. All photographs will be paid for at our usual rates.
(11) The publishers, MAP Ltd., can accept no responsibility for photographic material submitted but every care will be taken to ensure its safe return when requested.
SEND YOUR ALL-ACTION PHOTOS TO: MODEL CARS PHOTO PRIZE, PO BOX 35, WOLSEY HOUSE, WOLSEY ROAD, HEMEL HEMPSTEAD HP2 4SS.

PHOTO 4: A nice 'racing' photo was sent in by Simon Corbyn of Falfield, Gloucester. Taken at the Bristol Club Circuit, Simon used a Minolta 110.

PHOTO 5: Mr. I. Clenton's 'Audi Quattro' could certainly do with some 'four wheel drive' here. Mr. I. Clenton comes from Prestbury in Cheshire and uses a Pentax ME Super.

PHOTO 6: Jonathan Hatter of Horley, Surrey aptly entitled his photograph 'Road's End.' His Tamiya 'Sand Rover' was snapped (photographically) on a building site using an Olympus Trip.

PHOTO 7: A dare devil action shot of Terry Calcott's Tamiya 'Brat' and taken by Bruce Calcott (Dad). The car is pictured leaping through and over flames at a Chesham Off-Road Club display. Camera used as an Olympus OM10 with 50mm lens and 2X tele converter.

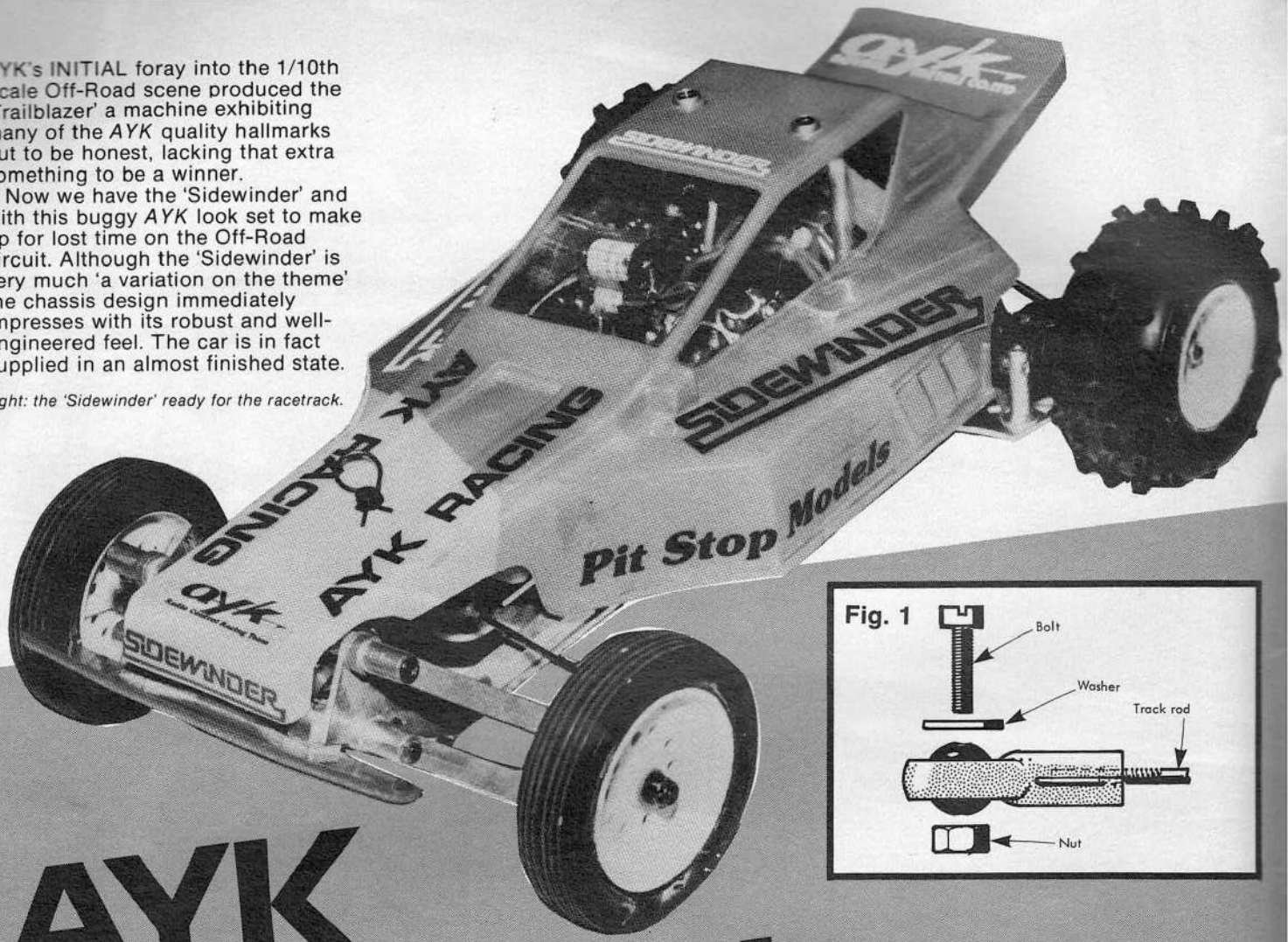
AYK Sidewinder

Lewis Eckett gets to grips with another slippery customer

AYK's INITIAL foray into the 1/10th Scale Off-Road scene produced the 'Trailblazer' a machine exhibiting many of the *AYK* quality hallmarks but to be honest, lacking that extra something to be a winner.

Now we have the 'Sidewinder' and with this buggy *AYK* look set to make up for lost time on the Off-Road circuit. Although the 'Sidewinder' is very much 'a variation on the theme' the chassis design immediately impresses with its robust and well-engineered feel. The car is in fact supplied in an almost finished state.

Right: the 'Sidewinder' ready for the racetrack.



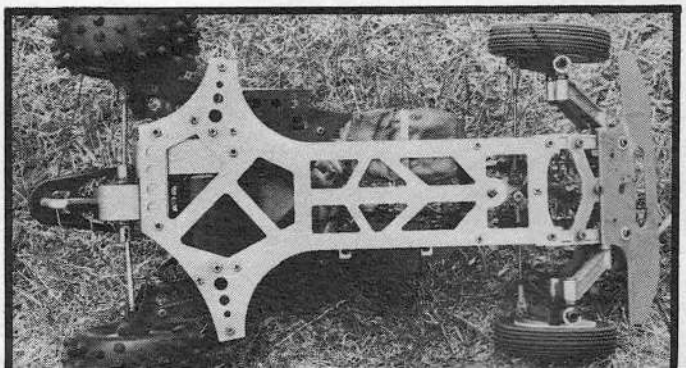
All you have to do is assemble the wheels and tyres, paint the bodyshell and install the radio gear. There isn't really much to say about building the car as most of it is done for you. However some of the design aspects are worth a closer look.

Main Chassis

This is a three-quarter length item manufactured from 2mm thick alloy and featuring cut-outs for lightness. The chassis supports the entire rear-end and shaker plate. The front end bolts on separately. The rear wishbone pivot points are mounted directly onto the chassis and as such, a stronger, firmer base is achieved for the suspension movement.

Rear Suspension

This is another area where *AYK* have done their homework. The suspension trailing arms are produced from tough, injection-moulded nylon, with the alloy right angled damper pivot sandwiched between. These trailing arms look much more resilient to hard knocks and in any case are protected from the front by the chassis.



Right: the chassis underside reveals the well thought out design. The 2mm thick alloy one-piece is very strong and protects the rear suspension. AYK have obviously made this component as light as possible.

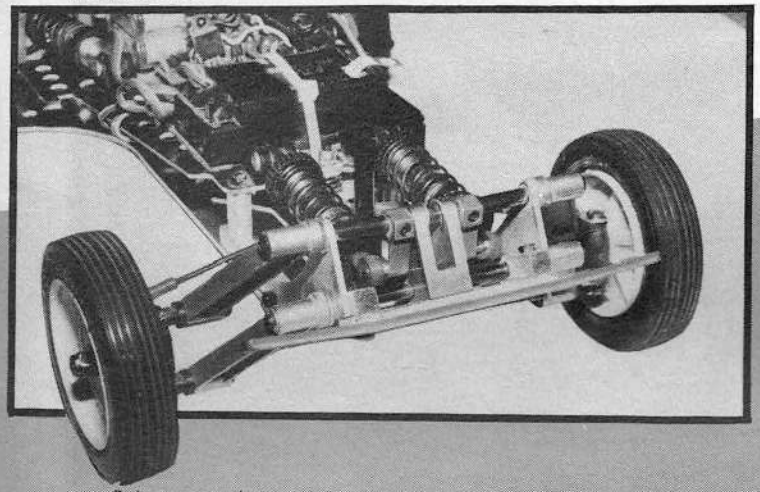
The front and rear dampers are all identical in size and shape and are mounted horizontally as opposed to vertically. The kit contains some extremely thin damper oil which I chose to replace with '3-in-One'. The ride height can be adjusted via the damper collet which adjusts the springs.

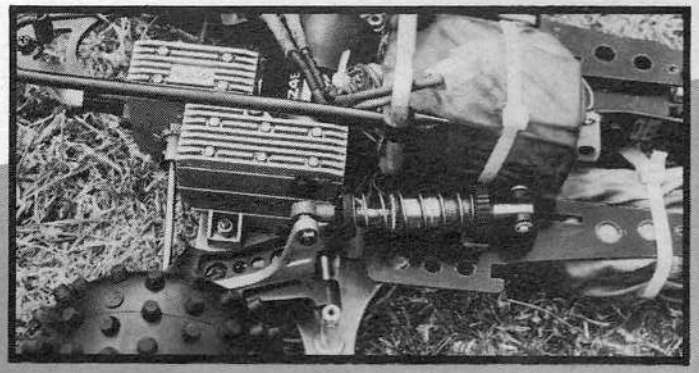
AYK ball-races are available as optional extras. Nevertheless the size needed for the gearbox drive outputs are the same as those used in the *Kyosho* 'Scorpion' and 'Tomahawk'. Unfortunately the rest are of very funny sizes and only the *AYK* importers will be able to help you with these.

A fully adjustable servo-saver bolts directly onto the chassis and connects to the servo and steering blocks using ball-joints. A word of caution here, to ensure that the ball joints don't pop-off install a washer under the screw head. **See Fig. 1.**

Lastly a very small bumper protects (?), the front of the car.

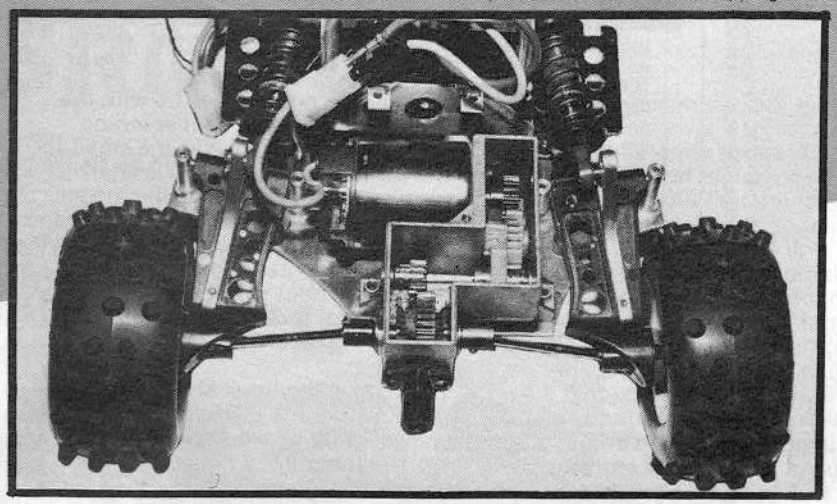
Below: close-up of the front suspension showing ride height cam-adjusters and pivot bars.

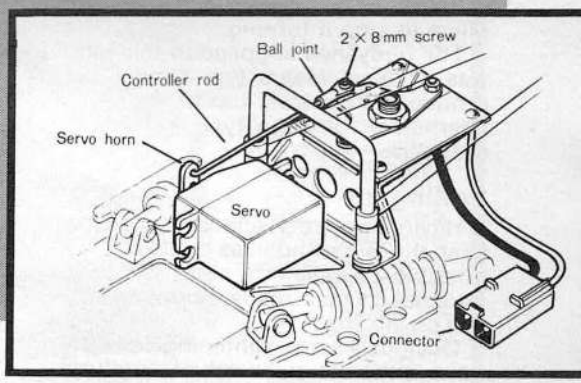




Above: close-up of the rear trailing arm and damper arrangement. The pivot posts are of different heights (higher on the outside) to promote slightly negative wheel camber.

Below: general view of the rear-end and suspension layout. The downward travel of the wishbones is limited by two bump stops. This stops the driveshafts from dropping out.





Speed controller installation.

Gearbox

Once again another well thought out item, although still in keeping with Japanese fashion in such things. The gearbox is a one-piece, cast alloy piece of fairly large dimensions. The motor mounting holes are slotted to allow fine meshing of the gears as well as the use of alternative gear ratio's (not supplied). Three stages of reduction are contained within, ending in the drive to the rear wheels via a bevel gear differential. This latter item, features hefty plastic gears and is, if looks are anything to go by, quite strong.

Drive to the rear wheels is carried by the usual ball and pin drive shafts. All the bearings supplied in the kit are of the sintered bronze bush type.

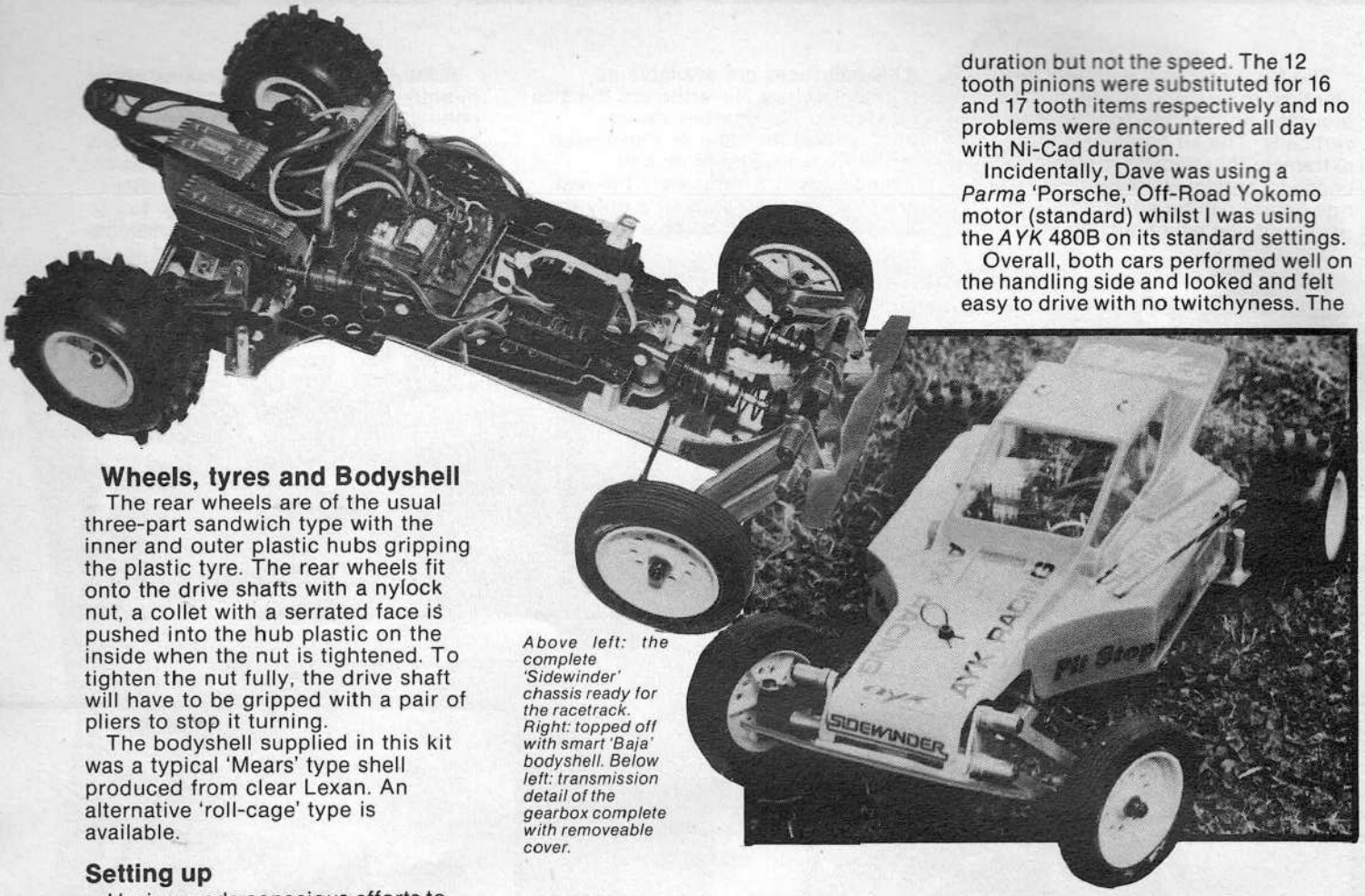
Finally, the 'Sidewinder' kit includes a standard buggy motor which features *Yokomo* style brushgear.

Front Suspension

Two angled alloy bearers bolt onto the main chassis and provide the suspension mountings. Upper and lower trailing arms carry the stub axle blocks. The arms pivot upwards on two steel bars which are mounted across the front end. The dampers project forwards from the shaker plate and connect onto two cranks bolted onto the upper pivot bar. By altering the angle of these cranks on the bar, different ride height settings can be obtained.

R/C Installation

The only real work needed here is the fitting of the steering servo if, like me, to you choose to fit an electronic speed controller. Whilst I am sure that the resistor type, supplied in the kit is perfectly adequate, I had no wish to let a perfectly good (and expensive) 'Laser Turbo Buggy' go to waste in my pit-box. So, in the 'Lazer' went. The steering servo mounts between the chassis and shaker plate on adjustable mounting brackets, this means that most common types of servos can be accommodated. The receiver fits either side of the shaker plate, servo tape and linkages are all supplied. The Ni-Cad pack fits across the chassis mounted on the shaker plate in either side-by-side or stick configuration. Tie warps are supplied to keep the Ni-Cads in place, although I would suggest using heavy-duty rubber bands or strips of cycle inner-tube as an extra precaution.



Above left: the complete 'Sidewinder' chassis ready for the racetrack. Right: topped off with smart 'Baja' bodyshell. Below left: transmission detail of the gearbox complete with removeable cover.

Wheels, tyres and Bodyshell

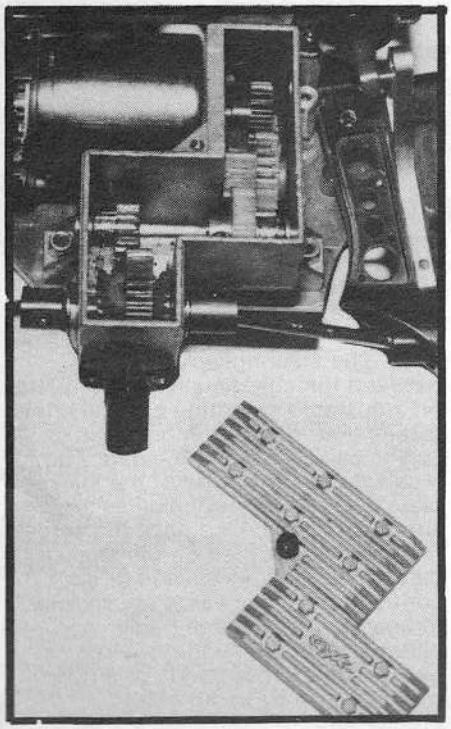
The rear wheels are of the usual three-part sandwich type with the inner and outer plastic hubs gripping the plastic tyre. The rear wheels fit onto the drive shafts with a nylock nut, a collet with a serrated face is pushed into the hub plastic on the inside when the nut is tightened. To tighten the nut fully, the drive shaft will have to be gripped with a pair of pliers to stop it turning.

The bodyshell supplied in this kit was a typical 'Mears' type shell produced from clear Lexan. An alternative 'roll-cage' type is available.

Setting up

Having made conscious efforts to keep the 'Sidewinder' as light as possible, I was slightly perturbed to find that it's race-ready weight was just on 3lb 7oz.

Obviously some lightening can be done, although at the risk of structural weakening. Still, extra weight can be an advantage.



The instructions show what effects the front ride-height has on the car's handling characteristics. High = understeer, low = oversteer and neutral, well = perfect.

The damping, both front and rear is excellent and the springing should be set as weak as possible, however. harder springing at the back will promote more steering bite at the front. It is essential to check that the servo saver is working perfectly and is not binding up. The nylon outer should pivot around the central screw and not with it. Also check that the ball joints are not binding and if necessary free them off on the inside of the plastic cups with a fine file.

On the track

The 'Sidewinders' first outing was at a 'Chesham Hooligans' 'Open' meeting held at their permanent circuit at the 'Royal Oak' pub, Little Missenden. This course has a long, smoothish straight with a very bumpy and tight infield section. An ideal test — I thought!

Of the rest of the entry only one other 'Sidewinder' was present, in the hands of Dave Taylor of *Pit Stop Models*. We had both decided that the kit gear ratio would give the necessary duration but not the speed. The 12 tooth pinions were substituted for 16 and 17 tooth items respectively and no problems were encountered all day with Ni-Cad duration.

Incidentally, Dave was using a *Parma* 'Porsche,' Off-Road Yokomo motor (standard) whilst I was using the *AYK* 480B on its standard settings.

Overall, both cars performed well on the handling side and looked and felt easy to drive with no twitchyness. The only major problems were with the differentials which kept spinning loose. The problem was the small set screw which links the drive shaft outputs together, no facility to lock this in place was available and drastic measures were needed. The end of the screw thread needed to be chewed up, the screw bent slightly and copious amounts of thread lock applied to keep it in place. This solved the problem.

Back on the track and the only disadvantage was understeer but this was slightly unavoidable due to the very fast nature of the circuit.

The qualifying system called for very consistent driving as the best three scores from four were added up to give the eight finalists. Interference and lack of power in my case put me well down but Dave scored three ten lappers, qualified for the final and ultimately came fourth.

In conclusion the 'Sidewinder' has great potential, with a controlled diet, ball-races and experimentation success is assured. This design is there and it will only need someone to take it and win to prove that. On the whole the 'sidewinder' is an instant performer from the box with slight reservations, isn't that the same with all of the other kits on the market?

UK distributor: *SRM Racing,* 140 West Street, Fareham, Hants.

Price approx. £100.00.

1/12th Chassis Handling

Attaining flawless handling is a subtle art. Pete Winton details his approach to the perfect set-u

DOES YOUR CAR handle well? How often have you been asked that question and found your reply limited to, "it's OK. I suppose, bit too much understeer" or some other vague mumblings. I'm sure Gordon Murray of *Brabham* wouldn't appreciate such an answer from Nelson Piquet! The problem is that those two gentlemen spend 365 days of the year racing and have time to converse at length on the subject, to exchange theories and views, and then test them on the track.

The majority of 1/12th racers are long on enthusiasm but short on time, and never have a chance to discuss these matters let alone test them extensively. I'm sure you must know, or have heard, the local racer who tells everyone how it's done (at the top of his voice) and if he is right then the rest of us have been barking up the wrong tree for years!

We all know the feeling; we spend hours hitting the barriers only to find that when the best drivers get on the track the hoses and dots have had enough and duly move aside as the fast boys take FTD and walk off with the trophies! I'm no chassis expert, either in design or suspension parameters, but we will try and explore some of the areas that affect a 1/12th car and reach conclusion that may help you improve track performance.

In all modelling activities where scale is reduced there are certain elements which can be scaled down and those that cannot. Broadly speaking, all dimensions are scaled. The laws of physics cannot be scaled, co-efficients of friction, inertia or the static or dynamic weight of the car, moments of inertia etc., all obey the relevant rules. Their values may well be less than a full size car but the equations used remain the same. Since we cannot afford the complicated test rigs and telemetry equipment needed to measure these figures precisely, we should not theorise on their values, but in everything you do to try and improve your car remember that those laws cannot be defied.

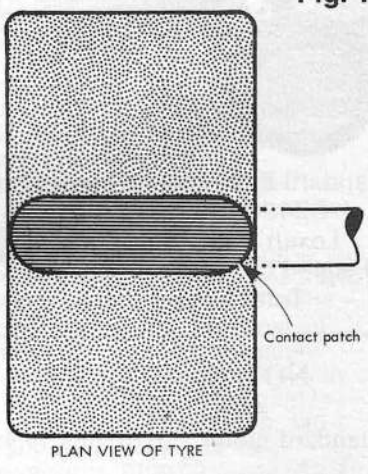
The ideal combination

There are two broad areas we seek to affect, roadholding and handling. These are not the same. Roadholding is the ability to generate as much sideforce as possible in a corner. We call this grip. In the extreme this is measured by travelling in a fixed radius circle as fast as possible until either the front or rear tyres lose grip. Recording the value of the side force generated 'g', (the acceleration due to gravity. 1g = 10 m/s² or 10 metres per second squared). The higher the 'g' force the better the roadholding. The higher forces of cornering can only be generated if contact is maintained between the tyre and the road surface.

Handling on the other hand, is the ability to change direction without losing grip by reducing the contact between tyre and road. This is not an area which can be recorded by one specific value. Its only relative measurement is subjective, relying on lap times. The driver's ability to set fast lap times depends on his method of driving a car, and each driver has different needs. It is reported that Keke Rosberg prefers cars set to oversteer, and John Watson understeer. Each was as effective as the other last year in terms of Formula 1 results.

For those of you new to racing in any form, understeer means, that as the car goes round a course the front wheels tend to travel towards the outside of a corner and the car travels in a wide arc around the turn. Oversteer is the opposite, as the car goes round the corner the front axle tends to turn towards the inside of the corner and travel in a tight arc. In the extreme condition an understeering car will go straight on when you turn the steering and oversteering car will spin round for the same steering input.

Fig. 1



It therefore follows, that a car with good handling but lower roadholding will be faster through a series of corners (that is, many changes of direction) than a car with better roadholding but worse handling. We are trying to achieve a car that handles well, even if that means that the highest levels of grip cannot be achieved. In practice the two factors are inexorably linked and what needs to be found is a balance between the two that leaves us with a car which is easy to control and position on the track.

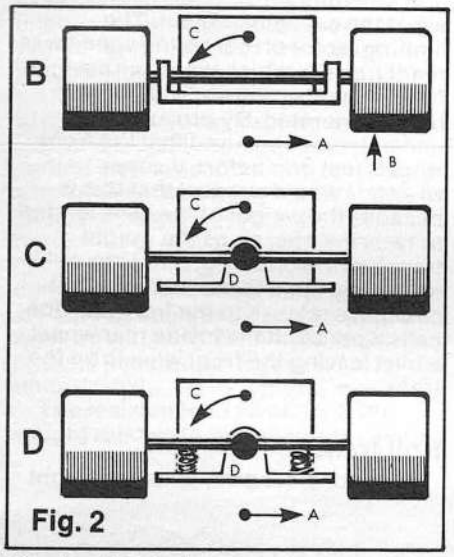


Fig. 2

Contact patch

The only contact between the car and the circuit, (theoretically) is the tyres. The area in which they touch is called the contact patch **(A). (See Fig. 1).** To maintain grip there must be no reduction of the tyres' contact patch relative to the track surface, as soon as such reduction occurs the tyres slip, wheels spin and grip is lost. If this continues for long enough then ultimately the car goes out of control. (time is relative, only fraction of seconds of lost grip are required to put a car out of control). The contact patch does *work* to achieve grip. It can *work* to provide traction (acceleration or braking) or sideforce (cornering). However, there is only a finite amount of *work* it can do, either to provide acceleration only or else to exert side force on the chassis. To do both at the same time the tyre must apportion percentages of its work rate to both traction and cornering. These percentages differ between front and rear tyres which is why rear wheels have a larger contact patch than front wheels on our 1/12th cars, since the former accelerate, brake and corner, whereas the latter only corner. The tyre cannot do as much *work* to accelerate the car whilst cornering as it does in a straight line, since it must do some *work* to generate sideforce. If the total *work* available from a tyre is 100% then it must apportion say 60% to cornering and 40% to traction. If the combination of the two forces exceeds 100% then the tyre will slip or spin. On acceleration in a straight line 100% goes to traction, whilst cornering, as the car freewheels, gives 100% to sideforce. These figures are only examples to illustrate the point. As you can see we must try to keep the maximum area of contact patch on the track so that as the car changes direction grip is not lost.

Momentum and inertia

There are a number of factors that conspire to lift a tyre off the ground and thus reduce the area of that vital contact patch. When a weight is accelerated it gathers momentum and achieves inertia. In order to change the speed or direction of that weight, *work* must be done to overcome the inertia. Think of the roundabout in a playground. When it is stationary, you push hard to get it going, initially to overcome the inertia, once it is moving less energy is required to accelerate it until eventually to keep a constant speed, only the occasional push is required. The same effect is prevalent in our car. Greater effort at the point the car changes direction (the car slows as energy goes into overcoming the inertia) followed by less effort (increase in speed as energy goes into maintaining the radius of turn having overcome the inertia).

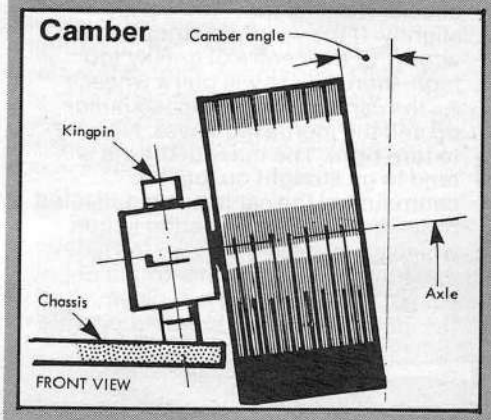
One of the main factors concerns the distribution of weight which definitely affects the ability of the car to change direction. In the main this ability is affected by the *polar moment of inertia,* that is how far away from the centre line of the car the weight is placed. Broadly speaking cars like the *Delta* and *Parma*, with their cells in two packs of three mounted on the outside of the car have a higher *polar moment of inertia* than stick cells placed across the car as used by *Demon, Schumacher* and *Associated*. In theory a higher polar moment prevents the car changing direction more easily, but in practice a good overall chassis design will counteract this effect and produce a car with stable handling indistinguishable from a car with stick cells (lower polar moment). So, once weight is on the move it will keep travelling in the same direction unless a force is generated sufficient to change its direction.

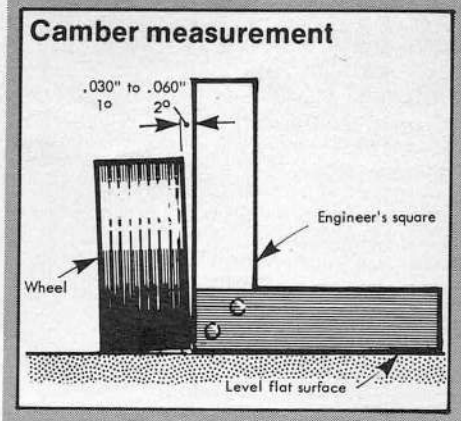
Let's pause a moment to recap. We are saying that we want a car that changes direction well and we call this feature handling. We therefore need to keep consistent and balanced levels of grip on both front and rear tyres as the car travels around corners, without excessive over/understeer to maintain this grip we need the contact patch of the tyre to be as even as possible. But our ideals are being upset by the weight of the car itself. This weight is providing the means of maintaining a

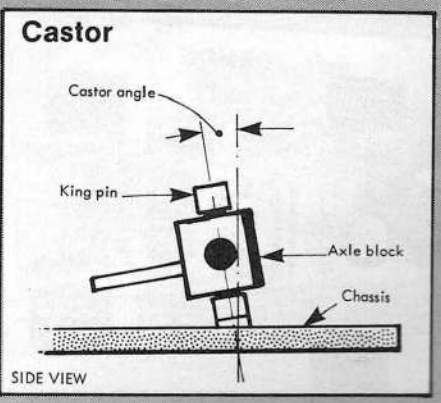
Castor & Camber

Camber is the inclination of the *axle* away from the vertical and presents more of the inside of the tyre to the ground as the car corners. 1° to 2° of camber prevents the inside of the tyre lifting and reducing grip.

Castor is the inclination of the *king pin* from the vertical. High castor angles (5° to 9°) make the car turn in sharply but lead to understeer, under power on exit from the corner Low castor angles gives more understeer on turning in, but tend to hold the radius of turn as power is applied. In general, aim for 2° to 4° when the car is fully laden. Experiment with castor to see which handling traits you prefer.







good contact patch, but as the forces of acceleration braking and cornering are applied to the car, the weight moves, tries to lift the tyre, and upsets the contact patch. OK so far?

The chassis

Now consider a chassis which is a flat and completely rigid plate, a wheel at each corner with all the necessary components mounted between the axles **(see Fig. 2)**. The distribution of weight is important so that we have enough weight acting on the front and rear axles to ensure the contact patch is pushed down on the track. To this end one tends to place most weight on the axle where tyres do most work, as we have said, in our case this is the rear axle. As the car changes its speed or direction this weight is 'thrown' around and its effect on the axles changes as we shall see.

So, as our flat and rigid chassis accelerates, the front wheels lift slightly. If the weight distribution is wrong, or the centre of gravity too high, then the car will pull a wheelie. As the car accelerates, speed builds up and the inertia increases. Now try to turn right. The mass of the car will tend to go straight on, but the centreline of the car is being deflected right. This creates a twisting action which causes the weight to roll to left and try to lift the right hand side of the car **(B)**. This dynamic movement has the effect of transferring weight to the left hand side of the car and thus loses grip and the car slides.

In perfect balance all four wheels slide together and the car loses speed until the tyres can grip again. If the front tyres lose grip first the car understeers, conversely, oversteer results when the rear wheels lose grip first. In either of the two latter events the car has not maintained its desired course and time has been lost. Additionally any bumps in the circuit will cause our rigid chassis to lift a wheel off the track, further reducing our contact patch. If the bumps are irregular and the car speed is high enough then the whole ensemble will leave the ground for short periods. This is useless, if there is no contact patch there can be no traction or sideforce generated.

Flexibility

Those of you approaching your later years will remember the original *Lectricar* which sported just such a chassis made from aluminium. Some bright spark perceived that to improve grip, some flexibility in the chassis should be included to allow the tyres to stay in contact with the ground as the car passed over the bumps.

To achieve this the chassis was allowed to twist about the centre line, whilst maintaining longitudinal rigidity between the axles. Thus was born the *Associated* RC12E, the original *Gemini* and the *Jomac* 'Lightning 2000.' The weight was supported on a shaker plate screwed to the rear blocks and the chassis *waisted* in the middle to allow it to flex. The front of the shaker plate was supported by a post screwed to the chassis forming a rigid box which prevented the chassis sagging. A slot in the shaker plate allowed the chassis to twist relative to the rear blocks and thus the front wheels could move relative to the rear wheels.

These cars were short on rear end grip and thus set up to understeer to avoid the car spinning out. The limiting factor on cornering speed was rear tyre grip, which was insufficient to handle the traction and sideforce being generated. By provoking understeer we ensured that the front wheels lost grip before the rear wheels. I would suggest that this is because the weight of the cells tended to twist the chassis as the weight transfers in cornering. Since the cells are rigidly fixed to the rear axle, but can move relative to the front axle the cells work to lift the inside rear wheel whilst leaving the front wheels on the track.

Roll transfer

Now consider a car where the front

is Talk... Chassis Talk... Chassis Talk.

Demon

Latest modifications item) have served to increase the stiffness of the chassis and work proceeds on providing more rear roll stiffness to give better front-end grip. You could try *Associated, Parma* or *Delta* front springs to vary handling characteristics. Softer springs should reduce understeer.

Parma and Delta

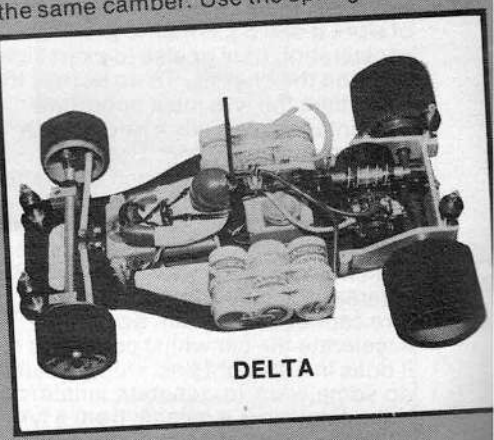
To alter rear roll stiffness means changing the thickness of the rear 'T' piece. Thicker items reduce understeer. At the front, try *Demon, Associated, Parma* or *Delta* springs, again soft springs reduce understeer.

Associated 12iS and ATP 'Omega'

The rear damper can be used as a crude roll stiffness adjuster, tightening the nut reduces understeer. At the front mix and match the springs just as for the previous two chassis, soft springs reduce understeer.

Associated Suspension

Rear roll stiffness adjustment is as for 12iS. At the front it appears that the spring/damper unit is just right, so thickening up the anti-roll bar will promote higher roll stiffness and therefore increase understeer. Because of the geometry of the 'suspension' the car will be smoother in changing direction if the camber is set to about 1° to 2°. Sit the car on a flat surface nd use an engineer's square to check that each wheel has the same camber. Use the spring to



and rear axles are beams fixed to the chassis by a pivot in the middle of each beam. As the car turns right the weight is twisted to the left and the weight tries to turn on the pivot anticlockwise **(C)**. Now, the tyres remain flat on the track and the weight is not trying to lift the inside (right) wheels. The weight rolls to the left and leaves us with a full tyre contact patch. Those of you still awake will have realised that we have set no limit to the amount of roll, and have no method of returning the weight to its original position. Thus on exiting the turn the car will have an unequal weight distribution or worse still, have the edges of the weight dragging on the floor! To prevent this we fit a return mechanism in the form of spring. By fitting a spring on each side of the pivot the weight is held central and horizontal until the weight acts against the springs as it rotates when cornering, returning to the horizontal or rest position when the car straightens up on exit from a corner. **(D)**. Obviously if the springs are very difficult to compress (or high rate) we return to the flat and rigid chassis plate which we see is undesirable.

The resistance to pivoting of the weight relative to the wheels is called roll stiffness. To sum up this section we now have a method of isolating the main weight of the car from the front and rear axles which in turn allows the weight to roll from side to side without lifting the tyres from the track and reducing the contact patch.

The most important feature is to be able to isolate as much weight as possible from the front and rear axles.

Roll reversal

When the car corners there is a velocity of roll. As the velocity of roll increases the weight lags behind the wheels and so the springs must exert a force to bring the weight back into the rest position. Therefore the force exerted by the springs must be as uniform as possible so that the car corners flat and generates even amounts of sideforce. The uniformity of spring-rates allow the mass to roll from side to side (as the car changes direction) in an even manner thus leaving the contact patch on the track. This raises road holding levels and allows quick and accurate changes of direction because the contact patch is not excessively reduced. This is good handling.

The resistance to rolling can be from either front or rear axles but is normally a combination of the two. If it were possible to alter the roll stiffness relationship between the front axle and the weight as well as the rear axle relative to the weight, then we have some means of controlling the *work* the tyres will do. Stiff springs are not the only way of adjusting roll stiffness. Stiffer springs promote wheel bounce which reduces the time the contact patch is on the track. So, if we fit softer springs to soak up the bumps, but connect one wheel to the other with a bar hinged on the chassis we have a torsion spring acting to lift one wheel when the other is deflected. Thus we have soft suspension with high roll stiffness. Such a device we call an antiroll bar. In Formula 1 cars antiroll bars are featured on the front and rear suspension. Their effect can be adjusted from inside the cockpit which allows the driver to balance his roll stiffness to take account of the change in weight of his car due to the lightening fuel load and tyre wear relevant to track conditions. Thus, he is able to promote understeer or oversteer during a race and adjusts, to maintain the preferred handling characteristics.

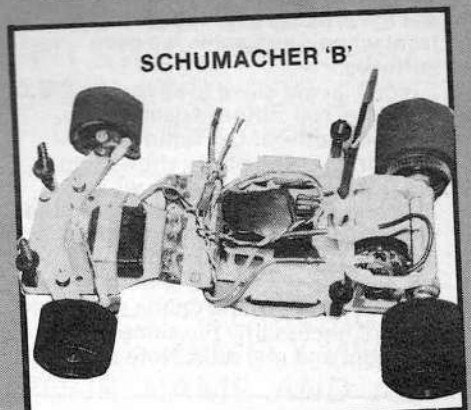
▷

..Chassis Talk... Chassis Talk... Chas

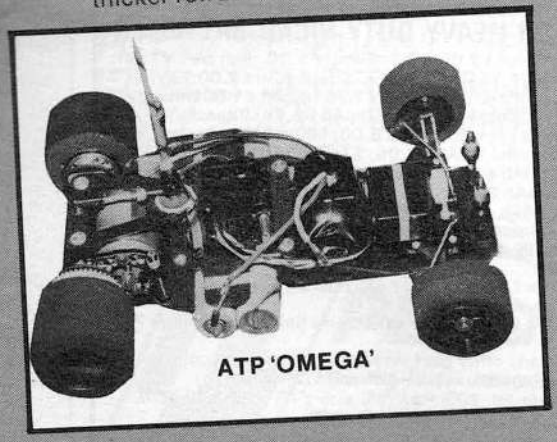
alter ride height as tyres wear, but when you increase the ride height remember to re-check wheel camber. Check camber with cells fitted.

Schumacher

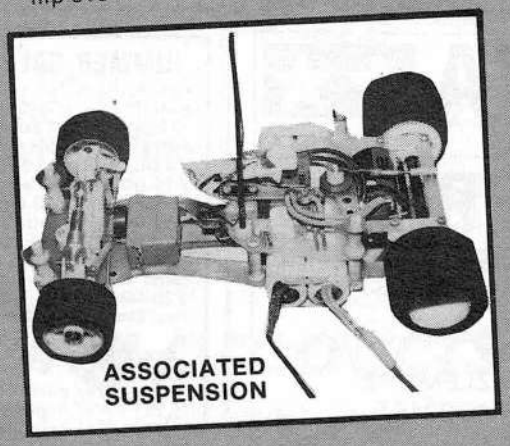
Rear roll stiffness can be increased by tightening the outer two screws on the rear strap equally. This promotes oversteer. At the front on both the 'C Car' and 'Clubman's B' tightening the springs will tend to increase understeer. Note that changing to a thicker roll bar will have the same effect. On the 'C Car', set the lower stops such that 1° to 2° of camber is present when the car is fully laden. On the 'Clubman's B' no lower stop is provided, but one could be fitted. Castor angle (king pin inclination) should be 3° to 5° when fully laden. As a refinement, try increasing the rear ride height to promote oversteer. As the rear is raised this leads to increased weight onto the front wheels in cornering. Beware that this also increases roll and may cause the car to flip over.



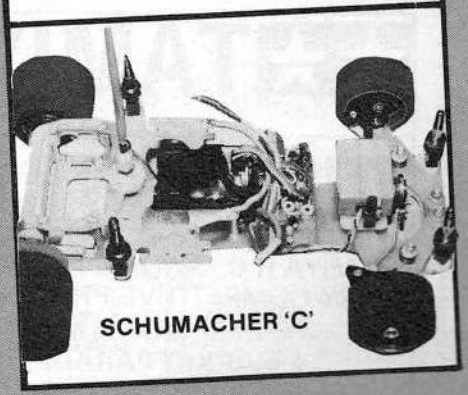
SCHUMACHER 'B'



ATP 'OMEGA'



ASSOCIATED SUSPENSION



SCHUMACHER 'C'

Setting up

Now let's see how this can be applied to a 1/12th car. Assemble your car complete less the body and set it on flat surface, making sure also that the surface is level. Note that the largest weight, the cells, is situated close to the rear axle, that the cells and the receiver/speed controller are isolated from the wheels. On some chassis you will find springs on the front axle.

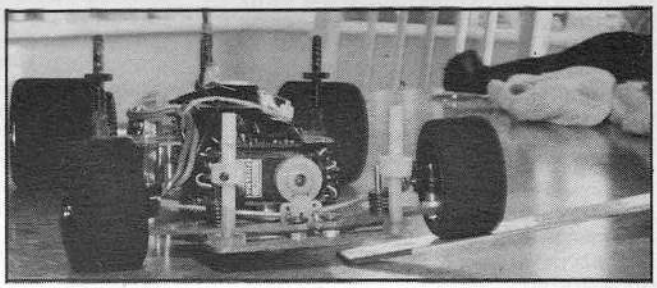
Others rely on the chassis for spring effect, notable of course the Tom Morgan folded Lexan Monocoque design. To check the independence of the weight from the wheels push down on one end of the cell pack. You will notice that both the front and rear springs deflect but all four wheels remain on the ground.

We need to check that all the springs in the chassis are having an equal effect on the roll stiffness. The classic method up to now has been a 'tweak board.' This is not entirely suitable since it only really measures weight distribution. When the old '12E's,' 'Gemini' and 'Lightnings' were around with their rigid rear pod systems, the tweek board was fine because it told you how the weight was spread on the front wheels. Since the chassis *was* the springs in these cases, if the front was not level then the spring was not exerting an even force on each wheel. By redistributing the weight, or 'shimming up' the chassis, we evened out the effect of the 'spring' on the front wheels and achieved even stiffness.

You can get close to a reasonable check on roll stiffness using the 'wedge' methods but remove the cells first. As the photo shows you place a wedge under each wheel in turn and measure the distance up the wedge each wheel will go before another (usually front) wheel lifts. The distance up the wedge should be the same for each wheel on the same axle, but not necessarily the same between the front and rear axle. Note also that when lifting front wheels you are testing rear roll stiffness and vice versa.

Tyres

Most of the adjustments that you can make nowadays must come from track testing. First, however, a word about tyres. In a pneumatic tyre, the deflection of the contact patch by cornering sideforce is affected by the construction of the sidewall. Thus, chassis designers can build suspension systems which are in harmony with the characteristics of the tyre sidewall whilst manufacturers of tyres can formulate a compound onto the periphery of the tyre which gives the maximum grip commensurate with wear and the nature of the track surface. We do not enjoy such consistency. As the 1/12th tyre wears away the ratio of the tyre width to height (called the 'aspect' ratio) changes so that we have constantly changing sidewall-characteristics. For our purposes regard the tyre only as a method of changing grip, altering ride height or changing overall gear ratio. However it is worth noting that well worn tyres (below say 46/45mm diameter) will tend to cause more understeer than new tyres.



Right: a simple 'roll stiffness' gauge manufactured from a piece of alloy strip. The long side is calibrated to measure accurately the 'roll stiffness' and chassis tweak.

On the track

Now put the car together and start off round the track. If the predominate characteristic is understeer then the front axle roll stiffness is high, and the weight is causing a reduction in contact patch at the front before the rear. If there is a lot of understeer try a softer front tyre compound first. If however this change causes oversteer, or you have only a small amount of understeer then make an adjustment to the front roll stiffness to change the grip. This is normally achieved by softening the front springs (reducing roll stiffness) but as you will appreciate you can also increase the rear roll stiffness to make the rear wheels lose grip a little earlier.

Whatever tyres you use, try to stick to your choice as much as possible. This makes comparison easier between circuits and also means that the results of adjustment or development can easily be assessed. Also you must be consistent in applying your silicone coating or tyre treatments, since their application has a profound effect on the amount of grip generated. You can vary the treatment to alter grip and thus oversteer/understeer but there is no substitute for getting the chassis balance correctly by setting the springing right.

Hopefully the explanation and brief handling guides for each chassis design will pave the way for your success. Any comments concerning this subject (for and against!) will be gratefully received.

Taking Stock

by Mike Chilvers

PEOPLE OFTEN ASK me why the race reports they read are of meetings that took place some three months prior to the current issue of Model Cars. Can I please try to explain again that the copy date is such that I am writing this in the first week of July for it to be out in the shops in August. Hence the meeting reports and other relevant information has to be with me before that date, subsequently, they are bound to be June meetings. It does have some advantages as one driver said to me the other day, "It's good to read the report of a meeting you took part in, if only to see how badly you had done!"

Well we have just come to the end of 'flaming' June, and the racing has been like the weather, quite hot, with Cliff Emms and Steve Talbot being the two drivers who have been setting the pace in the 1/8th field.

1/12th scene

Not a lot has been happening this month on the 1/12th front, due to the postponement of the Liverpool National.

Below: Paul Dudley's car makes a bid for the lead from the back of the field at the Bournemouth British Championship meeting.

1/8th Stocks

Stockcar racing in focus

However, there have been a few murmerings about the legality of some of the motors being used, or at least on the market and it may not be long before someone suggests that the winning drivers have their motors checked. I must admit that it always annoys me to think that some people are always looking for a way to beat the opposition even if it means breaking the rules, particularly in a sport with no money involved for the victors. Come on lads, play fair, stick to the rules and let's not have a lot of hassle.

The club scene continues to prosper, with more drivers joining in the fun and as winter approaches no doubt more will move indoors for their racing. The electric side could benefit from demonstrations such as that at Nottingham and it would be nice to see them at the Model Engineer Exhibition at Wembley, where electric stock cars are the only form of electric powered cars that have not been seen.I would always suggest to clubs that they affiliate themselves with the RSCA, it only costs £5 and it does enable drivers to race at more meetings and allow the club to hold more important meetings itself.

British Championship 1/8th. Bournemouth. July 1

The British Championships at Bournemouth were held amid the July heatwave and so resulted in an entry of 44 drivers making it down to the south coast amidst the holiday traffic. Apart from the expected southern entry there were drivers from the midlands who had come as much for the sunshine of the seafront as the racing. Some drivers found their way to the track for a spot of practice on the Saturday afternoon whilst the lure of the seafront proved too great for others.

Having been 'down south' before when Saturday had been fine and dry only to find it pouring with rain on the Sunday, it was a pleasure to wake up and discover Sunday was a bright clear warm day. After a quick breakfast it was off to the track to see if a bit of practice could be got in prior to the start of racing.

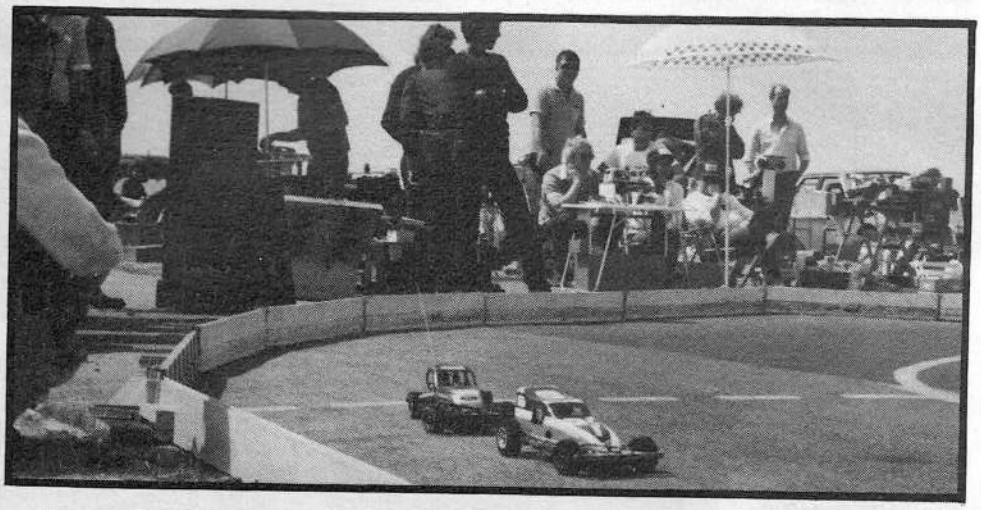
Once at track side the quality of the entry could easily be seen with most of the UK's top drivers present.

At this stage of the proceedings several drivers were unhappy with their tyres, no one seeming to feel that anything was working on the track. However practice was soon over for briefing and cars were scutineered ready for round one of the heats. As usual all drivers were to have four heats with the best three counting, the fastest four drivers would go through to the final, the next six fight it out for the two remaining places in the Consolation Final.

Above: Steve Talbot's car at speed around the circuit. Steve was defending British Champion but came sixth this year.

So racing began. Steve Talbot out in the first heat was going very quickly and recorded a 40 lapper, but as the heats progressed something appeared to be very wrong with the lap scores

that were being given. Several polite protests were put in before the organisers got to the root of the problem. The problem was that the cars were going too fast for the electronic lap counter! As is common with such machines a delay mechanism is built in to prevent the accidental double pushing of the buttons. On most machines this is set for about two seconds, but the Bournemouth one, which is also used on the formula track, had a longer delay which meant that the faster cars were beating the



Above and left: close exciting action from qualifying heats at Bournemouth. These cars were circulating so fast that the computerised lap-counting system couldn't keep up.

machine. A quick meeting of the drivers and organisers was called and the Round 1 scores declared void. It was agreed to proceed with manual counting over the remaining three rounds, with the drivers' best two to count.

At the end of the first fully completed round it was Steve Talbot who led the field with a score of 42, followed by Cliff Emms on 41 with Paul Dudley, Roy Crowson and the gear-drive car of Dave Perou all on 40. Just behind on 39's were Andy Fulford and Nigel Forster. In the next round the racing was very close, as emphasised in the final qualifying round when seven drivers finished within a lap of each other.

The four drivers who had made it through to the Final were Cliff Emms and Steve Talbot both with 81 laps from their best two heats, followed by Paul Dudley on 80 and Roy Crowson on 79, Roy having won a run off with Dave Perou who had also scored 79 in qualifying, and both had had 36 laps as their other heat score. The six to fight it out for the two remaining places were of course Dave Perou with his 79, Andy Fulford and Nigel Forster both with 78, and Ivan Congreve, John Elliott and Tony Bunn all with 77.

The closeness of qualifying was evident once the Consolation Final got underway as the race was very close at all times. As a result the drivers did tend to get in each other's way, eventually enabling Andy Fulford to cross the line in first place with 40 laps, being followed home by Nigel Forster on 39. Just missing out were Ivan Congreve and John Elliott who both recorded 38 laps, Ivan being placed just ahead of John. In fifth was Tony Bunn on 37 with Dave Perou having his car fail on him in the last few seconds recording 35.

As drivers waited for the cars of Andy and Nigel to cool down they packed away gear so as to be ready for what promised to be a very good, fast race. They were not disappointed. The 1984 British Championship Final proved to be a very fast, close race with little to separate the drivers for several laps. Steve Talbot became the first casualty after 13 laps when his car was pushed quite solidly into the barrier, stalling the engine and knocking off the air filter. In the pits Steve concluded that he had missed too many laps to get back into contention and was not prepared to run his engine without the filter. So back on the track it was clear that we would have a new champion, but who? Gradually, Cliff was breaking away from the field and really moving, extending his lead and lapping the field who were still closely bunched behind him. Soon he was snapping at their heels again, risking being taken out by the close fighting group he was about to overtake yet again, but he made it. The final hooter went, signalling the end of the race, and Cliff Emms was declared the new British Champion with 53 laps, second was Andy Fulford with 51, third Nigel Forster who just beat off fourth placed Paul Dudley, both with 50 laps, with Roy Crowson fifth on 49, and Steve Talbot in the pits with 13.

Congratulations to Cliff, who on being presented the trophy commented that the racing was getting harder and harder. The atmosphere in the pits was terrific, with a tremendous spirit of friendliness between all the drivers. The driving standard was very good making the job of marshalling the easiest I have experienced for a long time, I think I handled two cars the whole afternoon, and that was doing more than my share of marshalling! (Well I had to do something!) What of my performance I hear you ask, well the first round of heats was abandoned before they got to my race. In the first outing the carburettor came loose after four laps and as I was starting the engine for the second heat the flywheel came off. Everything held together for the third outing but only a 36 was recorded. My best performance of the day was helping to stamp out a heath fire on the common whilst the fire brigade arrived.

Thanks to all who made the event a meeting to remember.

Driver Profile. Peter Micheli. RSCA No. 31

When I first contacted Peter with a view to writing this profile his comment was, "Why me — I've not won anything?" However I managed to assure him that it was not only track success that I was looking for. There was some- ▷

Right: a shot from the 1983 Brighton International Meeting showing the winning team. Peter Micheli is shown on the extreme right hand side. Some character!

thing about Peter that struck me when I first saw him down at Brighton for the Series Final in 1982 that made me think that here was a man of character and interest. But, it was not until I set about this short profile that I found out just how much 'character.'

Peter's racing interest began in 1981 at the Sussex Radio Stockcar Club, with a *Kejon* car powered by a *Veco* 19, with *Acoms* radio to control it. In this first season Peter progressed from white grade to red top, ending up third in the club championship. To start the '82 season Peter changed to a *Mardave*, and also changed radio gear to *Futaba*, but stayed loyal to his *Veco* 19's. The season did not prove too successful racing at mainly club level, but he did travel to Italy for the European Championship, only for his car to be damaged in the first heat.

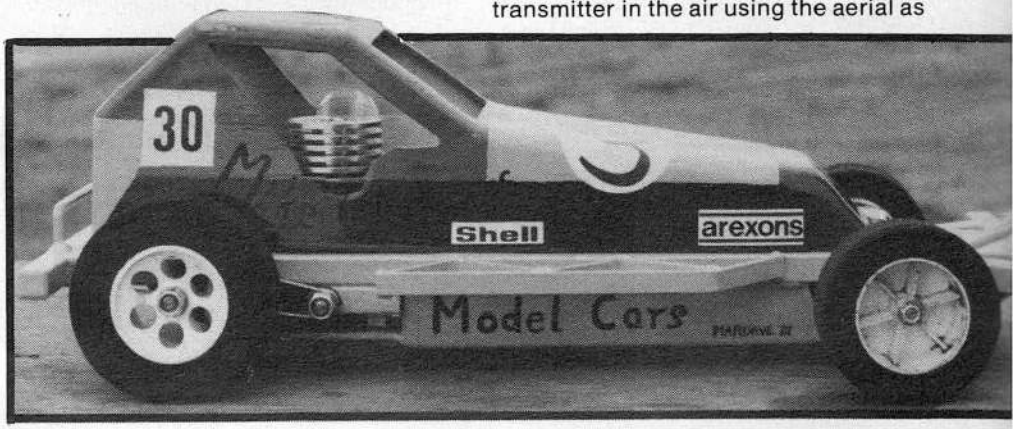
1983 was Peter's best season so far with a total of 20 odd trophies, including a first place in the Brighton International, where he beat both Paul Dudley and Graham Lawrence in the Final for the first time ever. Mid-way through the season he changed cars, this time to a *Puma*, fitted with an *OS* 21 engine. He went over to Holland for the European Championship, and wrote the article on the track that was published in the February '84 issue.

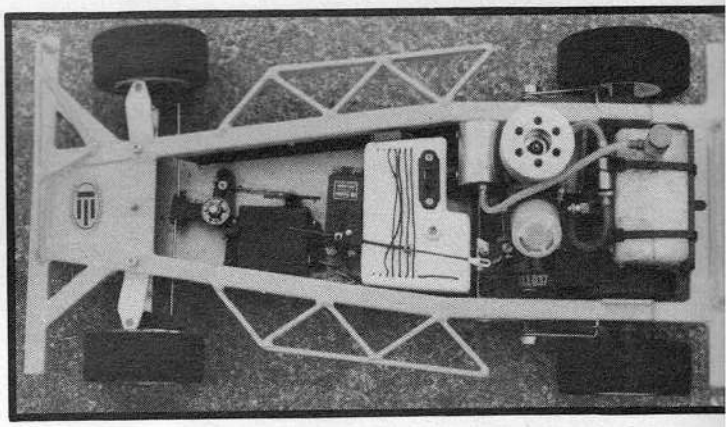
So far, this season has been a bad one, with little time available to race or prepare the car. He attempted to defend his title at the Brighton International and though he qualified fastest a servo broke in the Final. At the time of writing a new car is in the process of being built, again a *Puma*, with *OS* power and a new set of *Futaba* radio gear. He says he will put this year down to experience, and hopes to be back with a vengeance next year. He is going off to Italy for the World Championships, which will have been run by the time you read this, combining the visit with his holiday. In some ways it will be a working holiday, as he has been asked to do a write up of the event for the *MG Owners' Club*, of which he is a member, and is preparing an *MG* body for the event. So once again we see the way people are trying to publicise the sport.

When asked about hobbies Peter said his main one was to try to keep his *MGB* 'Roadster' running, and it is this that he is taking to Italy, or should I say it is taking him. When not looking after that he likes to try to get some tunes out on his electronic keyboard, and growing the most colourful weeds ever seen! He says his trouble is that he is a dabbler, as he also enjoys photography, fencing, (no not the stock car sort, the other type), horse riding, river cruising, boozing and conjuring — he claims to even have been paid to appear! In his modesty he claims not to be very good at any of them.

For the last 13 years Peter has been working in computers, currently being a programming manager for a firm in London. Prior to that he had a variety of jobs and for a few years was a professional stunt man, and still runs a small stunt team, which up to a couple of years ago worked regularly. But, as he put it, "the gut is expanding and the bones getting brittle," so they only do half a dozen gigs a year. Peter specialised in horse stunts and sword fights. He has appeared all over Europe with the jousting team, The Knights of Griffon; he has done films, TV, adverts, promotions etc., nothing he says 'spectacular' just good fun. He has even done a sword fight for radio once, for their special effects department, which must give him a unique twist to the stunt man's job — a wireless stunt man!

As I said at the beginning, I knew there was more to Peter Micheli than met the eye, now I know what it is. So drivers beware, take a good look at that man standing next to you driving car number 31 and watch out; he might leap over the barriers at you waving his transmitter in the air using the aerial as a sword. However I doubt it. Peter is more likely to be found quietly getting on with the job in hand, or if down at his home club giving a hand if it is required. I hope all goes well in Italy, that the MGB makes it there and back, and that you have better luck with the stock car than on your last visit. No doubt we shall hear the name of Peter Micheli again.





Above: nicely decorated bodyshell atop the Mardave MkIII stockcar. Note very fine ground clearance and low centre of gravity. Right: MkIII without the lid on. Note revised R/C crate with servos now external. Irvine .20 fits in nicely with bellcrank throttle arrangement.

Below: Irvine .20 fitted with Mardave clutch, twin-pipe silencer and SG air filter.

Mardave MkIII and Irvine 20

The prototype chassis' of the *Mardave* MkIII have been in the hands of Scot Grocock and Ken Cornish since the Leicester European Championships at the end of April, but I only managed to complete the building of mine the other week. As mentioned earlier the chassis design is only in its early stages, but is already much stronger in its basic construction having the undershield welded in place.

The actual process of constructing the car is easy as it is all welded together. The rear axle fits the old type of rear swinging arms, so all that is

required is to fit the pulley — I used one from *Kingsway Kar Komponents*, as at this stage am not sure if Mardave are going to produce one of their own. At the front end I fitted one of Mardave's new front axle beams which is of the moulded type. The production of this has minimised the risk of air bubbles entering the mould and so weakening it. This was easily fitted. A *PB* servo saver was used as one was around at the time, though *Mardave* are bringing a new one out for the kit when it comes on the market. Out of habit I used piano wire for the linkages, though again I understand *Mardave* are planning to improve upon this.

By far the longest task was to install the radio gear. This was due to the fact that I am used to the radio crate that has been standard with *Mardave* for so long. The new car may be sold with two possible options, a redesigned crate that will hold all the usual gear, including a flat mounted servo for the steering and an upright one for the throttle. Or the second option of a small crate for receiver and battery, leaving the owner free to mount the servos at will. As the redesigned crate for the first option had not been moulded I had no choice but go for the second option — if you see what I mean! It took some time to work out the correct placement for everything, not helped by the fact that I had to allow for the exhaust pipes which intrude into the area of the radio gear. Eventually a home was found for everything though a primitive home made mounting for a throttle bellcrank did have to be produced. I have since heard from *Mardave* that a mounting will be provided on the production kits. A standard *Mardave* fuel tank and mounting plate was used, the lugs of the mounting plate first being removed so that it fitted tight to the rear of the car, which is now two rails thick. Now all that remained was the engine.

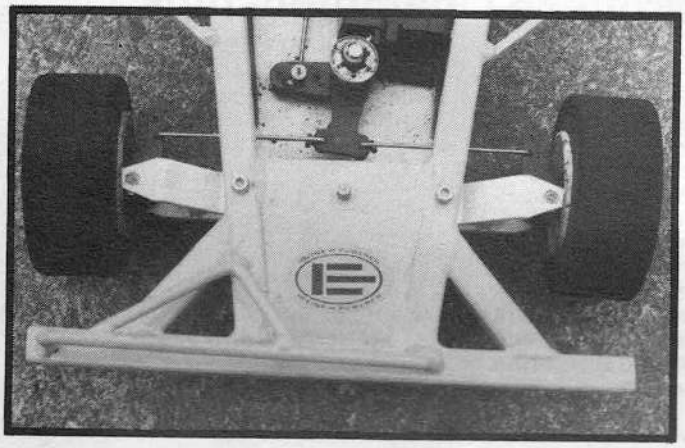
Having heard that *Mardave* were building the car around the *Irvine* car engine (it will accept any) in an attempt to keep the car all British, I thought it would be a good idea to obtain one for the new car. The latest *Irvine* 20 has improved upon its predecessors and at the moment are flying in the hands of people like European Champion Roy Crowson and other fast men like Steve Talbot and Bob Clayfield. The new engine is well designed and ideally suited to the task of powering a stock car, and with the new engine mounting of the 'MkIII' there is no risk of putting a strain on the crankcase. Engine mounting is via blocks which have to be drilled. Not being too fond of drilling and tapping I settled for drilling and bolting the engine in, widening the hole at the bottom for the head of an allen bolt with the nut at the top. This has worked very well, and with the engine bolted firmly into its housing on the chassis looks very rigid.

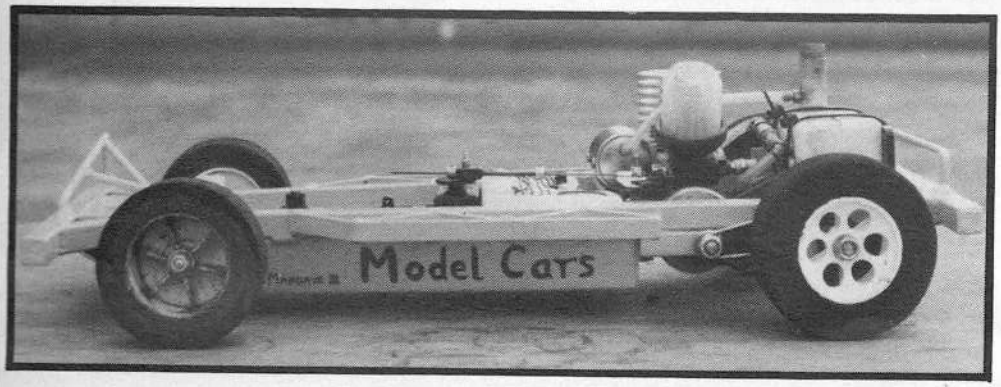
The only remaining jobs were to drill through the undertray to let the exhaust pass out, and attach some tubing to the pipes of the silencer — one of *Mardave's* new ones for the *Irvine* — as the pipes are not long enough to pass through the undertray. This is not a design fault, if the pipes were long enough to pass through there is a risk of them grounding and causing damage to the engine. The other remaining job was to fix a front mounting post, and then it was all systems go.

I must admit to being pleased with the finished results. As the photographs show, the car has a very low ground clearance, and all parts are well down between the chassis rails giving a low centre of gravity. The car looks heavy but in fact is well within the RSCA limit.

In the car's first outing at a club meeting the other week it took me to third place in the Final — my best result so far this season, with no trouble from the car itself, apart from a kingpin which popped out, but this was a temporary job as the *Mardave* ones had not arrived. They now have and with an 'E clip' on the top and nut on the bottom I expect no further trouble.

So what about the future? It would appear that the 'MkIII' will prove to be a very competitive car, and once the little modifications have been carried out to it following its initial testing I hope to see it on the market in the model shops before too long. As for the *Irvine* 20, well this is an engine with quality, home produced, and easily available spares — need I say more?





Left: close-up of the Mardave MkIII front-end showing new front axle beam PB servo-saver is used with wire linkages. Below: another shot of the MkIII minus bodyshell showing the low mounted R/C gear. This gives total protection to the electronics and keeps the weight as low as possible in the chassis.

Racing round and about

As this issue will be with you in early September then there is time to go along to the Nottingham Craft Fair on September 15/16 to see the 1/12th racing, and if you get the copy early enough you could go to the National Meeting at Stoke (Biddulph Moor) on the ninth.

The big meeting this month for the 1/8th boys is the RSCA Championships at Lilford Park on September 16, when I shall be looking to see if a Lilford driver can hold onto the title as they have done for the past three years, Roy Crowson in '81 and '82, Ivan Congreve in '83, or whether Steve Talbot will win as he has done on his recent visits to the track. The other major meeting of September is the Series Championship which has its final round six down at the Sussex RAC venue on September 23.

The remaining major meeting of the season is the Champion of Champions meeting at Keighley on October 14.

Well that wraps it up for this month. Please keep your comments coming in, and especially those of you running 1/12 clubs, do let me know your whereabouts as we approach the winter season. Any replies you require please enclose an SAE when you write to me at 85 Elliott Road, March, Cambs.

See you ovalling around.

by Bill Burkinshaw

1/8th Off-Euro-Cha

All the information and gory details from the third European Championships

DRIVER AGAINST THE circuit seems to have been the theme of the previous two 1/8th European Off-Road Championships and this circuit provided by the Swedish organisers at Skanor Falsterbo for the 1984 event over the weekend of July 21/22nd continued the tradition. Scandinavia, land of lakes, pine forests, smorgasbord and blonde haired natives looked to be an idylic setting for the 1984 event but sadly, although the actual race organisation proved well up to the task of organising the event, pre-planning particularly from the point of view of general comfort of spectators and competitors was lacking. Whereas the 1/8th scale European circuit racing organisational system seems to have now developed into a slick machine for producing a series of memorable races, for many competitors who had to "rough it" in a field alongside the circuit this weekend, the event may remain memorable for the wrong reasons.

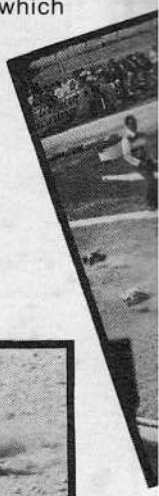
Pre-event planning should have lead EFRA (European Federation Radio Auto) to realise that the inexperience of the Swedes should have been taken into account, for they were well aware that the circuit would suffer a tremendous degree of attrition during the preceeding weeks practice. Four rounds of racing were not practical if the track was to have been properly maintained during the main event.

A peaty soil base covered with six inches thickness of rolled gravel cuts up at an unbelievable rate as the high-power, four-wheel-drive cars circulate, leaving the track looking like a rutted mountain track. With sufficient time allowed between rounds of heats the problems could have been contained as demonstrated during the second day of qualification. As it was, the only real chance of a good qualification time for most drivers was in their first heat, run on a track in virgin condition following overnight repairs.

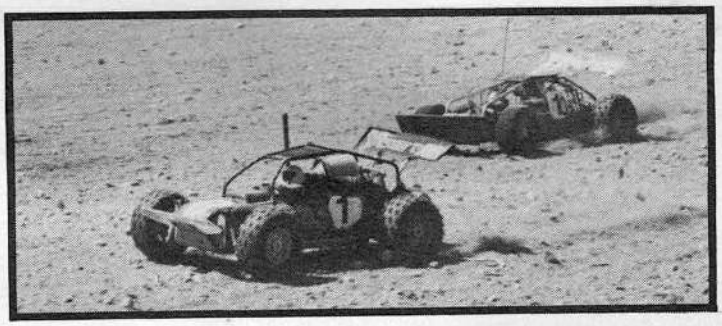
Pre-race forecast

As has already become common even in the comparatively new class of R/C racing the factory teams were well in evidence — the Italians from the *S.G.* and *Garbo* factories had been at the circuit for the best part of a week. The brand new 'Gepard' was expected to do great things, but from the incredible pile of broken drive gears evident in the *Garbo* pit area, all was not sweetness and light. Surprisingly, the *S.G.* presence was very low key, far outshadowed by their rival compatriots and the *Serpent* team of "Cobras". A new *Yankee* car, albeit a development of the 1983 Euro Champs car was there in force, plus the inevitable smattering of virtually every other buggy currently in production.

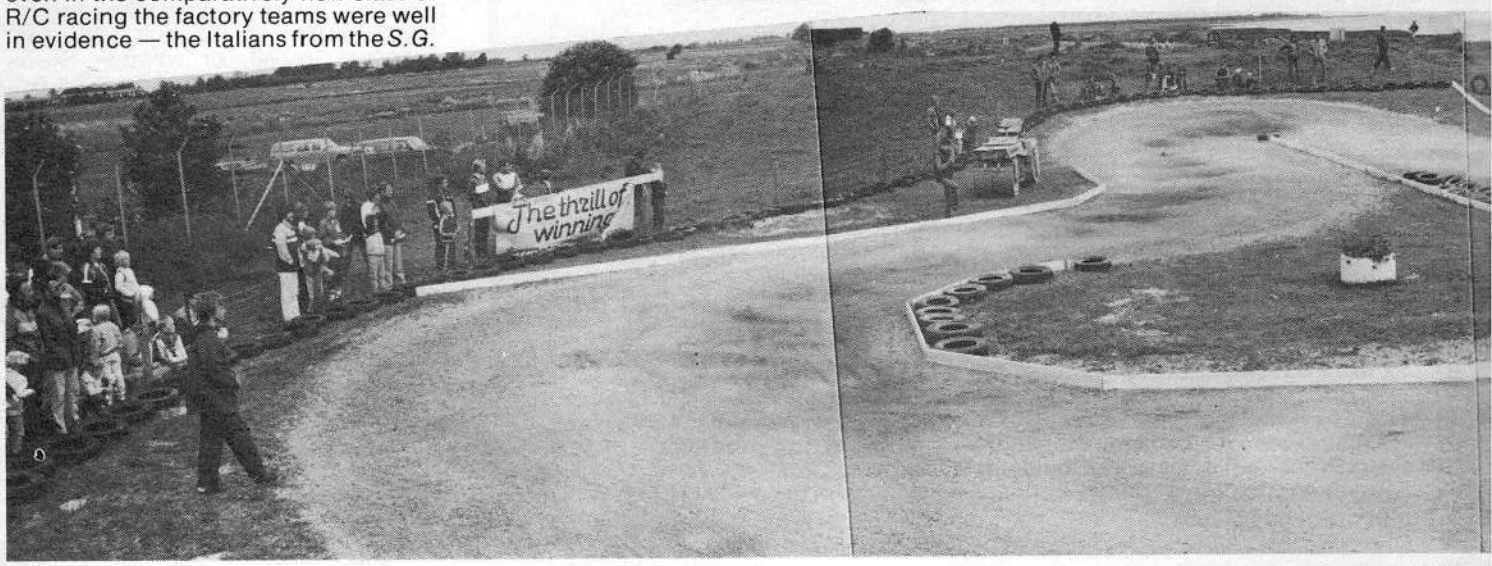
The race format involved a period of free practice fairly well contained by a system that called for each driver to place his registration card into a clip by the rostrum. Ten clips were provided each accompanied by a pad on which



Right: Le-Mans style starts used for all the finals from 1/16 up to the main event.



Right: on the way to victory, Pedro Marinez drove a superb race demonstrating surprising maturity. Below: the Falsterbo circuit panorama.



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Above: Lap 1 Corner-1, the big one! an early lead gives a psychological advantage if nothing else and are these drivers psyched up!

frequencies were written. The procedure was to wait for a free clip, then, if the frequency was available, write the frequency being used on this pad provided and then drive. This system did get a little out of control as several cards were placed in the same clip allowing more than the 10 drivers catered for to take the track. A total of 78 frequencies were in use which did ensure that there was in fact very little queuing for practice.

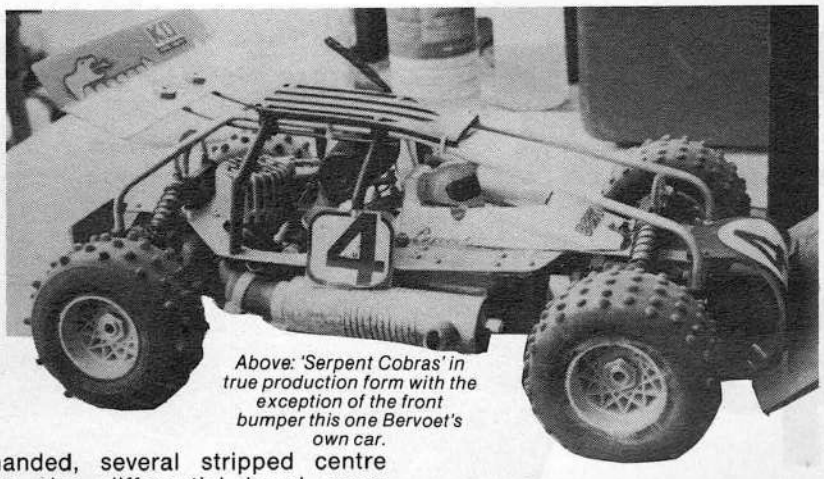
Following the free practice session the track was in fairly good condition for the following formal sessions. Each driver was able to take 10 minutes on the track with all the drivers who were to be in his heat during the qualification heats proper, thus meaning that any problems of interference would be sorted out. With many instances of R/C equipment operating in 10 KHz spacings, there were no interference problems. Good quality FM equipment was almost universal with 27, 35, 40 and 72 MHz frequencies being in use.

The ten minute sessions were followed by a further full round of timed five-minute sessions which enabled the lap counting system to be exercised and also enabled drivers to see how their performances matched up to the standards required. Only two drivers managed ten laps of the circuit, Martinez of Spain, the current Euro-Champ, driving his, *anything but* 'Yankee' 4 × 4, and Pieter Bervoets driving his *absolutely Serpent* "Cobra". Precursor of things to come!

The British team of Russell Buckner, (*S.G.* 'Leopard'), Bill Burkinshaw (*Serpent* 'Cobra') Tommy Chung (*Garbo* 'Gepard'), Steve Marr (*Serpent* 'Cobra'), Gary Marsden (*Garbo* 'Gepard') and Tony Marsden (*Garbo* 'Gepard') Richard Stitson (*S.G.* 'Leopard') were by and large competitive although Bill was to experience the first taste of the engine problems that were to follow him throughout the event. ▷

Racing Report

Once the practice sessions were over it was obvious that the circuit was in dire need of repair. In places the rolled gravel surface was totally thrown to one side leaving the soil surface exposed. The ruts and bumps made any sort of fast driving totally out of the question. A lengthy meeting of representatives of the National Associations involved resulted in a compromise decision being taken that allowed Race Director, Tomas Prodenius, to remove the tops of the worst bumps and generally scrape the track surface as smooth as possible.



Above: 'Serpent Cobras' in true production form with the exception of the front bumper this one Bervoet's own car.

Qualification

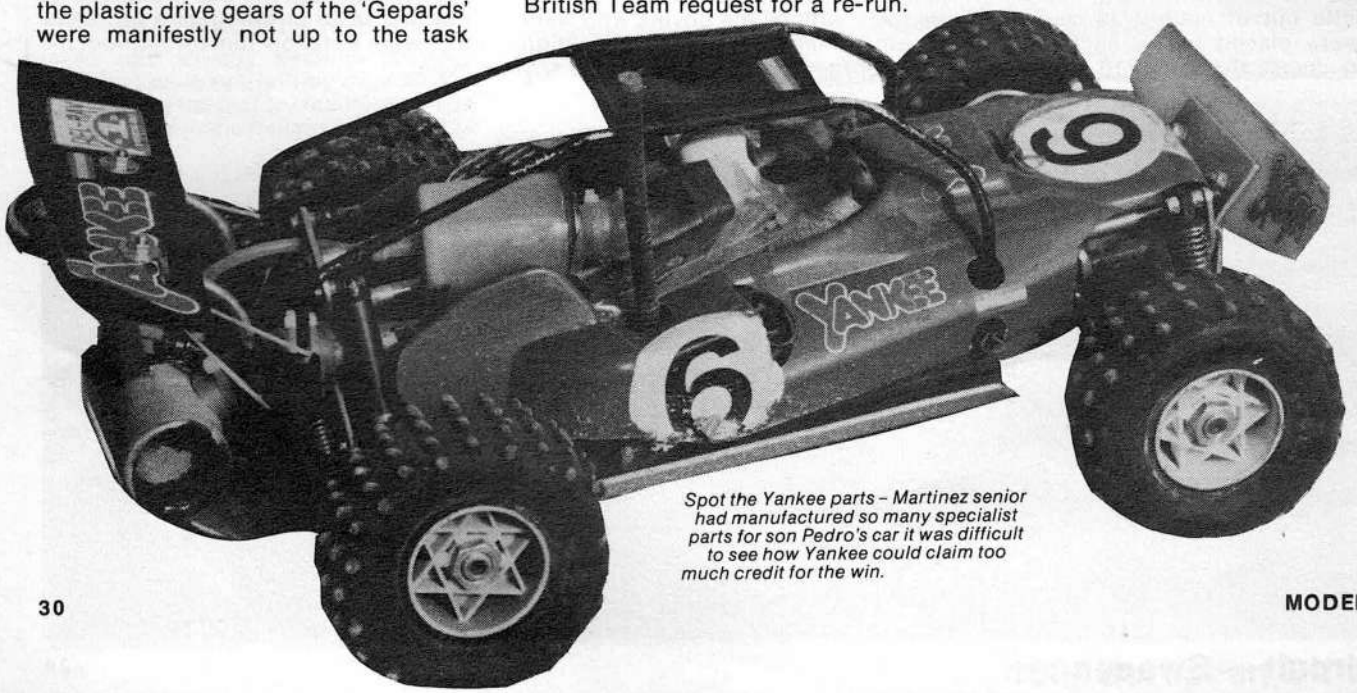
'Why oh why' cannot the circuit racing procedure of an itemised list of points for the drivers briefing not be adopted for off-road meetings? To be fair the race director did a reasonable job but, expecting a Swede to be totally fluent in English is not reasonable. It must be difficult at times for the various nationalities concerned to fully understand a briefing carried out in clear grammaticable correct un-accented English! Once the formalities were over the serious business of the day could start Four rounds of 5 minute heats were to be run, the single fastest time to count and with track conditions as they were, first round times were likely to be critical. Russell Buckner was first of the G.B. drivers out in Heat 1 and a trouble free run gave Russell his qualifying time. he did not in fact improve upon this in subsequent heats. Bill Burkinshaw suffered an engine cut after only 4 laps. It was difficult to determine whether or not this was a result of stones catching in the vitals of his *Serpent* or just because of a recalcitrant engine. Tommy Chung also had an engine cut whereas Richard Stitson had a trouble free run in fact recording the best qualifying time overall of the British sextet. The three British *Garbo* drivers had a succession of mechanical problems, the plastic drive gears of the 'Gepards' were manifestly not up to the task demanded, several stripped centre gears plus differential bevel gears caused stoppage after stoppage. Eventually replacement metal differential bevel gears provided by the *Garbo* factory team solved most of the problems although the metal centre gears were only available on the following day from *Garbo* via Conzelman their West German agents. Steve Marr was uncharacteristically plagued with engine problems and one can only suppose that in common with Bill Burkinshaw's *Serpent*, small stones were probably the cause.

By the end of Round 3, it was firmly underlined that few would be able to improve on their first round times. Of the British, only Tommy Chung managed to qualify in his 4th heat joining Richard Stitson, Russell Buckner and Gary Marsden for the finals day. Bill Burkinshaw did for a while look set for a qualifying time, his engine problems being traced to a change of fuel, he had elected to use 'Team Fuel' in contrast to his normally chosen brew which had really unsettled his engine. During Bill's last heat a mistake by the commentator in wrongly awarding a 1 lap jump start penalty caused Bill to retire unnecessarily. A later protest disallowed the British Team request for a re-run.

Four drivers qualified straight through to the finals — Baruchello (*Garbo* 'Gepard'), Gueye (*Yankee* 4 × 4), Murizio (*Garbo* 'Gepard'), Perrso (*Garbo* 'Gepard') the remaining places in the finals were to be hard won via the EFRA 'Christmas Tree' procedure of 1/16, 1/8, 1/4 and semi finals. The top 4 qualifiers were the only drivers to record 10 laps during the qualification heats.

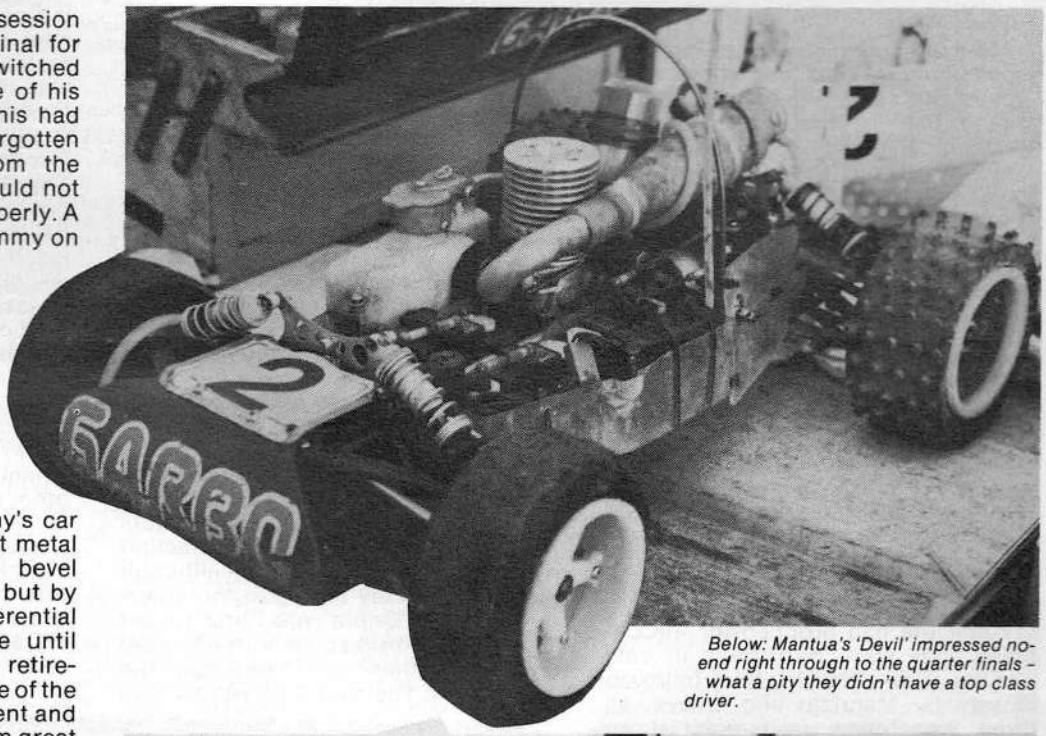
Finals Day

In contrast to the cold and dull qualification day, Sunday 22nd proved sunny, with a stiff breeze still remaining following gale force winds overnight. Three British drivers figured in the 1/16th finals but luck was only on the side of Russell Buckner who comfortably held the necessary third place to elevate him into the 1/8th final. Gary Marsden soon captured the lead in his 1/16th final driving with commendable restraint but the dreaded *Garbo* gear bug nibbled the teeth from his centre gear after only 5 laps forcing him to retire. Ironically, Guergins, the *Garbo* boss, handed Gary a metal centre gear within five minutes of the end of the final!



Spot the Yankee parts – Martinez senior had manufactured so many specialist parts for son Pedro's car it was difficult to see how Yankee could claim too much credit for the win.

Tommy Chung had a panic session on the line prior to his 1/16th final for when his R/C equipment was switched on, it was discovered that one of his servos had a stripped gear. This had been undiscovered as he had forgotten to collect his transmitter from the pound the night before and could not therefore check over his car properly. A lightning servo change had Tommy on the track one lap down. Tommy's car was one of the *Garbo's* without metal gears and a rear differential bevel stripped after only a few laps, but by locking up the centre differential Tommy was able to continue until something else failed forcing retirement. At just 13, Tommy was one of the youngest competitors at the event and his final placing of 63rd does him great credit — these were the best drivers in Europe after all.

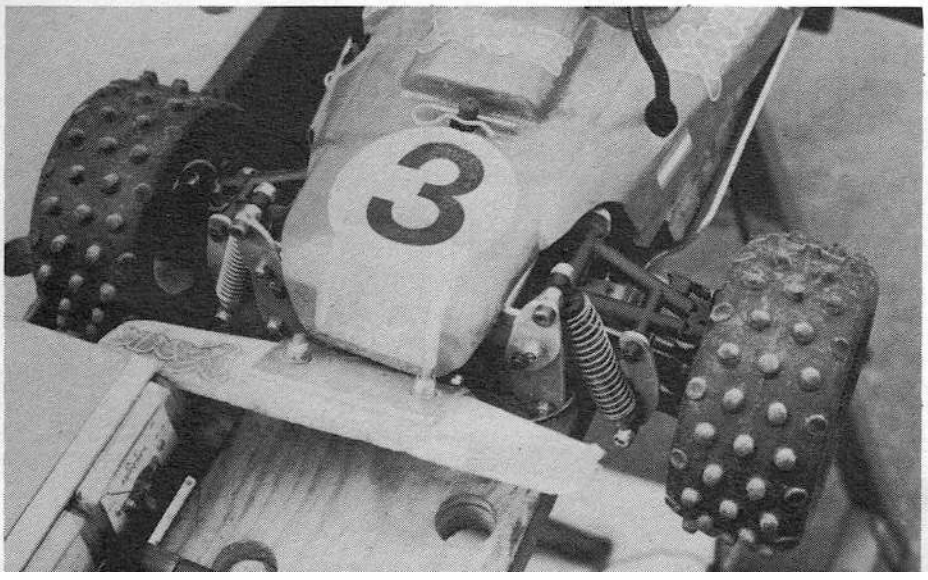


Right: trying to find the last little bit of performance on the rough circuit prompted Garbo team drivers to try out every conceivable type of tyre including 1/8 circuit racing foam tyres.

The 20 minute 1/8th finals followed on after a pause for track repairs which gave us all the pleasure of watching EFRA Chairman, Saul Manashe driving a mini tractor round the circuit towing a scraper. As luck would have it, both Russell Buckner and Richard Stitson drew the same 1/8th final and hopes ran high for a British 1, 2 as both drivers had had faultless running throughout practice and qualification. A good start put Richard well up the field but Russell had to do it all from the back of the field which he appeared eminently capable of, steadily working his way towards the top three spots. Inexplicably Richards engine cut, was quickly restarted but with valuable time lost allowing Russell to catch him up. Then began a series of engine cuts, Russell again because of an empty fuel tank and a series of cuts from Richard both eventually being forced out of contention and ending all British hopes of higher placings.

Below: Mantua's 'Devil' impressed no-end right through to the quarter finals - what a pity they didn't have a top class driver.

The semi-finals put young Pedro Martinez *(Yankee)* back on the track, qualification not having gone his way but an exhuberant drive put him into the final. Pieter Bervoets made his way up via smooth drives in the 1/4 and semi-final to a place as did Peter both the latter driving *Serpents*. Quarter finals saw the last of the two wheel drive cars disappearing as Lloyd Petterson despite valiant efforts could not keep his *Tomo* "Lupus" on the track surface long enough in between aerobatics to really go fast enough. *Micro Racing, Mantua* and *S.G.* saw their hopes of a European Champs win disappearing as the semi-finals finished to leave *Garbo, Yankee* and *Serpent* to battle out the final.



Left: front end of the 'Martinankee' removal of the bodyshell revealed special R/C trays, home brewed drive shafts and damper fixings - even a home made chassis.

Racing Report

The Final

After the customary delay for track repairs, photo calls and more track repairs the stage was set for the 40 minute final of the 1984 European Championship. In spite of the very rapid qualifying times of the top 4, there was considerable speculation about the eventual outcome. Could young Pedro Martinez the '83 Champ do it again? Would the *Garbo* cars last the distance? At this stage Pieter Bervoets was a firm favourite with Martinez the favoured outsider for with a demonstrated reliability from the Dutch concern and the likelihood of the pressure of the occasion facing Martinez, the odds seemed to be on reliability and maturity winning the day.

If numerical superiority were to be counted the *Garbo* concern could rest content with five cars against *Serpents* three and *Yankees* 1 plus the Martinez car.

When the flag dropped for the Le-Mans style start, Baruchello in pole position flew into the lead followed closely by Manrizio and Gueye, all three benefitting from their front running position on the grid. Poor Martinez had a poor start as did Bervoets starting from the rear end of the grid both seeming to hit everything in sight as they fought to make up lost ground. Martinez seemed to have some form of thought control operating his car for it seemed that human reactions were at times totally inadequate to extricate the car from the situations it encountered. The young Spaniard managed it though, placing his car with precision on a circuit that had drivers, many years his senior, struggling to just stay upright on.

By one third of the race distance Martinez was able to challenge the leading group one by one and he once again demonstrated his ability to pressurise defeat and demoralise the opposition who one by one put up a fight were beaten and left behind.

By dint of steady persistent driving Pieter Bervoets was meanwhile working his way up the field undoubtedly aided by continuing engine problems suffered by all the fast Italians. With two thirds distance gone Martinez lapped Bervoets by now in 5th place and set about lapping 2nd and 3rd places Baruchello and Gueye, the former unique amongst the Italians in having a trouble free run.

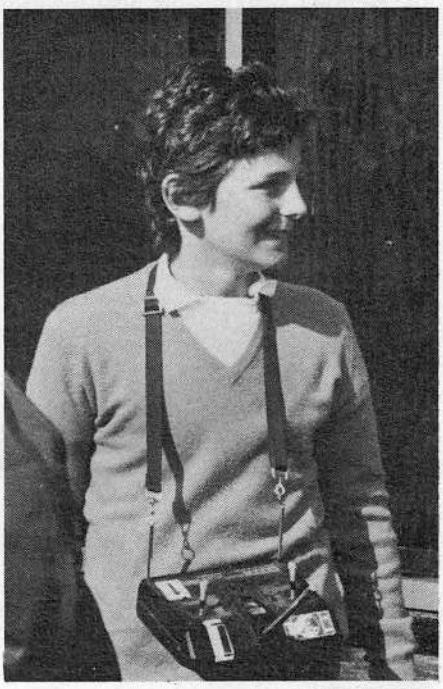
An engine cut by Güeye and then Maurizio put Pieter into 3rd place and with only a couple of minute to go, Baruchello's engine cut allowing Pieter to slip into 2nd place with enough of an advantage to prevent the Italian from re-catching him in the remaining minutes of the race.

Although the race lasted a full 40 minutes the impression was one of much shorter time, the driving of Martinez enthralled, the fight back from the rear of the field by Bervoets compelled. I have to say that Bervoets must take a great deal of satisfaction from this 2nd place, for although beaten, albeit by less than three laps his *Serpent* 'Cobra' was "first kit car home." The *'Yankee'* of Martinez used little more than wishbones from the original kit. The modifications made to the car were very extensive including new chassis, drive shafts, damping system, R/C mountings, gears etc. all beautifully made by Martinez Senior for his sons car. In contrast Pascal Gueye of France drove a nearly standard car very well into 5th place. The *Garbo* 'Gepard' is a very good car but even with the excellent drivers fielded, mechanical problems beset the machine. A basic re-think over gear design is called for here, the drive train is too fragile for this class of competition. Bervoet's *Serpent* was a standard kit car with the sole exception of stone guards fitted to the side of the body, a solid endorsement of basically sound design.

So ended a memorable European Championships. Moves are already afoot to put to rights the shortcomings of the EFRA Off-Road organisation and it is to be hoped that they will get it all right for 1985. The willingness is there, it is a young sport which looks set to grow as the years go by.

Can Pedro Martinez make it three in a row?

Above: Serpent final trio of Peter Lind (left), Pieter Bervoets (centre) and Ole Harder (right) after presentation. Right: second time winner Pedro Martinez.



RESULTS

		Car	Nat.	Lap	Min.	Sec.
1	Pedro Martinez	Yankee 4 × 4	Spain	72	40	30.0
2	Peter Bervoets	Serpent Cobra	NL	69	40	26.6
3	Baruchello	Garbo Gheperd	Italy	68	40	05.5
4	Monesi Maurizio	Garbo Cheperd	Italy	65	40	03.6
5	Pascael Gueye	Yankee 4 × 4	France	59	39	56.6
6	Ole Harder	Serpent Cobra	Denmark	59	40	11.6
7	Peter Lind	Serpent Cobra	Denmark	47	39	03.2
8	Ghedini Roberto	Garbo Gheperd	Italy	46	40	28.3
9	Marzegan Vittorio	Garbo Gherd	Italy	39	40	09.5
10	Michael Persson	Garbo Gheperd	Switzerland	34	29	27.0
43	Russell Buckner	S.G. Leopard	GB	27	19	22.7
44	Richard Stitson	S.G. Leopard	GB	26	18	51.0
63	Tommy Chung	Garbo Gheperd	GB	14	15	22.2
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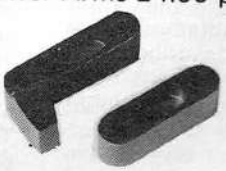

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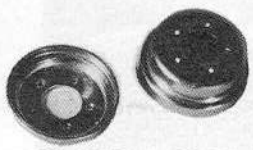

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Above: the Parma '412' class, ready to run, car sporting, additional body pan. These modifications, although simple, will make the '412' illegal for BSCRA racing. For ordinary club racing it's a must.

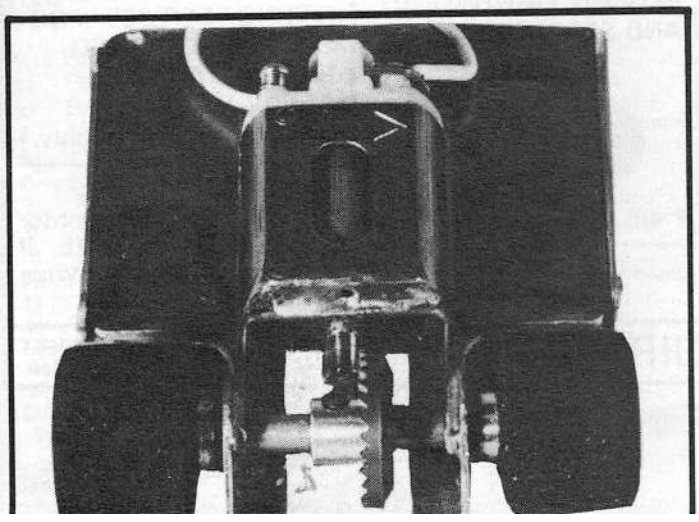
RTR Race Preparation

Ready-To-Run slotcars can benefit from a little improvement. Here's how from Trevor Tennant

JUDGING BY the number of poorly prepared cars I see being raced, it would seem to be a good time to show how to do the job correctly. The British Slot Car Association has approved the *Parma* Ready-To-Run 1/32nd car as a racing class and the *Parma* 16d motor is the approved power unit for a free formula chassis class. The car and the motor will make excellent examples to explain car preparation although the chassis modifications will make the car illegal for BSCRA racing. It may seem odd to the uninitiated to have to prepare a RTR but no commercial product at this price will be perfectly set up without some work. When one considers the price of labour nowadays, for the product to be perfectly setup would mean a purchase price many times higher and even then would probably need adjustments to suit varying track conditions.

Shortly it will be possible to buy all the *Parma* slotcar equipment at Club shops or direct from *Helger Racing*. The importers are prepared to sell direct to bona-fide clubs at trade discount. This is because no model shops are interested in stocking slot car equipment at the present time. Whether the shops will ever support slot racing again is open to question. The difference in circumstances this time round is the fact that the company involved knows what to advise the shops to stock. This means that the shops won't stock a lot of equipment that won't sell and get the hobby a bad name again.

The car as sold is good value with good potential to be made to go very fast indeed. The first step after you have obtained the car is to completely dismantle it. This will allow it to be built up carefully, allowing the maximum performance to be obtained. The simple modifications described are standard procedures and as such can be used in the preparation of most slotcars. The purchase of a purpose made 0.050in. Allen wrench will be a great help in maintaining your cars. *SCD, Betta* and *Pooch* all make excellent tools. The normal soft Allen keys are a poor substitute, except for shortening grub screws. If you use the hardened type to grind down screws you will be lucky if the tip doesn't break.



Left: close-up of the rear end showing revised motor position. Note also, piano wire strengthening brace between the motor can and axle supports. The axle is spaced either side of the centre gear with brass tubing to ensure the correct position.

The motor

1. Remove the pinion gear with either a puller or if you don't own one a substitute is to grip the motor lightly in a vice with the gear vertical. The use of two thin strips of metal one each side of the motor shaft. If the strips are placed on top of the vice jaws. This will allow the gear to be tapped off with a small hammer and a short length of piano wire.

2. With great care unhook the brush-springs from their tabs, you may need to use a small screwdriver if the tabs are too tight. Remove the screws which are inserted though the loops of the brush spring. It would be a good idea to replace the crosshead screws with *Mura* Allen head endbell screws and sleeves. The springs can now be removed and the motor brushes should

slide out of their holders. If the brush movement is at all stiff in the holder then a rat-tail file can be used to ease the offending items. Do not remove too much material.

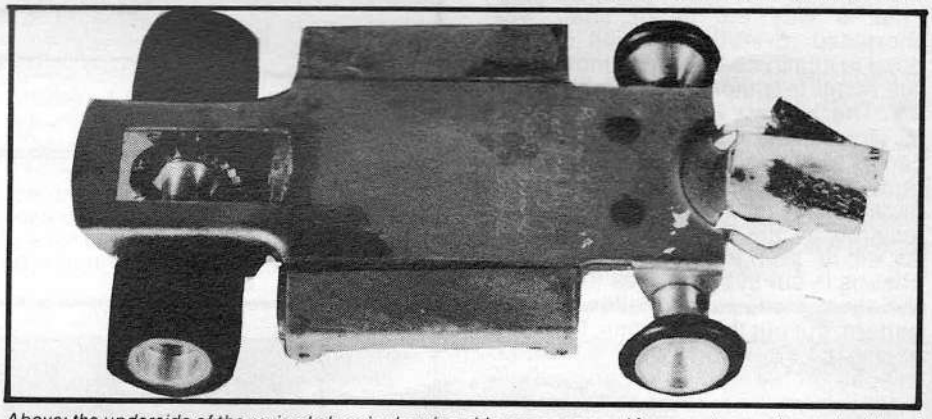
3. With the use of a pointed tool, i.e. a small scriber, lever the two tabs which hold the plastic endbell in place outwards to release the endbell. Withdraw the endbell very carefully taking note of the spacers at each end of the armature. Remove the magnets and springs from the can. Taking note of any markings on the magnets for re-assembly in the same manner.

4. At this point I suggest that you drill the can and endbell for retaining screws instead of using the standard tabs. This will allow the motor to be stripped down for regular cleaning. These motors will accumulate a surprising amount of rubbish during normal racing. For best results the motor should be cleaned with a good electrical cleaning solvent. I see there is on the market several 'Wonder', motor cleaning sprays for which all manner of claims are made. However, when a motor loses its 'edge' the only real solution is a *proper* strip down and careful cleaning. After a number of hours use the possibility of having the commutator re-trued should be considered. The problem with the *Parma* motor is the fact that I don't believe that very much material can be removed from the commutator without hitting trouble. I am informed that *Parma* intend to replace the commutator with a more durable unit very shortly. The *Mura* and *Riko* motors will allow several retrues to be carried out because there is a greater thickness of copper in their design of commutators. It *is* possible to replace commutators but its a very awkward operation and is best left to the experts.

As space is at a premium the best size screws to retain the endbell are 8BA, $\frac{1}{8}$in. size, a $\frac{1}{16}$in. drill will be a satisfactory tapping size for 8BA. The can and endbell should be drilled and tapped as shown on the diagrams.

5. At this stage check that the brush-holders are in line with each other and at 90 degrees to the axis of the armature shaft. This is most important if the motor is to perform correctly. A tip here is to use a 2.5mm drill bit which is a sliding fit in the brushholders. This will ensure that the brush-holders can be aligned correctly, the retaining screws may need to be slackened to allow this to be carried out. *Mura* motors can be aligned with the aid of a simple tool made by *MG Products*. The *Riko* motor can be attended to by the use of $\frac{3}{32}$in.sq. tubing.

6. The can end bearing must be retained with a small fillet of solder. Apply the fillet of solder to the *outside* of the can. This is very important because the bearing is only located in the can with a very small shoulder and a good bang will upset the alignment of the bearings. To ensure exact alignment use the armature to locate the bearing during the soldering operation. The armature should spin very freely when things are correct. Take your time on this operation and get it right. The bearing can be replaced with a ballrace in some cases but I am not sure whether the rules will allow this.



Above: the underside of the revised chassis showing side-pans removed from centre-section and soldered to the new body pan.

7. The armature in standard form is not fitted with an 'oilthrower'. This item is a thin fibre washer which is a tight fit on the armature shaft. It stops oil getting onto the commutator when the bearings are oiled. The 'oilthrower' is fitted next to the commutator and *Mura* sell the relevant parts. The end float of the armature must be checked at this time, there should be only a very small amount of clearance. The endbell should be screwed in place and the ends of the armature should be lightly tapped to settle everything in place. The total endfloat should not exceed 5 thousandths of an inch.

A simple gauge can be made from shimstock and extra brass spacing washers can be obtained. This spacing operation is very important because excess end float will wear the motor brushes prematurely.

8. The pinion gear should be positioned close up to the can bearing and the excess motor shaft should be removed with a grinding wheel. This gear placement will reduce the whiplash effect on the gear mesh when power is applied to the gears. The standard nylon contrate will not tolerate poor gear meshing. If possible I would consider the use of a harder plastic gear such as *Cobra*. The *Beatties* range of steel gears may not be too successful on the *Parma* chassis because the centre line of the axle is below the centre line of the motor.

9. The magnetic airgap can be checked at this time. My own example motor was shimmed between the magnets and the can with thin beer-can tinplate. This amount of packing produced the ideal airgap for the use intended. We shim the magnets to improve the torque, braking and make the motor run cooler hence improving the reliability. The other possible benefit may be that the gear ratio may be raised with a further increase in performance. The shimming should be checked to make certain that the armature doesn't foul the magnets.

10. Very carefully re-assemble the motor, checking everything before you run it for the first time. Points to watch are: armature endfloat, airgap correct, motor brushes in place correctly. Oil the bearings with light machine oil. Never run a rebuilt motor on 12 volts until everything is bedded-in. I prefer to run my motors on 6 volts for about 20 minutes checking everything regularly to make certain nothing is binding. It is surprising how a motor's performance can improve when run in.

There is no magic in motor preparation just remember to take your time and get everything right.

Fig. 1. Motor preparation

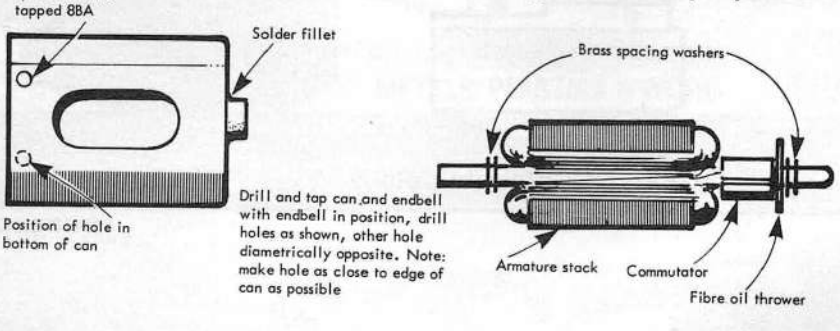
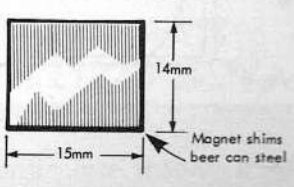


Fig. 2. Motor shims



The Chassis

The standard *Parma* chassis when tried on a track with good power and grip will seem to be a bit of a handful to drive. The main problem is the motor is too powerful for the chassis in standard form. However, this can be rectified with a few simple modifications.

1. The vertical bracket, which the motor is fixed to should be removed. This can be done by simply flexing the bracket back and forth until it fractures. The resulting sharp edge must be dressed down with a flat file, level with the rest of the chassis pan. Removal of this part will allow the motor to be mounted nearer to the rear axle. This will improve gear life due to the reduction in motor shaft overhang. That is why the motor shaft was shortened. Everything which can be done to eliminate unwanted movement will result in a more dependable car.

2. The biggest improvement I have found that can be made to these cars is to fit a loose pan to support the body. Once again my age is showing because this is an old idea which was inspired by the Canadian slot racers. As will be seen from the drawings the chassis is cut in two places to provide the two side pans. Following the pattern, cut out the brass pan, then drill as per the drawing. Carefully position the pan on the chassis making certain that everything is square and then spot drill through the pan into the chassis. Drill out the chassis with 1/8in. holes, countersink the bottom of the chassis to take the 6BA screwheads. Assemble the pan arrangement using locknuts on the screws. The pan should be a free fit in the chassis. Remove the brass pan, the cutting of the chassis should now be done with the thinnest blade you can find, afterwards deburr the cut edges. With a good hot soldering iron attach the outer chassis pans to the brass pan. Do not solder everything together solidly!! When cool loosen the screws so that the loose pan will lift approximately 1/16in. at the rearmost point.

3. The oilite bearings which support the rear axle should be soldered to the chassis to remove unwanted movement. To ensure accurate alignment the axle should be oiled and inserted through the bearings. To obtain a good soldered joint a flux is essential, dilute phosphoric acid is the flux I use, however, this must be washed off the chassis after each work session or the chassis will corrode very rapidly.

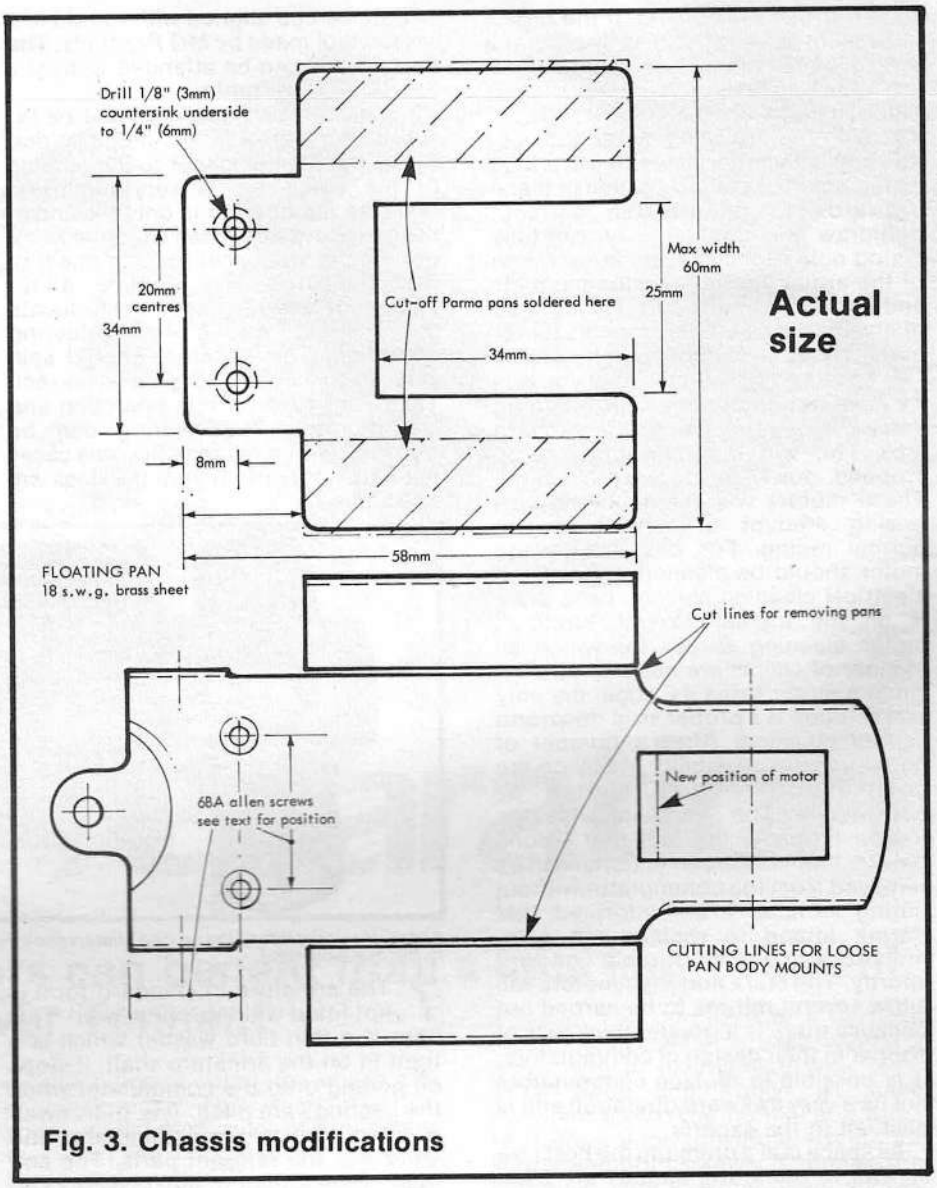


Fig. 3. Chassis modifications

4. The motor should be soldered to the chassis with the centre line of the motor on the centre line of the chassis. It's a good idea to scribe a guide line on the top face of the chassis. Solder the motor to the chassis in the position shown on the drawing. The rear axle and gear should be also fitted at this time to allow

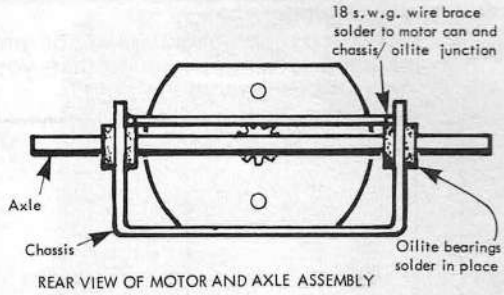


Fig. 4. Motor mounting

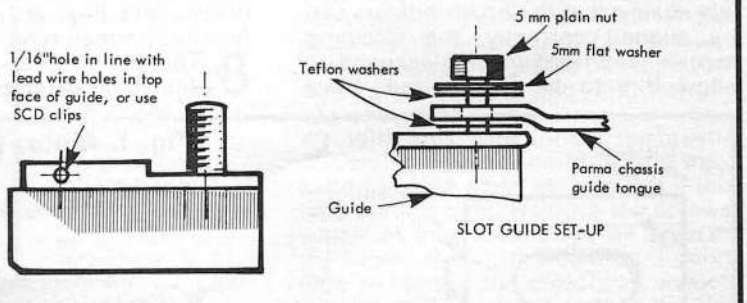


Fig. 5. Slotguide details

accurate positioning to be obtained. It is a good idea once the motor and gears are in place for the gear to be spaced correctly in the chassis. The spacers for best results can be brass tubing cut off and the ends machined square. However, if you are really wealthy then Teflon tube is the way to go as this will help prevent the gear and axle moving in the event of a crash. Relying on just the gear set screw is not a good idea. An extra reinforcement to the drive train is a 18swg piano wire brace; this should join the drive face to the oilite bearing housing. See drawing for details.

5. The rear tyres are too large in diameter and are also, in my opinion, too wide and as a result give too much grip for the chassis. The tyres are 7/8in. dia. and 5/8in. in width; this should be changed to 3/4in. and 9/16in. respectively to improve the roadholding of the car dramatically. The tyres should be reduced on either a lathe or be sent to a specialist who will do the job for you. The importance of accurate tyres cannot be overemphasized, out of true rear tyres will make the car very difficult to drive.

6. The steel front axle is too heavy and can be replaced with a lighter component. One possibility is the *Champion* 'Arcolite' axle as fitted to the 'Thumper' cars and which is a fibreglass item. A cheap alternative is a 1 7/8in. length of 1/8in. aluminium welding rod. The inertia of the front axle assembly can be reduced with advantageous results. The front wheels could possibly be lightened by drilling whilst the front axle overall width should be set a 2 7/16in. to give approximately 1/16in. of sideways movement. Although an old idea 'the clonker front axle' helps the road holding to a significant degree — I don't know why. Another trick is to shorten the wheel set screws so when the screws are tightened they don't protrude from the wheel hubs.

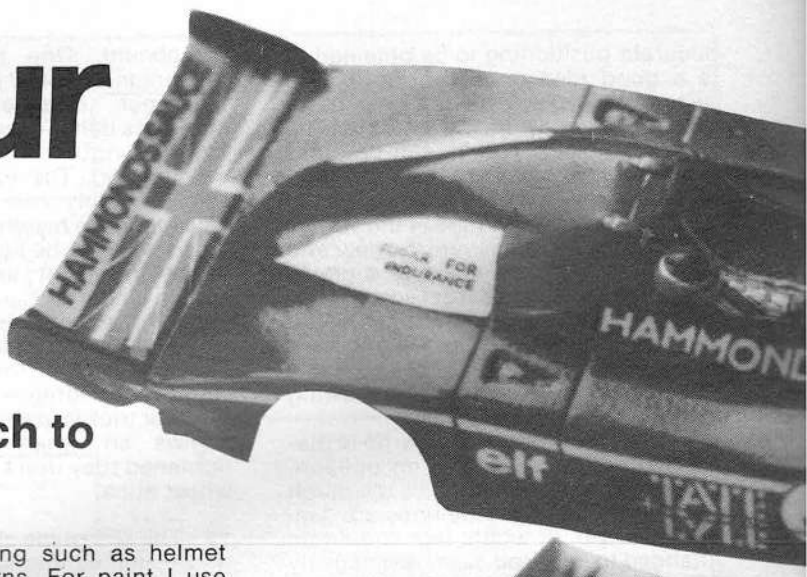
7. The slot guide should be carefully examined and any excess moulding flash should be removed with a very sharp knife. To prevent the track tapes being lifted, help everyone by chamfering the front edge of the guide. The standard retaining nut should be replaced with a 5mm item. The best setup is shown in the drawing and the use of *Mura*-Teflon guide washers is to be recommended. Set the slot guide so the action is smooth but without any rocking movement. *MRRC* soft braids are the best braids inspite of the cost and rapid wear. The standard braids can be used but will need combing out with a scriber. *MG Products* silicon hook up wire is the best wire I have ever used whilst *SCD* guide clips are a first class invention and will tidy up the front of the car as well as allow the body to be mounted lower. A cheaper way of connecting the lead wires to the guide is to drill into the side of the guide. See drawing for details. Check that the front wheels touch the track when the slotguide and braids are held in the slot. If required either bend the chassis or use spacing washers.

8. The 'Pro Womp' brass chassis can be used in place of the plated steel item and will definitely improve the appearance of the car.

9. The body should be mounted as low as possible without the wheels rubbing.

To conclude, take your time with the work. If your car performs as well as mine then you will have a very good cheap car for your stable. The best of luck and I will try to answer any queries through the magazine.

Paint your wagon



Part 2 of Nigel Ritson's approach to slotcar bodyshell decoration

IN PART ONE of this article I described how to prepare and paint a slot car body shell. In this second part I shall be outlining how to paint interiors to complete your body shell and also how to look after your painting equipment.

Interiors

Vacuum formed driver figures if not painted and detailed to a reasonable standard, can easily resemble a multi-coloured deep-sea diver. When starting to prepare an interior, do not remove surplus plastic around the outside edges, the main reason for this is so that you have actually got something to hold onto whilst painting.

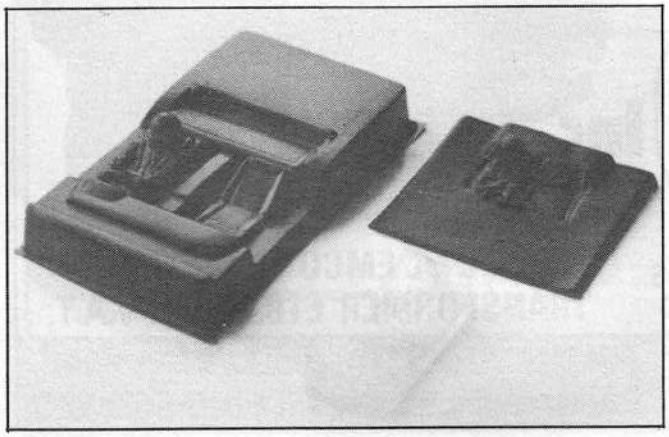
The surface of the interior can be cleaned using the same method as for bodyshells — scouring powder and a toothbrush; this will provide a nice clean, keyed surface ready for painting.

If the interior moulding is transparent, i.e. clear Lexan, it is worth spraying or brush painting the whole piece black. This provides a good base to work from. If a 'scale' driver is required, pictures of the real car/driver combination are very useful. Sometimes a driver's spare helmet may be different from his usual one. For actual painting of interiors I use a size 0 or 1 brush, the 0 being more useful for doing fine detailing such as helmet stripes and patterns. For paint I use *Humbrol* enamel and also the new range of *Tamiya* acrylic paints. (Since publication of part one, I have also used the *Tamiya* paint on shells and the result seem quite favourable). When painting the interior, let the paint dry before applying colours next to or over each other, this will prevent running and also stop different colours merging together.

Right: very nicely produced Marlborough McLaren M26 F1 bodyshell. All the details were brushed on, the main colours were sprayed.

When detailing, e.g. sponsors' labels, don't over do it, as this can make the overall finished job look pretty tatty. Trying to copy and reduce sponsors' names by 32 times can sometimes be quite tricky. The basic overall colours and helmet pattern are usually enough to impress. After all the colours required have been used, let the paint dry thoroughly and then using the *Rotring* draughting pen (described in part one) the fine details and outlines can now be picked out. Examples such as seat belt buckles, overall cuffs, seat belts, helmet outline and visor outline are the main details which can add realism.

After inking in the last few details, the interior can then be trimmed to size to fit the driver's cockpit. The interior is best held in place by a good quality adhesive tape. Don't use too much tape, just enough to hold the interior in place, otherwise the flexibility of the shell will be drastically reduced.



Left: different types of interiors. Largest to smallest: saloon, Sports/GT and Formula 1. The latter is produced in Lexan. All these are available from 'Betta Bodies.'

Left: De-Codenet, Le-Mans Sports car bodyshell winner of a good few concours trophies over the past few years. Details, brushed - main colour, sprayed.

Care of Equipment

Paint

As mentioned before, I would recommend using Lexan paint for spray jobs (especially 1/24th racers), as this eats into the actual shell surface. Lexan paint is available from many model car specialists such as *One-O-One products*. For 'Concours de Elegance' bodyshells and detail/interior works I use *Humbrol* enamel and Tamiya acrylic paint. Your local model shop should stock the superb colour ranges of these two paints.

If the paint in a tin or bottle starts to thicken, it can be thinned down using an appropriate thinner. However, if the paint starts to skin over, or thickens to a point where thinners aren't much good — throw it away. Old paint loses a lot of its characteristics such as surface adhesion and covering power. Always replace the lids when not in use.

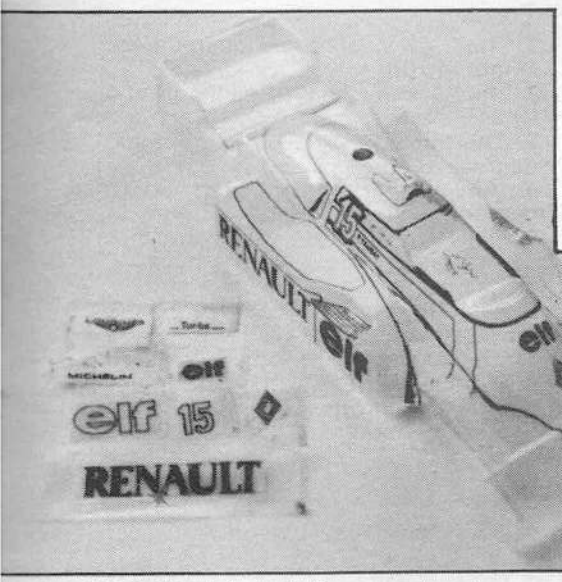
Draughting Pen and Ink

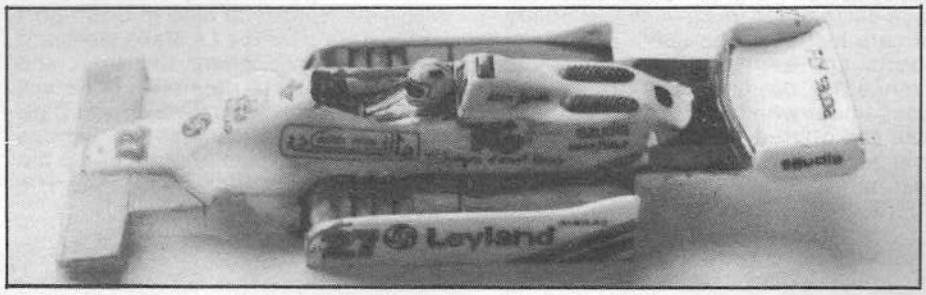
As soon as I have finished using a pen, any ink left in the reservoir is returned to the bottle and the pen stripped and washed out. After washing, all parts are then dried off carefully and then reassembled in accordance with the manufacturer's instructions. To some people this may seem pointless and time wasting, but the pen is quite an investment so it is worth looking after. Draughting inks also tend to dry out whilst in pens so this is another reason for the cleaning process. If ink starts to dry out in the bottle, it is time to invest in a new bottle!

Brushes

After use, thoroughly clean the brushes in thinners suited to the paint used, then rinse out in warm water. Dry off and store with a small protection tube over the bristles. Better still, store brushes in a large tube such as the middle out of a roll of kitchen towel — with the ends covered over with a clean piece of cloth or even cling-film and rubber bands.

Before using a new brush, rinse out in warm water and dry off. This should remove any loose hairs and will wash out any dirt from the bristles. Old brushes which tend to discard hairs every now and then should be disposed of. Remember, buy the best quality brush you can afford.





Above: a rather battered looking 1980 Williams FW07 complete with scale, Alan Jones. Proof that the concours winning bodyshells can be raced as well. Left: 1983/4 Renault F1 in process of being painted, with ink detailing nearly completed. Alongside body are stencils used for lettering.

Spray equipment

If you own a compressor, a regular service of this item should ensure years of trouble-free service.

Airbrushes are expensive items, so a great deal of care and attention must be given to them. Always thoroughly clean all parts after use and follow the manufacturer's instructions. A protective box is also an invaluable item as this keeps the airbrush clean when not in use. I cannot stress how important it is to clean out an airbrush after use. If paint is allowed to dry in the 'brush', it may well make it totally useless.

When buying an airbrush, don't buy the most expensive as sometimes this can run well into a three figure price. The shop should be able to recommend a suitable brush without lots of gimmicks, with a back-up providing spares and servicing.

From a safety point of view:
(i) Never point an airbrush at anyone, even yourself;
(ii) Take care with compressors and air canisters, both can be lethal — follow the manufacturer's instructions;
(iii) always spray in a well ventilated space and ensure no naked flames are present. Paint spray can ignite if a naked flame is present.

Body Tips

Don't be too adventurous at first, the results may be disappointing. Always try a paint scheme that is within your capabilities.

Don't over-detail, as this can sometimes spoil the finished shell. The main sponsors names and body details usually give a more appealing finish.

Some detail work, such as pinstrips (a JPS-Lotus Formula 1 for example) can be difficult to reproduce at 1/32nd scale. So try and plan or think about new ways of doing such details. A paint brush is not always the answer — some coloured draughting inks can be used with a draughting pen; much easier for small lettering and designs than using a paint brush.

When storing unpainted bodies always keep in a clean condition. Dirt and grease removal is time consuming and can sometimes damage a body. Try and keep the paint on a shell as thin as possible.

If masking, ensure all edges of tape are stuck down or *Humbrol* 'Maskol' is applied correctly. Paint runs are extremely difficult to remove and sometimes other detailing is destroyed.

Hopefully this article has provided an insight on how some slot car bodies are painted; not everyone will agree or favour my methods, but then again it may have taught a few more people 'how to go about the job'. So to all future Michaelangelos of the body painting world, best of luck for your next masterpiece and successful racing to all slot racers.

ARRA

AUTO ROAD RACING ASSOCIATION

Slotcar Le-Mans or 298 miles in 24 hours

16/17 June, Southport, Lancs
Report: Pete Crane

BACK IN THE days when slot cars used solid rubber tyres and model train motors it was necessary to 'stretch' the limits of these components in the never ending search for more speed. It was a delicate balance between the heat generated by a hard working, home tuned motor and the melting point of various plastic brushgear parts which were enforced on the racers due to a lack of anything better. This is how the term of a 'hot' motor came into the slot racers vocabulary. A prominent Northern racer named Duncan Laycock had the great idea of a 24 hour race designed to improve the reliability of cars just as in the famous *Le Mans* sports car event held each year in France. He designed a set of regulations under which the event should be run, and offered a superb trophy to the first team able to complete over 150 *real* miles.

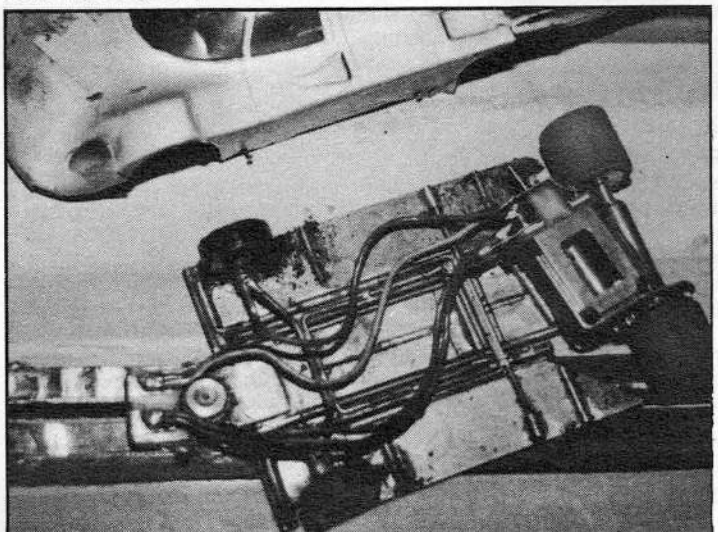
The rules Duncan devised have stood the test of time with only minor alterations and with the establishment of the British Slot Car Racing Association (B.S.C.R.A.) the opportunity was taken to publish a definitive set of rules. This would stimulate interest in a team competition and also generate some exposure for the hobby due to the interest of the public in any zany achievement such as racing slot cars for 24 hours.

Over the years one club has established a reputation for being the best at team endurance racing, based on the fact that they win most of the races they have entered. The team is North London and they hold the record for the most distance covered by a 1/32 scale slot car over 24 hours of racing, at just over 304 miles set at Hatfield in 1975. However while no-one disputes the distance covered, we do not know if the track conformed to the letter of the regulations and as it was destroyed some time ago we never shall.

That brings us neatly around to the ARRA 24 hour race held in Southport Lancashire over the *Le Mans* weekend of 16/17 June, where the first race under the BSCRA definative rules was held with teams from the **Barnton Club Edinburgh** a **MURA** team of various aces, the local team and of course the mighty **North London SME** team. The race rules are:

Teams

1. A team shall consist of 3, 4, or 5 drivers.
2. Only nominated drivers may drive or do any repairs to the car.
3. No driver may control the car for less than 3 hours or more than 10 hours.
4. At least 3 teams must compete in the race.



Left: the victorious North London SME team car after 24 hours of non-stop racing. Excellent car preparation and consumate driving skill paved the way for 298 miles.

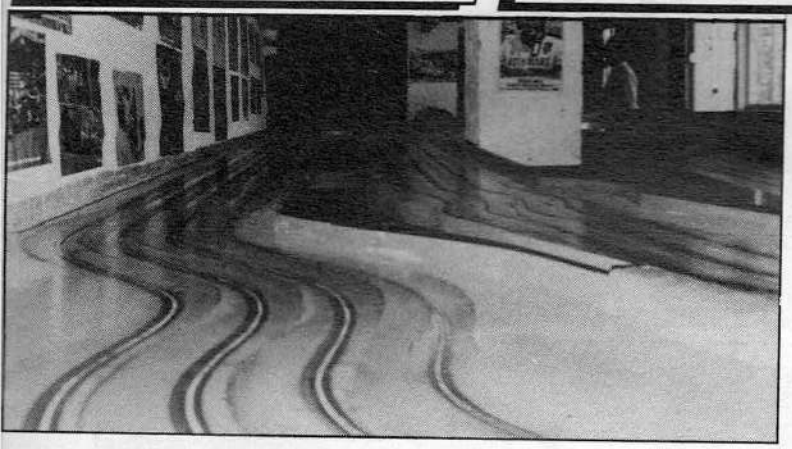
Above: back out into the sunshine the winning team, from left to right: Phil Young, Chris James (holding official certificate), Ian Fisher, Paul Martin (car builder) and Alan Lucas.

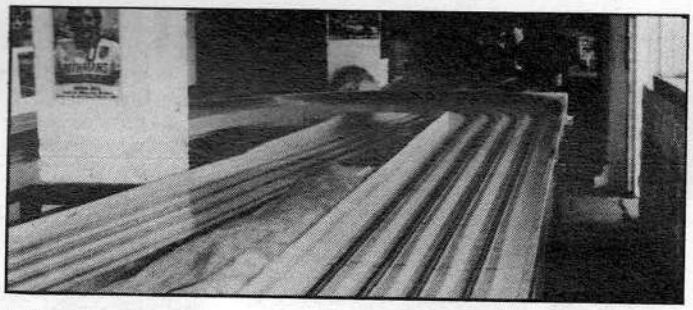
Track

1. The track must have a minimum lap length of 70ft.
2. The track must have a minimum of 4 lanes.
3. The track must have a total of 900 degrees of corners.
4. Any corner banked to over 10 degrees shall not count as a corner.
5. There shall be at least 180 degrees of corner of no greater radius than 7½ inches.
6. Each team must drive on each lane for equal amounts of time.
7. Tracks over 200ft long must have over 1400 degrees of corner, tracks over 300ft long must have over 1800 degrees of corner.

Cars

1. Each team may use only one car during 24 hours.
2. The car shall be a 1/32 scale model of a sports, GT, or saloon car as raced to FIA rules.
3. The car must comply to BSCRA car regulations.
4. The motor, chassis, and body of the car may not be changed during 24 hours.
5. The following parts may be changed: motor brushes and springs, bearings, gears, wheels, tyres, pick ups, guide flag.





Left and above: two views of the ARRA club track. Each team ran for an equal amount of time on each lane. Eat your heart out - Derek Bell!

Race

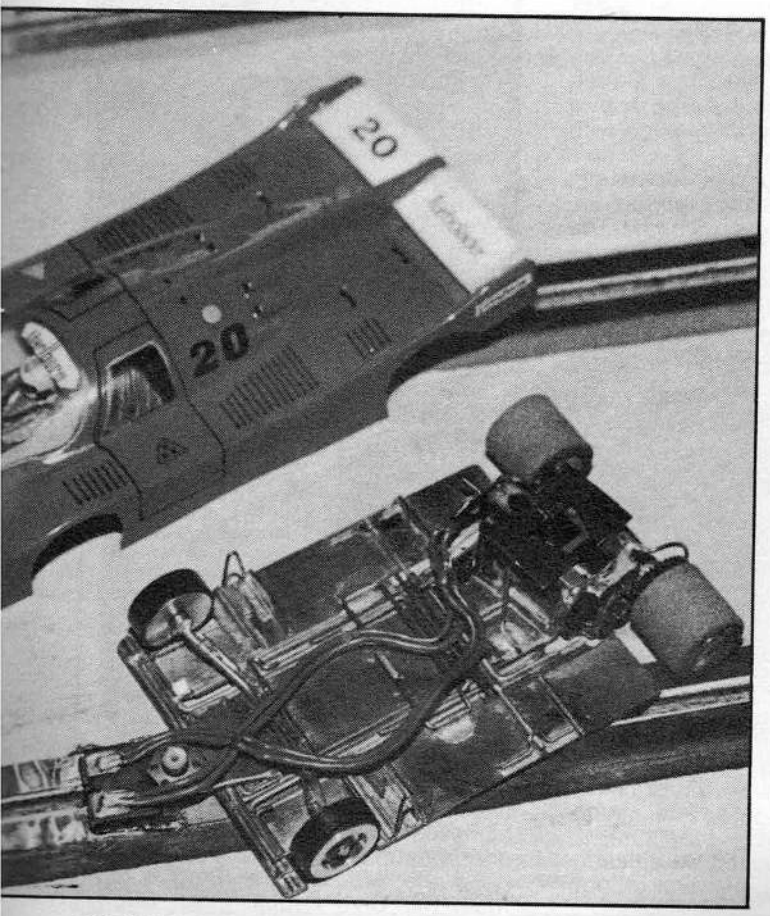
1. To qualify as a record attempt the race must be observed by the following:
The competition secretary of the BSCRA or other BSCRA Council member, an independant adjudicator who is NOT a member of the BSCRA, a representative of either the RAC or the *Guiness Book of Records*.
2. A detailed report of the race must be published, signed by more than one of the above officials.

24 hours later . . .

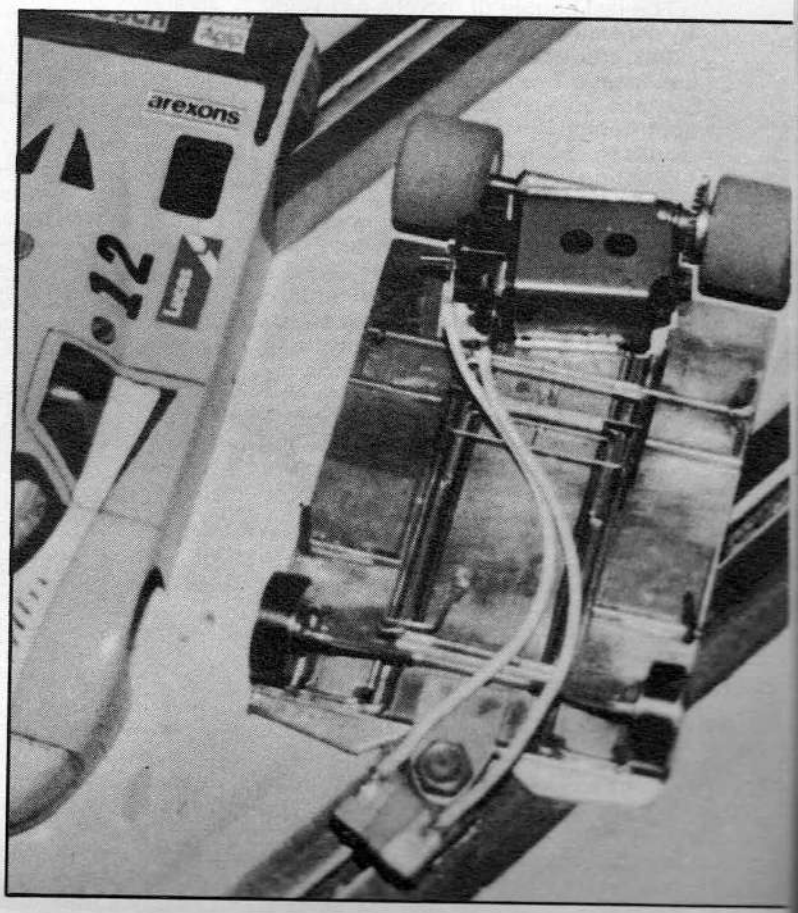
The story of the race is simple, **North London** crushed their opponents and cruised to a winning distance of 298.88 miles, although **Team MURA** led for the first hour and the local team were always fastest on the track but not consistant enough to snatch the lead for more than a few minutes and eventually retired after 17 hours with motor problems. The **Barnton** team were never able to realise their potential as a postal dispute caused them to run a 'bitsa' car assembled on race day, nevertheless they finished second with 276.65 miles.

The event was a great success and very economic enjoyable racing was had by all 20 racers, the standard of driving was very high with 50 lap dices being a regular feature, a particular highlight being **North London** and **ARRA** racing for the lead on the same lap for over 10 minutes after *12 hours*. However the driving skill and superb car preparation of **North London** as usual proved too much for the other teams, even after 4 or 5 hefty shunts their car sounded as sweet at the end as it did at the start and appeared to be even faster once properly 'run in'. Due to the lack of urgency once the **ARRA** challenge faded they relaxed the pace and 'only' completed 298 miles thus leaving the official BSCRA record distance at a lower figure than the Hatfield distance of 304 miles, perhaps the teams in next years race will finally beat that incredible distance set up in 1975.

Below: the extremely fast but inconsistent Area 2 car raced by the local team. Pete Crane, Steve Mutimer, Mark Harrison, Ian Fitzpatrick, Paul Lyon. The car was built by Charlie Fitzpatrick and features infinity can motor and magnets.

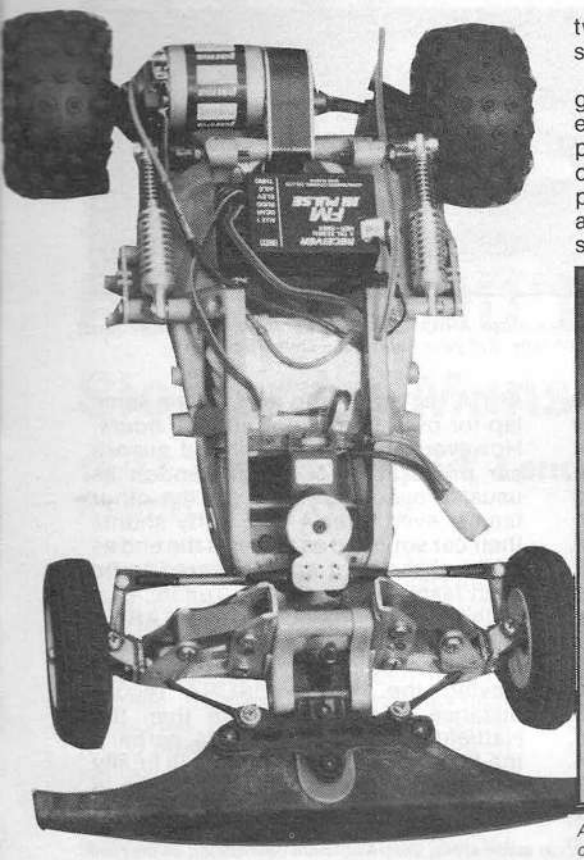


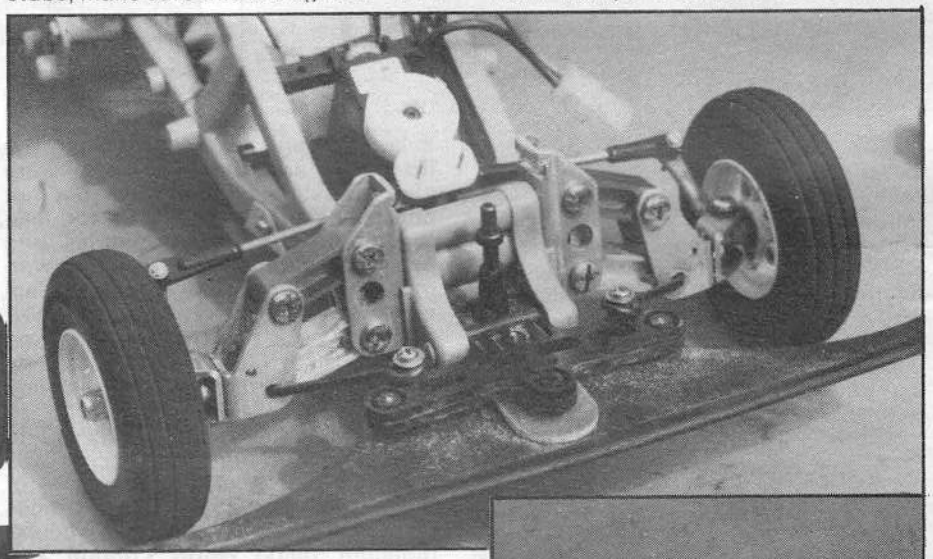
Below: the MURA team car taken at rest before ultimate destruction on the race-track. The drivers were: Keith Packer, Dave Chambers, Mick Webb, Bob Williams. MURA motor equipment was complemented with MG gears and Betta body. Built by Mick Webb.

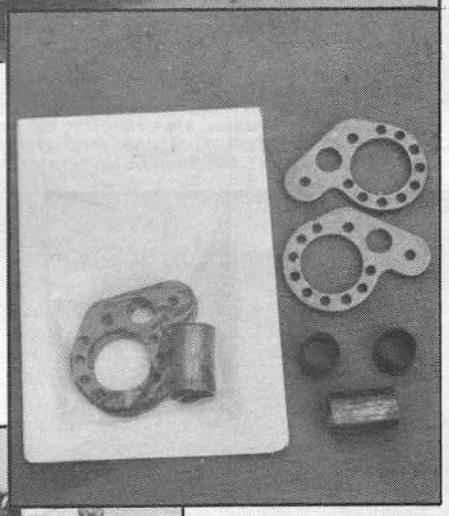


Rough Riders

by Bill Burkinshaw







Above left: a much more cleaner looking 'Frog' chassis after various modifications. Above: new alloy front-end, TMS uppers and A. Hopkinson lowers. The front bumper is also from TMS. The centrally located servo uses a Kimbrough, Off-Road servo-saver connected to the steering arms here, via Parma track-rods.

Frog Update, Update, Update

The last couple of months has seen an 'explosion' in the amount of optional extras and tune-up parts available for the *Tamiya* 'Frog', 'Brat', 'Lancia Rally' buggies. Some of these we have had the opportunity to test with the following results.

The most common extra, available is replacement front suspension arms manufactured from aluminium or suitably alloy.

Two manufacturers, both British, have sent their's to look at: *A. Hopkinson Ltd.*, and *Trade Model Supplies. A. Hopkinson* supply both upper and lower arms whilst *TMS* only supply (at present) the uppers.

Basically the thought behind these items is to reduce wear because the plastic kit items tend to develop elongated holes after a few hours' use. Although these new items are direct replacements some 'play' be apparent between the arms and their supports. To avoid this, make up some Lexan washers, (from excess bodyshell material) to reduce the clearance. **See Fig. 1.**

Prices: *A. Hopkinson*, £8.95 (complete set)

TMS £2.95 (upper pair). £4.95 (lower pair).

Another life prolonging item has been produced by *Specialist Turned Parts* who are now marketing a complete bearing system for the rear suspension system. The kit parts include a phosphor bronze bearing, two alloy end caps and two outer, pivot stoppers.

The main bearing is a push fit into the gearbox and very little work is required except to drill, file or ream out the side-plates to ½in. dia. This bearing should only be a light push-fit and not glued in permanently. The alloy end caps are also push-fit onto the rear arm pivot stubs, make sure this is a tight fit — if in doubt glue it on. The resulting bearing is much smoother, although a little tight at first. This can be overcome by a light polishing of the alloy caps with fine emery paper.

Finally, the outer pivot stoppers can be made from steel or aluminium according to customer preference. The stoppers are 3mm thick and this increased bearing area will dramatically cut down the wear rate on the plastic arm.

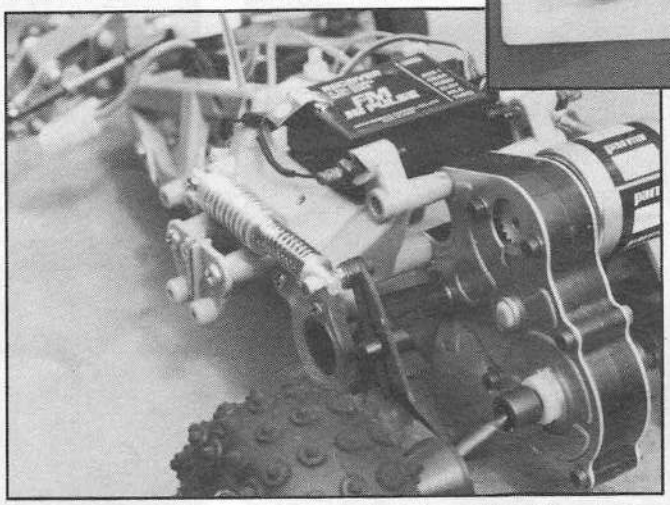
All in all a very useful modification which will prolong the life of your buggy a great deal.

Price: £12.00 (complete set).

Finally, some straightforward 'home' modifications to up-date your 'Frog'. Replacing the steering track rods is a must as the ordinary 'pop-on' type will soon 'pop-off' as they become worn.

The captive type ball joints as used on the 'Super-Champ' are ideal and these should be available as spares from *Tamiya* stockists. However, on the 'Frog' the ball-joint heads are riveted onto the steering arms and need to be removed. This can be simply achieved by drilling them out from underneath. **See Fig. 2.**

On the 'Model Cars' 'Frog' I have fitted the Glyn Peglar 'Laser Buggy'



Above: the specialist turned parts rear bearing kit and instructions. Two types of outer pivots are available either alloy or steel. Left: 'Frog' rear-end fitted with STP gearbox bearing but using A. Hopkinson perspex outer pivot. The Tamiya dampers work extremely well if carefully and correctly assembled. Kit springs have been substituted with 'Grasshopper' equivalents. Finally, Parma Porsche buggy motor provides the power.

Fig. 1

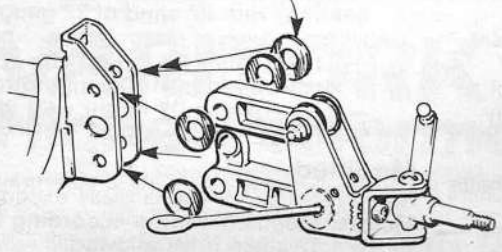
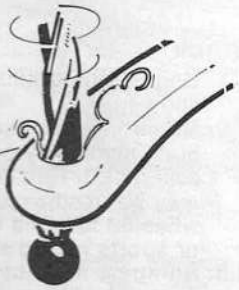


Fig. 2



speed controller. Now that the additional servo has been discarded the steering servo is centrally mounted. This will required the drilling of two extra holes in the servo mounts. For simplicity's sake we chose to use tie-wraps to secure the servo.

The 'Laser Buggy' speed controller is a neat fit inside the chassis once some trimming of the plastic has been accomplished. If the expense of an electronic controller is too much then an alternative arrangement with the existing controller can be made, by re-positioning the servo on the flat part of the chassis, above the Ni-Cad pack.

That's basically it for 'Frog' owners, although I am sure that our readers will have a few more modifications that are worth considering.

Rough or Smooth?

One of the most interesting observations made at the recent 1/8th Off-Road European Championships was the very low — almost non-existent, number of actual breakages of cars. Setting aside such calamities as collision with the drivers rostrum, fence posts and the pit lane barrier, cars were rolling, flying through the air colliding heavily, very frequently and not suffering breakages. With few exceptions, the major reasons for retirement from heats was engine failure or plastic gears stripping. However rough the track looked, and indeed was, the fact that cars slide when they return to the ground because of the loose surface rather than stop abruptly is obviously less damaging than on our own grass circuits. The high grip grass, stops cars abruptly and does impose greater loads on the whole car than the hard gravel in common use in continental Europe.

If the actual racing surface is suitable, sandy or gravel, we will actually end up with cheaper racing providing cars are adequately protected against dust and grit. Not that on grass the effects of dust can be ignored, inadequate filters, and dry conditions combine to turn the soil underlying grass circuits into loose dust. I recently witnessed a newcomer to 1/8th Off-Road ruin 2 piston/cylinder assemblies in one meeting. So there you have it, the European buggy manufacturers have been unable to understand the rate of breakages experienced on their products in the U.K. It looks as though we might know the answer, all that remains is to educate circuit builders and clubs into producing circuits that don't wreck cars.

EFRA EGM

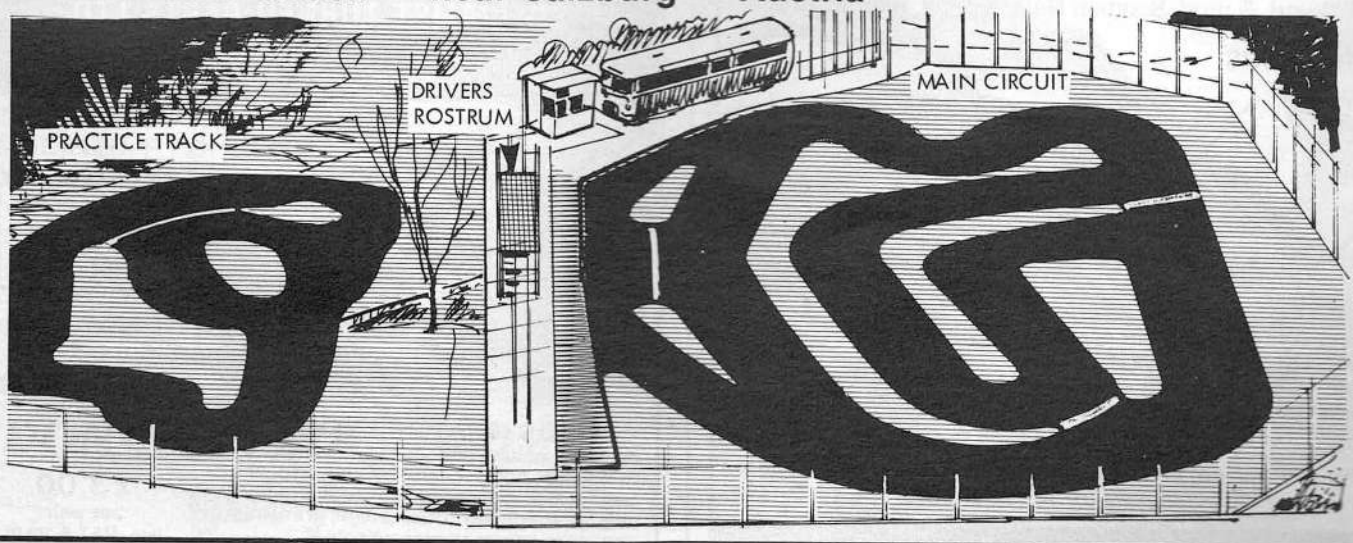
During the Swedish Euro Champs meeting, representatives of the member nations of EFRA (European Federation Radio Autos) met to discuss, amongst the problems of the day, 1/10th electric rules, the 1/8th appearance rules and the 1985 1/8th Euro-Champs.

A proposed set of 1/10th scale racing rules is now available for general discussion before adoption at the 1984 EFRA General meetings to be held in November. In principle, the rules look fine. Construction rules are very open as are our own BRCA rules, with the exception that seven cells will be permitted. Really the only decisions to be made concern race procedure, the feeling is that shorter, five minute heats will provide fast racing particularly with modified motors but a single five minute final is neither a spectator event or a true test of driving skill to choose a champion. Thoughts revolve around the possibility of running the final in three stages with all the results to count on a points basis to decide the eventual winner. This has much merit and could provide some fascinating racing as the three stages of final proceeded.

Appearance is of very great concern to all nations but the blanket proposal to adopt saloon style bodies for 1/8th scale cars for the 1985 season has not met with universal approval. Although a proposal could not be voted upon at an Extra-ordinary General Meeting, and informal show of hands indicated that a proposal from the BRCA would be accepted at the General Meeting proper. This proposal sets aside the 1983 rule change and directs EFRA to set up a sub-committee to advise on the appearance rules. Hooray for compromise!

In the absence of any other applications, the venue of the 1984 European 1/8th Off-Road Champs is to be in Austria not far from Salzburg on a ▷

The 'A-Team' circuit — near Salzburg — Austria



circuit belonging to a club who go under the name of "The A Team". A photograph of the circuit was circulated and it looks good with a practice circuit available alongside the main track. More details when they are available.

A Grand Prix for England?

During discussions at the Euro Champs many nations indicated that a Grand Prix in England would be welcomed, all we need to do is run one! A nucleus of U.K. 1/8th Off-Road racers seem keen to have a go with approaches being made to Robin Cloke owner of the Remote World Circuit at Goring on Thames. Money will need to be spent, but the basis of circuit, permanent rostrum and camping facilities are there with plenty of local attractions to entertain overseas visitors. It would be really interesting to take on the Continental opposition on our own terms instead of on theirs.

EFRA 1/10th Scale Off-Road rules

Stock

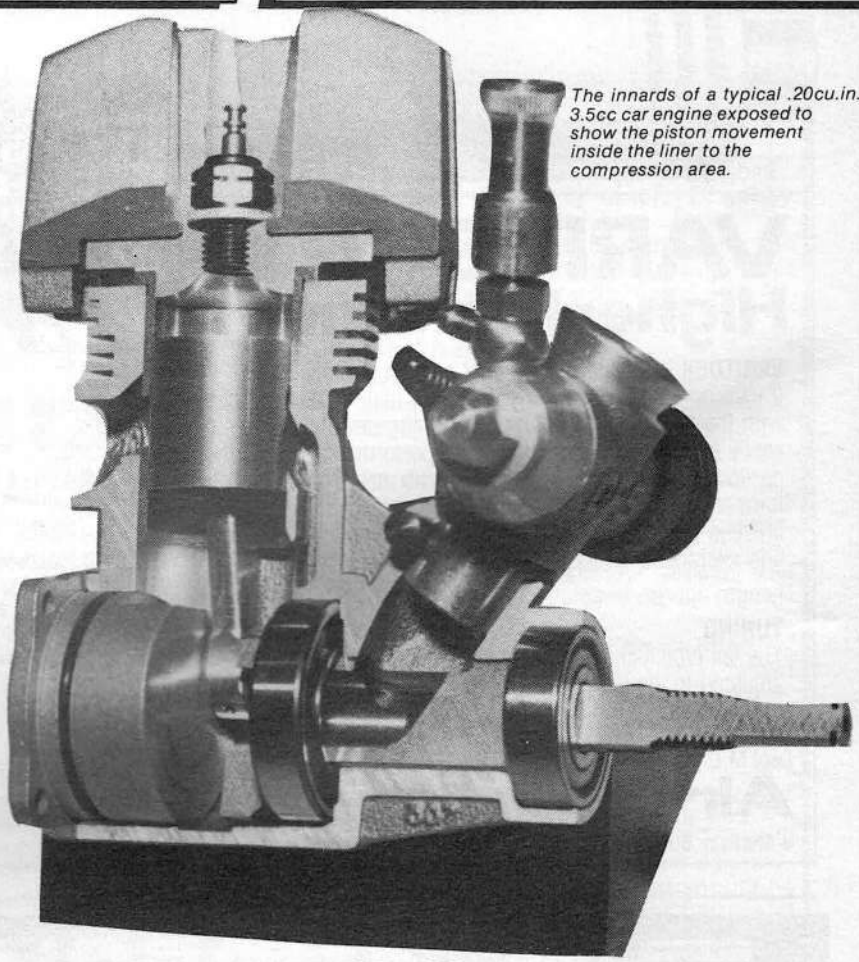
1.1. Unlimited modification on cars allowed.
1.2. No car may be raced without a body shell. Any commercially available 1/10th scale body shell may be used except open-wheeled formula one type shells or sports racing shells.
1.3. Bumpers must be of a flexible material with no sharp edges.
1.4. Overall length: 457mm maximum, including bumpers.
Overall width: 241mm maximum, outside of tire to outside of tire.
2.0. 7 cells of 1.2 volt, 1200 mAh Nicad batteries. Specification of battery cells according to EFRA 1/12 scale rules.
3.0. 5 minute heats.
4.0. Motors: Unopened stock Off-Road motors. No modification allowed, including re-timing, re-ballancing, epoxy or ball bearings.
Re-magnetising is allowed.
Windings — 27 turns of 22 gauge wire (error factor of — 1 turn allowed on 2 of 3 poles only)
4.1. Motor with more than 27 turn of 22 gauge wire will be considered for approval.
4.2. Legal motors:
— The Mabushi RS 540 non ball bearing, with 27 wind of 22 gauge wire.
— The Igarashi 05 motor with 28
— or more winds of 22 gauge wire.
— The Yokomo 05 motor with 28 winds of 22 gauge wire.

Modified

Same rules as for Stock class except:
Motors: Modified motors according to EFRA 1:12 scale rules allowed.
In addition to this a:
Production — class, which is recommended as a beginners class raced in national events only. It should therefore be up to each country's national organisation to make the rules for this class. However, following is recommended:
— Any speed control can be fitted.
— Max 6 cells 1.2v 1200mAh Nicad batteries to be used.
— Any type of 1:10 scale tyre or rim can be used as long as no modification is necessary on wheel hub.
— Every car must race with a body, any type of 1:10 scale body is allowed.
— Bumbers must be of a flexible material and have no sharpe edges.
— Stock motors unopened should be used (same as in stock class 1:10 scale)

Prepare For Success

by Bill Burkinshaw



The innards of a typical .20cu.in./ 3.5cc car engine exposed to show the piston movement inside the liner to the compression area.

Engine Maintenance

Bill Burkinshaw examines engine upkeep and how best to go about it

ADVISING PEOPLE not to take engines to pieces is probably a somewhat negative approach to an article on engine maintenance and preparation. But, modellers being what they are, the temptation to tinker is bound to get the upper hand at some time! If you are going to strip down an engine then there are a whole host of little tips and techniques that you should be aware of.

When to strip down?

Most car drivers will be quite content to accept the engine as supplied from the manufacturer as a properly set-up powerplant ready to use (and abuse) in the chosen car. Under normal circumstances such an owner will continue to use the engine until it is worn out or something breaks.

The other type of owner only feels happy when he has stripped the motor, cleaned out what he considers to be the rubbish left in it during manufacturing, fitted a high speed main bearing, drilled sundry holes in the crankcase and generally 'improved' the whole thing. In my experience unless the latter owner is a skilled engineer, he will have a less happy experience with his motors than he who just buys and runs the motor. Taking an engine to pieces is all too simple, putting it back together again properly is another matter entirely.

However, there will surely come a time whichever category of owner you come into when a strip-down is essential as something either breaks or is so badly worn that replacement is essential. The most regular item on the list of replacements is the piston and cylinder, or in older motors, the piston ring.

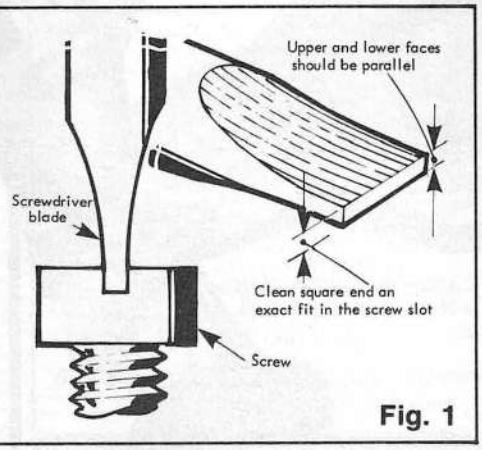


Fig. 1

Tools and materials required

Firstly I will describe the list of tools that are essential, then the exotic extras the tune-up enthusiast will need.

(**1**) Proper size, good quality screwdrivers, Allen keys, spanners, etc., to fit all the types of screw and nut on your engine, all in good condition. Ordinary engineers screwdrivers should be correctly ground to fit screws (**See Fig. 1**). Most screwdrivers these days are made from alloy steel and are not hardened and can therefore be shaped properly with a smooth cut file. Small pliers, tweezers, a good vice and a glow plug spanner.

(**2**) Suitable cleaning solvents (strong detergent, petrol methylated spirits), a stiff brush and material for blocking all the engine openings during cleaning. Kitchen paper towel is ideal for this purpose.

(**3**) Several pieces of hardwood dowel, new and in good condition and a clean block of hardwood approximately 50mm square and 25mm thick.

(**4**) Several clean, solvent resistant containers for holding parts during cleaning and assembly.

(**5**) Lubricating oil for use during re-assembly, thread locking compound and silicone sealant.

(**6**) Access to a domestic oven.

(**7**) A depth micrometer and ordinary micrometer for checking squish band clearance and measuring shims will be necessary if more than a basic replacement job is undertaken.

Once you have assembled all the necessary parts and materials, select a suitable environment to work in. I usually move out of my workshop when it comes to engine re-building time. A

move to the less dusty domestic kitchen also has the bonus of an oven and gas ring handy for the essential heat source required for the bearing fitting and removal. A strong light source is also necessary and usually to be found in kitchens.

Engine dismantling

Before making any attempt to remove a single screw from the engine, effectively plug the various openings including the fuel nipple on the carburettor. Now clean the exterior of the engine scrupulously. I use a strong detergent and a stiff brush then wash off the dissolved muck under the hot water tap at the kitchen sink. Make sure that even the slots of screwheads are clean. Once the engine is clean then you are ready to start.

The most simple check of all is on the state of the big end bearing, that is the lower end of the connecting rod crankpin fit. To check this remove the backplate of the engine which is usually retained with four screws. There may be a gasket fitted, don't just wrench the backplate straight off, remove it carefully in case the gasket is stuck partly to the crankcase and partially to the backplate.

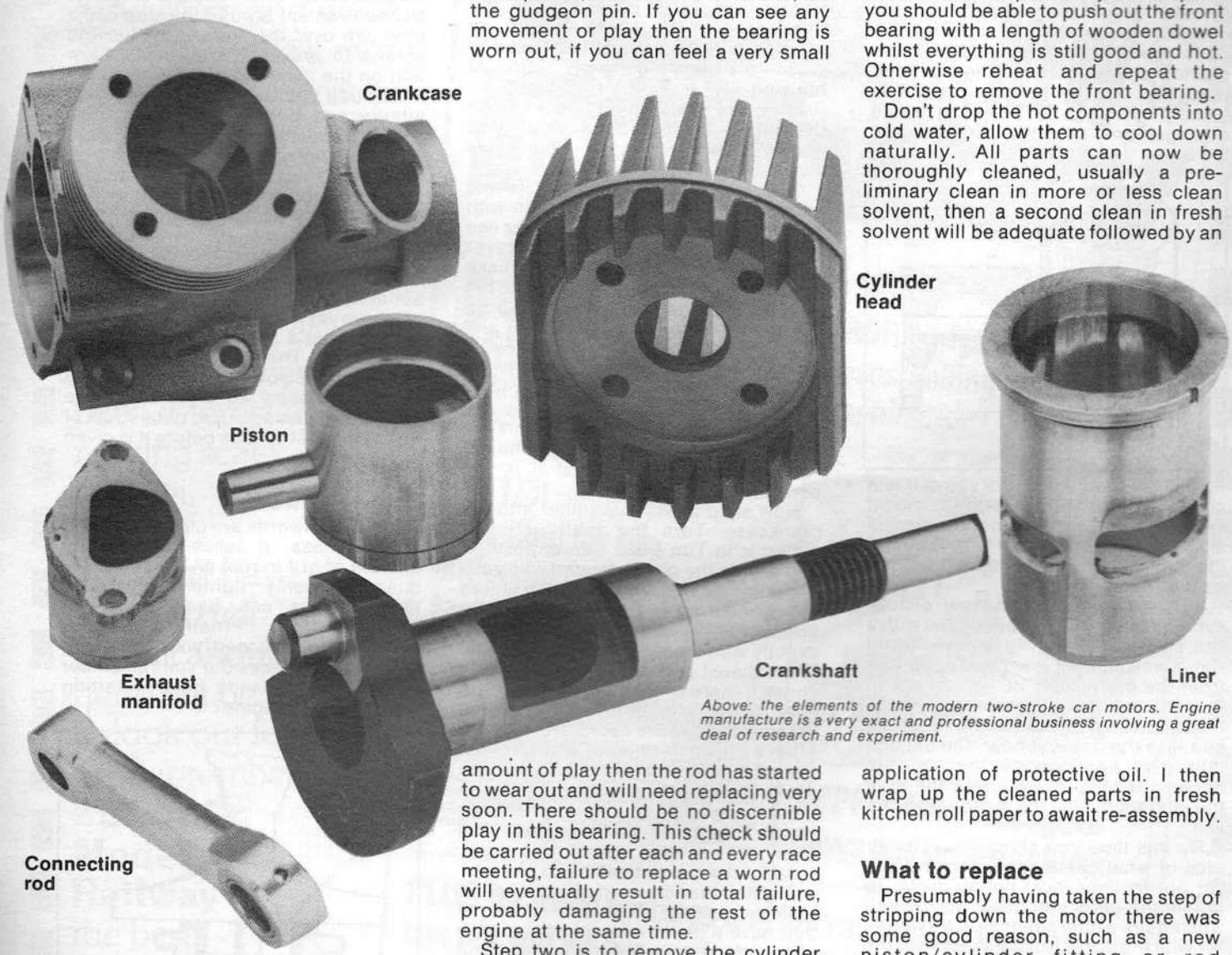
With the backplate removed, turn over the engine until it reaches top dead centre and then rotate the crankshaft backwards and forwards a few degrees. In cases of extreme wear the rod can be heard to 'click' on the crankpin or, even at the little end, on the gudgeon pin. If you can see any movement or play then the bearing is worn out, if you can feel a very small amount of play then the rod has started to wear out and will need replacing very soon. There should be no discernible play in this bearing. This check should be carried out after each and every race meeting, failure to replace a worn rod will eventually result in total failure, probably damaging the rest of the engine at the same time.

Step two is to remove the cylinder head/heatsink. Once this is removed the cylinder liner can be pushed out. This is sometimes a little tricky but can usually be accomplished by carefully pushing on the bottom of the cylinder with a length of wooden dowel.

With cylinder liner drawn out mark the rod with a soft pencil or crayon so that it and the piston can be returned to its place the right way round on reassembly. Now lift the rod from the crankpin with a pair of tweezers and the piston and rod can be removed from the crankcase. The crankshaft will usually slide out at this stage but if it is too tight a fit in the bearings a tap with a block of wood will cause it to drop out. Remove the carburettor from the crankcase and turn on the oven!

Place the complete crankcase on a suitable tin lid, baking tray, etc., in the oven set at 150° C for 5-10 minutes. With suitable protective clothing i.e. oven-gloves or rag, remove the crankcase and tap smartly downwards onto a clean block of wood. The rear bearing should then drop out. If you are quick you should be able to push out the front bearing with a length of wooden dowel whilst everything is still good and hot. Otherwise reheat and repeat the exercise to remove the front bearing.

Don't drop the hot components into cold water, allow them to cool down naturally. All parts can now be thoroughly cleaned, usually a preliminary clean in more or less clean solvent, then a second clean in fresh solvent will be adequate followed by an application of protective oil. I then wrap up the cleaned parts in fresh kitchen roll paper to await re-assembly.



Above: the elements of the modern two-stroke car motors. Engine manufacture is a very exact and professional business involving a great deal of research and experiment.

What to replace

Presumably having taken the step of stripping down the motor there was some good reason, such as a new piston/cylinder fitting or rod replacement. Even if only one part was planned as a replacement everything else needs checking at this stage.

Ball races are number one on the list and these should be absolutely free of sideways play and have no trace of 'grittiness' when spun. The front race is usually sealed on one side — the outside, and this is a little more difficult to clean. I use strong detergent and the effects of the high pressure hot water tap to clean bearings. Any trace of rust on the bearings signals instant replacement, don't just clean them with emery cloth and replace!

Prepare For Success

Piston/cylinder assemblies of the ABC type are made as a matched pair and have to be replaced as a unit. However, if you have a ringed piston engine, a simple ring replacement will usually rejuvenate the motor. Both types of motor usually have some form of restraint for the gudgeon pin either in the form of PTFE, Nylon or Brass pads in the holes in the piston or small wire circlips. The gudgeon pin floats in the small end bearing and depending on the arrangement of the parts in the cylinder either the circlips stop the gudgeon sliding out into a port or the pads prevent the hard gudgeon pin scoring the surface of the cylinder. **(See Fig. 2).** To remove pads it is usually sufficient to push the whole arrangement straight through the piston.

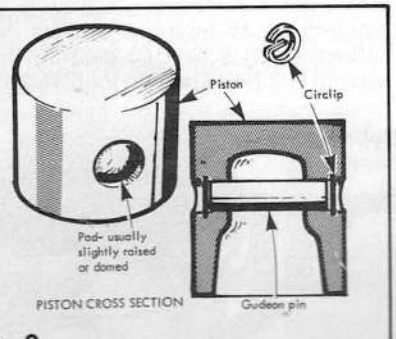


Fig. 2

Circlips are a little tricky and it is a good idea to deal with these whilst keeping the piston/rod assembly inside a clear polythene bag. If one of the circlips does fly off, then it will not be lost.

It is not usual for a new piston/cylinder assembly to be supplied with a rod, so it is necessary to remove the old rod — assuming it is in good condition from the old piston. Be careful not to rub off the face marking for even though the new piston being fitted will bed into the new cylinder, the big and little end bearings of the rod are already bedded in. Do check the fit of the gudgeon pin, the piston and the rod.

By this time you should have a fair idea of what needs replacing and can set out to your local hobby dealer to obtain the parts you need. Maybe you will require a little patience at this stage for with the dozens of engines available and with all the subdivisions and marks produced you may have to wait for a spares order to be processed via the main distributor, or in some cases the manufacturer.

Re-assembly techniques

Once you have the parts you need then adopt the same, careful approach throughout the exercise, don't be tempted to rush just to get it all going again. The new parts should be thoroughly cleaned and lightly oiled before building into the engine. Don't allow pistons and cylinders to knock against one another in a jar of solvent, clean them separately.

First re-fit the bearings. To do this you must warm up the crankcase as previously described then slide the rear bearing onto the crankshaft and push the whole assembly firmly into the heated crankcase. Tap the shaft down gently using a piece of wood and a small hammer to properly seat the bearings. Do make sure that the tools are clean, wipe them over with clean kitchen paper before each use. The front bearing can be slid down the threaded end of the shaft into its housing and a length of tube used to press the bearing firmly into its housing.

Allow the whole thing to cool down then apply a small amount of good quality lubricating oil to the ball races and crankshaft.

Now fit the connecting rod to the piston. Only grip the new piston with your fingers. **Don't use a vice; never use pliers.** Fit new circlips wherever possible and if pads are fitted make certain they are a good push fit into the piston. Oil the moving parts then drop the piston/rod into the crankcase and drop it onto the crankpin. There is usually only one position in the rotation of the crankshaft that this is easily accomplished, don't force the rod over the crankpin, you will mark the bearing. Also check that if it is the old rod you are re-fitting that it is the correct way round.

Now slide the cylinder liner into the crankcase. Turn the shaft until the piston is in Top Dead Centre position and wiggle the piston around with your finger inside the cylinder until it enters the cylinder bore. Push the liner fully home checking that the ports line up exactly with the ports in the crankcase. The exhaust port is easiest to use as a check if there is no locating pin for the liner fitted into the case. Oil the assembly and fit the backplate. There is often a step in the plug-in section of the backplate designed to allow gasses to easily pass up the transfer ports. On most engines hole alignment or words/letters on the backplate will show which way round this goes. Usually the cut-out will be to the top.

Tighten the screws in diagonal order with a properly fitting screwdriver. If you have a depth micrometer you can at this stage measure the squish band clearance and adjust with shims to suit. Turn the engine to TDC and use the micrometer to measure the depth of the piston face down from the top edge of the cylinder A. Now take any existing shims off the head and measure the height of the plug-in section of the head B from A to find the un-shimmed squish band clearance **(See Fig. 3).** An average setting should be around 0.015in. and shims should be added to pack up the head to give this. If it is more than this to start with, the only solution is to put the head into a lathe and machine it. This is a very unlikely situation I should stress.

Fit the head retaining screws using the same diagonal tightening sequence. Now turn over the engine carefully by hand. It should be very free except over TDC where new ABC piston/cyinder assemblies are often tight, some even squeak when turned over. If all is well fit a plug and check that compression is good.

Starting up

Re-fit carburettor, using a smear of silicone sealant around the stub and a little dab over the ends of the locking screws to prevent air leakages. Now bolt on the manifold and re-install the motor into your car. Remember, to all intents and purposes this is a new engine and should be treated as such. Spin the engine over with your starter until it has drawn up fuel then connect the glowplug and fire it up. Allow it to tick over for a minute or two and then give the throttle a couple of gentle blips to see that all is well.

I don't really care what people say about ABC motors needing no running in; I have yet to see the motor that didn't benefit from a gradual building up to full power. There may be little difference to the power output but engine life will probably be enhanced if the engine is given a couple of tankfuls of fuel at modest speeds before it is given its head.

The watchwords

The watchwords are cleanliness and thoroughness. It takes only a tiny amount of grit to ruin an expensive rebuild, unevenly tightened cylinder head screws can badly distort a cylinder liner. Finally, however carefully you cleaned your tools and your work surfaces did you remember to wash your hands before starting work on your engine? □

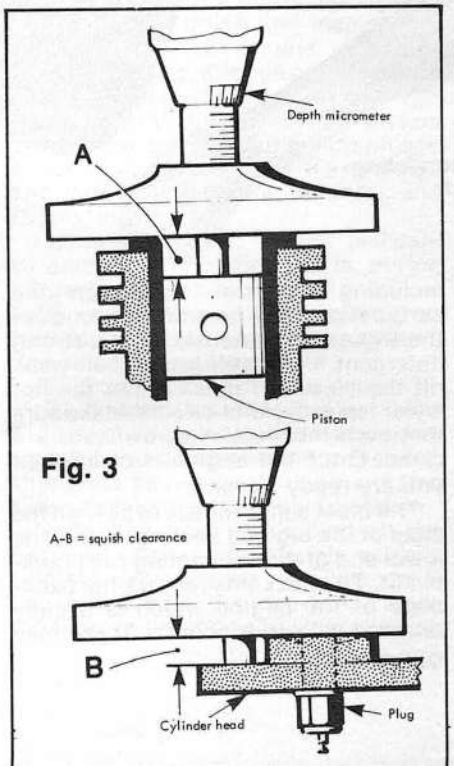


Fig. 3

New Magazine

Railways is still the most popular area of modelling, and we're about to make it more popular still. Because September 21st will see the launch of **Your Model Railway,** the first really professional magazine for *all* who have ever been interested in making scale layouts.

We don't have space to tell you all about it here, but be sure to look out for it on September 21st. **Your Model Railway** – the best.

Out Fri. Sept. 21st

BRCA/Ever Ready 1/8th Scale British Grand Prix
Southampton — July 1st
Report: Southampton RCMC

A PERFECT WEEKEND greeted the near full and International entry for the *Ever Ready* British Grand Prix. The months of preparation had paid off. *T.V.S.'s* programme on Thursday brought the crowds out in force. *B.B.C.'s* 'Top Gear' Programme were also filming all weekend. (The programme goes out in October, we believe).

Sunday

Saturday, and the heats started in earnest. The Bervoets automatic lap counting system, which necessitated special wires laid into the track, and the B.B.C. computer system of Ron Wylie ably manned by Muriel Russell and Eric White, burst into life and never faultered all weekend.

Gary Culver held F.T.D. for the first 3 rounds, but was beaten in the 4th by Debbie Preston, who set a new lap record. Bob Errington and Paul Pagdin joining them in the Open Final.

5-20% Final

A very close and interesting race for the full 15 minutes, saw R. Leonard overcoming strong challenges from both S. Bennett and J. Richers. The first three being in that order.

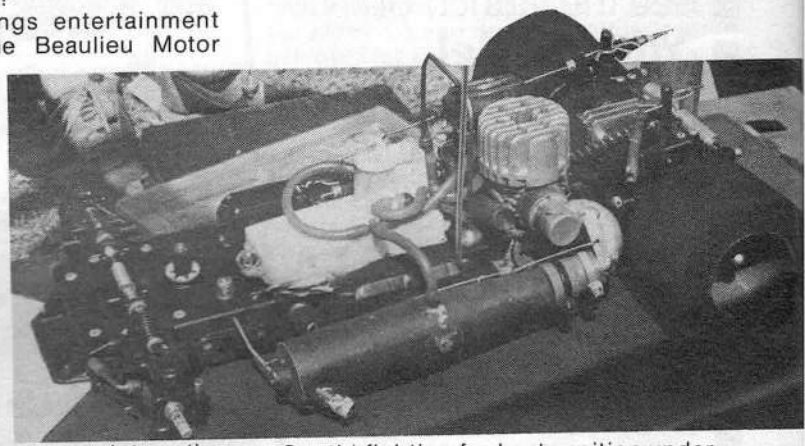
25%+

Both Chris White and Colin Strauss (as the Open Finalists had not been finalised), elected to drive in the final. Both disappeared into the distance leaving the battle for 3rd which was close and hard fought. Colin's engine cut (we'll hear more of this later) leaving Chris to win from Terry Wareham and Murray Collins.

A noticeable change from Easter was total lack of interference even with the massive metal structure which comprised the covered pits area. The only difference ... Transmitter control. Perhaps this should be implimented at all major meetings?

Saturday evenings entertainment was a trip to the Beaulieu Motor Museum which was very interesting and a meal which was also very interesting but for different reasons! Everyone seemed to enjoy the occasion though.

Above: the start of the British GP 'Open' final as ten cars stream away from the echelon start. Paul Pagdin's car is third.



Right: Paul Pagdin's, Picco powered, PB 'Nova' prior to the Open class final. It's good to see a British car (albeit with Italian engine) win on home soil.

Sunday

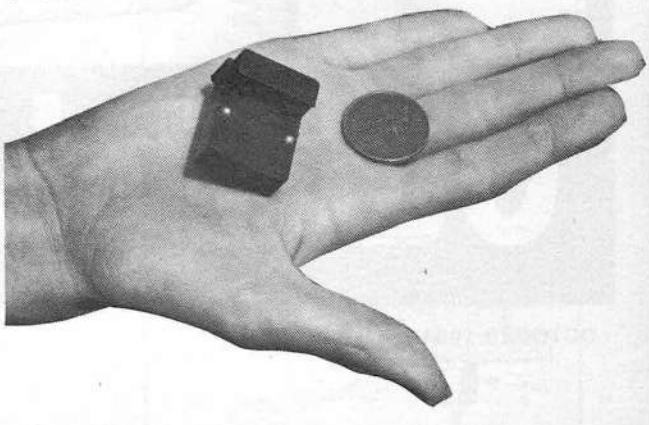
Again blessed with great weather, saw another camera crew *(B.B.C. South)* fighting for best position under the rostrum. The knockout finals started with fine precision, when the Mayor arrived we were running less than 30 seconds late — nobody seemed to mind!! The races were clean and fast all day. G. Dilly must have been pleased with his efforts, as he moved through three sub-finals before faultering.

Left: the dynamic duo, terrible twins, gruesome... call them what you will, but Keith Plested and Paul Pagdin (right) look well pleased with the first place trophy.

Semi A

Several drivers led this race from time to time, but it was Phil Greeno who stole the limelight and traction and led from the last fuel stop to the finish. The race however was hotting up for second place. Phil Hague, John Chamberlain Walt Bailey and Jacob

Below: the automatic lap-counting system onboard transmitter – hardly bigger than a 2p piece.



Above: the finalists line up. Left to right: Bob Errington (just); Paul Pagdin; Ted Longshaw (commentator); Debbie Preston; Rody Roem; Gary Culver; Jacob Buehler; Phil Greeno; Walt Bailey; John Chamberlain and Colin Strauss.

Buehler (Switzerland) snapping and biting at each others heels. The horn sounded to end the race, Buehler heading for the line, hit a tyre and spun leaving J.C. to cross in 2nd place. Both Walt and Buehler would have to wait for the times from Semi B to see whether they would qualify for the final.

Semi B

After a messy start, the drivers settled into their task. Rody Roem (Holland) Colin Strauss, Stuart Grant (Australia) and the ever present Steve White fighting tooth and nail for the lead. They followed each other lap after lap (possibly slowing each other up in the process). Rody Roem crossed the line first followed by Colin Strauss, Steve White and Stuart Grant. Unfortunately the times of the latter two were not quick enough to qualify them for the main final. "It's a long way from Australia"!

Open Final

Just before the start of this Final, the Referee decided to toughen up on the pitting procedures. White boxes were painted in the pit lane. Each mechanic had his own box (calculated in order like the echelon starts), and if he put one foot outside this area his driver would be penalised one lap and given a warning. Just before the start, Bob Errington must have had a small problem, as he exercised his right to a ten minute delay. The problem rectified, the race began. Debbie took the early lead, followed by Gary and Paul, obviously looking for a 1-2-3.

Paul worked his way into the lead followed by Debbie and Rody Roem in third place, with Gary falling back. Phil Greeno now charging through the field passed Debbie when her engine cut. It was not to be though for after a few laps Phil's engine also went bang and cut, Paul now finding himself back in the lead pulled away from the rest of the field, his Picco powered 'Nova' performing faultlessly. Debbie, amazingly back into second place, was fighting off strong challenges from both Bob, Jacob Buehler and John Chamberlain. Bob's engine then cut, as did Colin Strauss' (again) leaving Paul to win, a clear winner from Debbie and Bob.

As the foreign entries were keen for an early start home the main trophies were presented by Saul Manashe (EFRA) and John Breckon (Imperator Ltd) on behalf of *Ever Ready*.

Clubmans

Last, but not least, the Clubman's finalists climbed the rostrum for a battle royale. Andy Stafford took the early lead, but was quickly passed by Paul Landels and Mark Stockford who charged through the chicane. Mark passed Paul and led until the first pitstop. An incredibly quick pitstop from John Ward saw Paul out on the track first. he held this position from Mark for the next ten minutes with Mark literally riding on his rear bumper and both cars having the same time on computer. The battle for third was equally as tight, Pete Murkovic, Andy, Frank Chung and Charlie Dudfield being separated by less than 5 seconds. Mark's push for the lead ended when he tried to overtake Paul on a "less grippy" part of the track and spun off, leaving Paul to win, followed by Mark, Charlie and Frank.

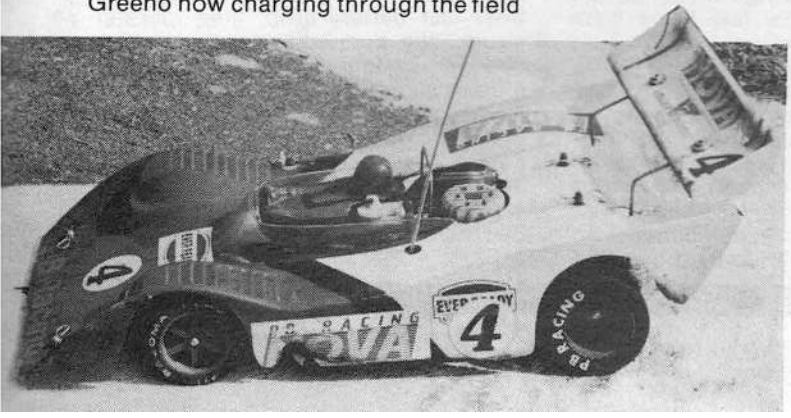
Roundup

Thanks must go to Eric and Muriel in race control, the two referees Jeff Lindstrom (UK) and Andre Vanlinder (Belgium), Dennis Jones (starter), Ron Wylie for the lap counter and P.A., Robin Ellis for his commentary and all the other members of the GP Committee and the Southampton Club too many to mention. Thanks also to *Ever Ready* for their kind sponsorship and to the Southampton City Council for their help and encouragement.

Interestingly perhaps for the sponsor, was the fact that the first cars in the Open Final and the winning car in the Clubman's were using *Ever Ready* Ni-Cads.

Below: what a poser! Paul Landels winner of the Clubmans final looks happy, although that car looks much too neat for him.

Below: Paul Pagdin's 'Nova,' third on the Le-Mans style start, waits patiently within the confines of its start box.



Results

5-2025+

1	R. Leonard
2	S. Bennett
3	J. Richens
4	K. Drinkwater
5	B. Williams
6	J. Mulgrew
7	G. S. Dilley
8	C. Smith
9	T. Preston
10	S. Brook

Clubmans

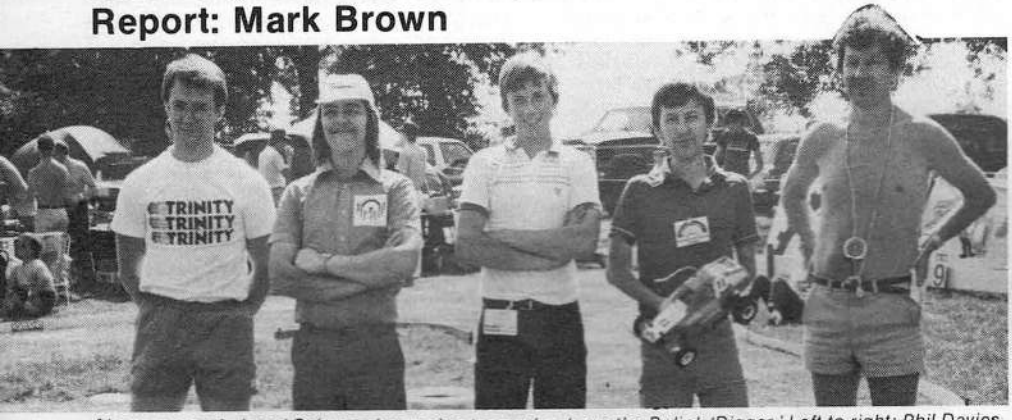
C. White	T. Wareham	P. Landels
M. Collins	N. Sayles	M. Stockford
J. Russell	C. Strauss	C. Dudfield
M. Harmsworth	S. Broover	F. Chung
T. Griffiths	C. Banks	P. Murkovic
		J. Tubby
		S. Fagg
		A. Stafford
		M. Smith
		D. Brader

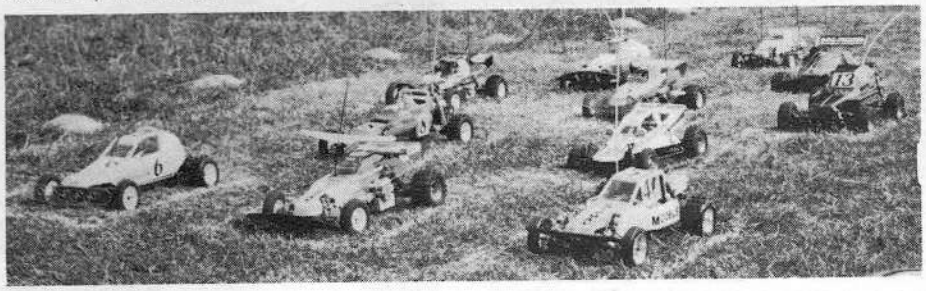
OPEN

1	P. Pagdin	GB	*PB*
2	D. Preston	GB	*PB*
3	B. Errington	GB	*SG*
4	J. Buehler	Swiss	*Serpent*
5	P. Greeno	GB	*SG*
6	J. Chamberlain	GB	*SG*
7	C. Strauss	GB	*PB*
8	R. Roen	Holland	*Serpent*
9	W. Bailey	GB	*Serpent*
10	G. Culver	GB	*PB*

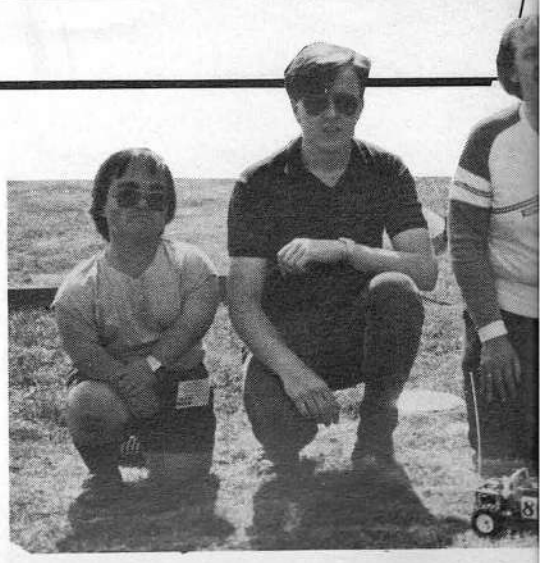
1/10th scale Off-Road six-hour team race. Pottersbury Transport Festival Northampton — August 8th

Race organiser: Colin Spinner
Report: Mark Brown





Above: second placed Schumacher racing team who drove the Bolink 'Digger.' Left to right: Phil Davies, Glyn Peglar (speed controllers); Paul Stallard; Robin Schumacher and the boss, Cecil Schumacher. Below: cars line-up for the start.



Above: third placed Parma Team driving the Hirobo 4WD car. Left to right: Martin Jones; George Land; Pete Stevens; Dave Taylor and

THE FIRST 1/10th Off-Road six hour endurance team race using one buggy took place at the Pottersbury Festival of Transport on the 8th of August. The track was well designed and all grass with some well placed pot holes along the straight, also there was one jump and three buried logs, which caused more trouble for drivers. There were a few rules and regulations, but nothing stringent, thirteen teams in all were attempting to last the six hours and bets were already going down on the odds of them all finishing.

At 10.25 the thirteen teams lined up for the start. All got away safely and a large sigh of relief went up from the pits. The cars were averaging between six and eight minutes on a battery pack which was good going considering it was an all grass circuit. The first battery changes were a worry time for all, the time taken varied greatly from twenty seconds down to an amazing three seconds by the *Schumacher* Team, thanks to their quick change system and Phil 'nimble fingers' Davies as he was nick-named. The most original cooling method for nicads was developed by Team *Associated,* it consisted of a bucket of water and placing the nicads in it while charging.

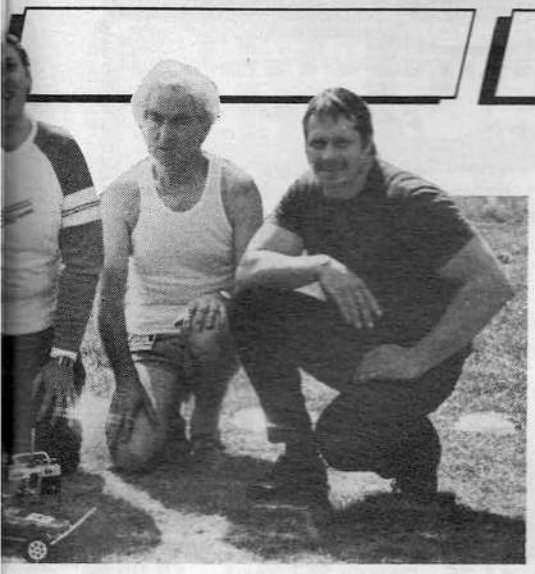
The first trouble appeared after only half an hour when the Bury Club's motor siezed up. *Associated* meanwhile were complaining of lack of steering and finally solved it an hour from the end by using larger fronts, after the advise of a spectator.

As it was such a hot day the main trouble was from blown motors due to overheating, even heat sinks didn't cure the trouble.

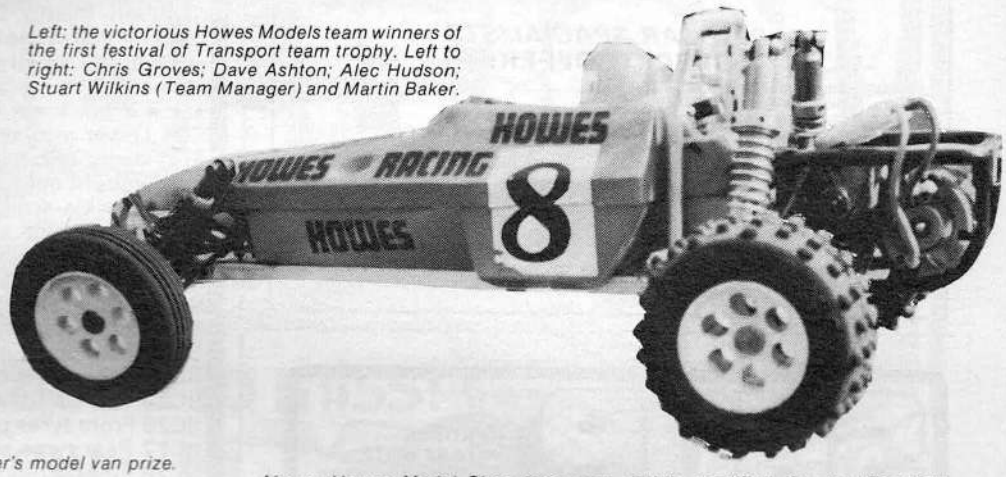
In the first two hours the cars were still settling down, along with the drivers. The racing was very close and competitive the whole of the six hours. Although there were mishaps and breakdowns occuring, most drivers were surprised how few these were during the six hours.

Five of the buggies used by the teams were the new *Tamiya* 'Frog' on their first big test in the racing scene and they performed quiet well, the only trouble they experienced were lost drive shafts and stripped diffs. After four hours the two main leaders *Howes Models* and Team *Schumacher* who had about a twenty lap lead over the rest of the field. *Howes Models* were keeping a steady lead over *Schumacher* due to a faster and better handling car, but *Schumacher* were keeping in touch thanks to their quick change system.

After five hours the lead car of *Howes Models* started to complain and two rear suspension arms broke in quick succession, letting *Schumacher* slip into the lead by only two laps with twenty minutes to go. The pits started to buzz with excitement as the end loomed closer and closer. *Howes Models* would close the gap and then lose it again due to the difference in the battery change times. With two minutes to go and only a lap in it *Schumacher* pulled into the pits for their last battery stop, then disaster struck, the connector on their quick change system broke and *Howes Models* slipped nimbly through into the lead to win the race after six hours by one lap. The third place was won by *Parma Racing* run by George Land. The trophies were presented by the organisers and a vote of thanks was given to the lap counters. □

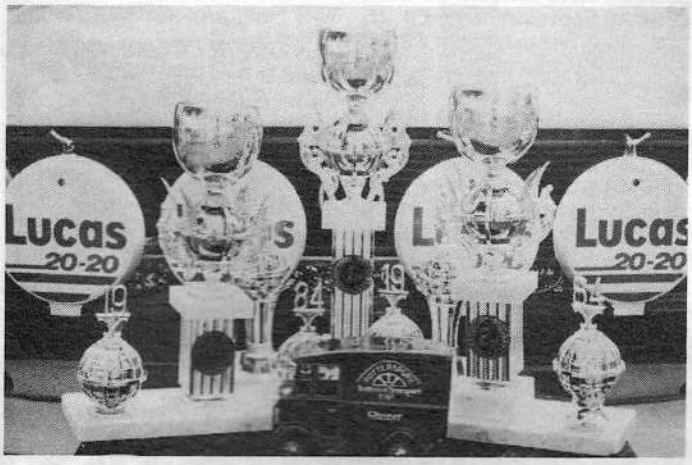


Left: the victorious Howes Models team winners of the first festival of Transport team trophy. Left to right: Chris Groves; Dave Ashton; Alec Hudson; Stuart Wilkins (Team Manager) and Martin Baker.

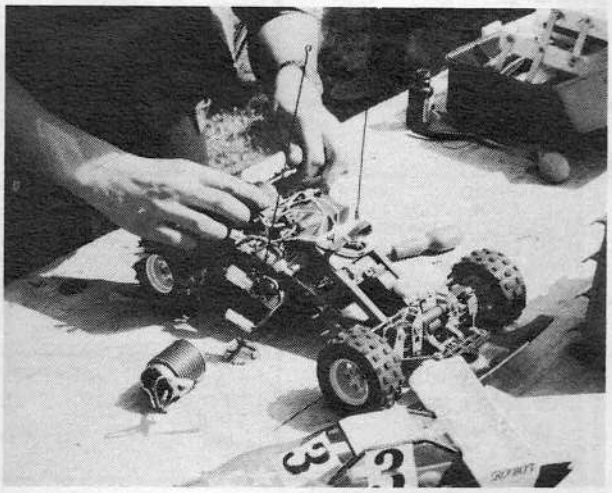


Above: Howes Model Shop team car; slightly modified Kyosho 'Scorpion' featuring 'Land Jump' shocks on the rear. Still performed well after six hours but beginning to lose the edge.

Below: highly coveted trophy array including winner's model van prize.



Below: try tracing the cause of interference in that lot! Thirteen drivers line-up, thumbs at ready for the start of the six-hour race.



Above centre right: the Associated team's novel charging and cooling method. Maybe the drivers could have done with this too. Above: a furious motor-change on the Bury Buggy Club's Tamiya Frog.

HOURS	Howe's Models	Schumacher/ Bolink	Parma Racing	Ripmax Kyosho	World's End Off Road Club	Frog Racing Team	Bury Buggy Club	Associated	AYK Racing Team	Grasshopper Racing	Radio Race Car	Stars Electronics	Ripmax Yokomo
2	223	203	194	177	171	165	155	173	162	126	158	126	139
4	425	407	364	339	324	337	296	382	296	257	275	229	266
6	601	600	494	489	470	453	442	421	417	403	395	350	347

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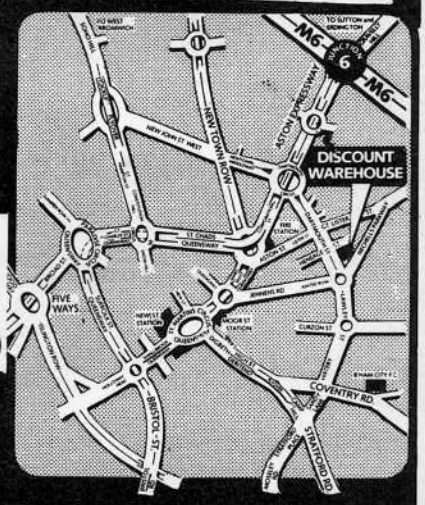

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