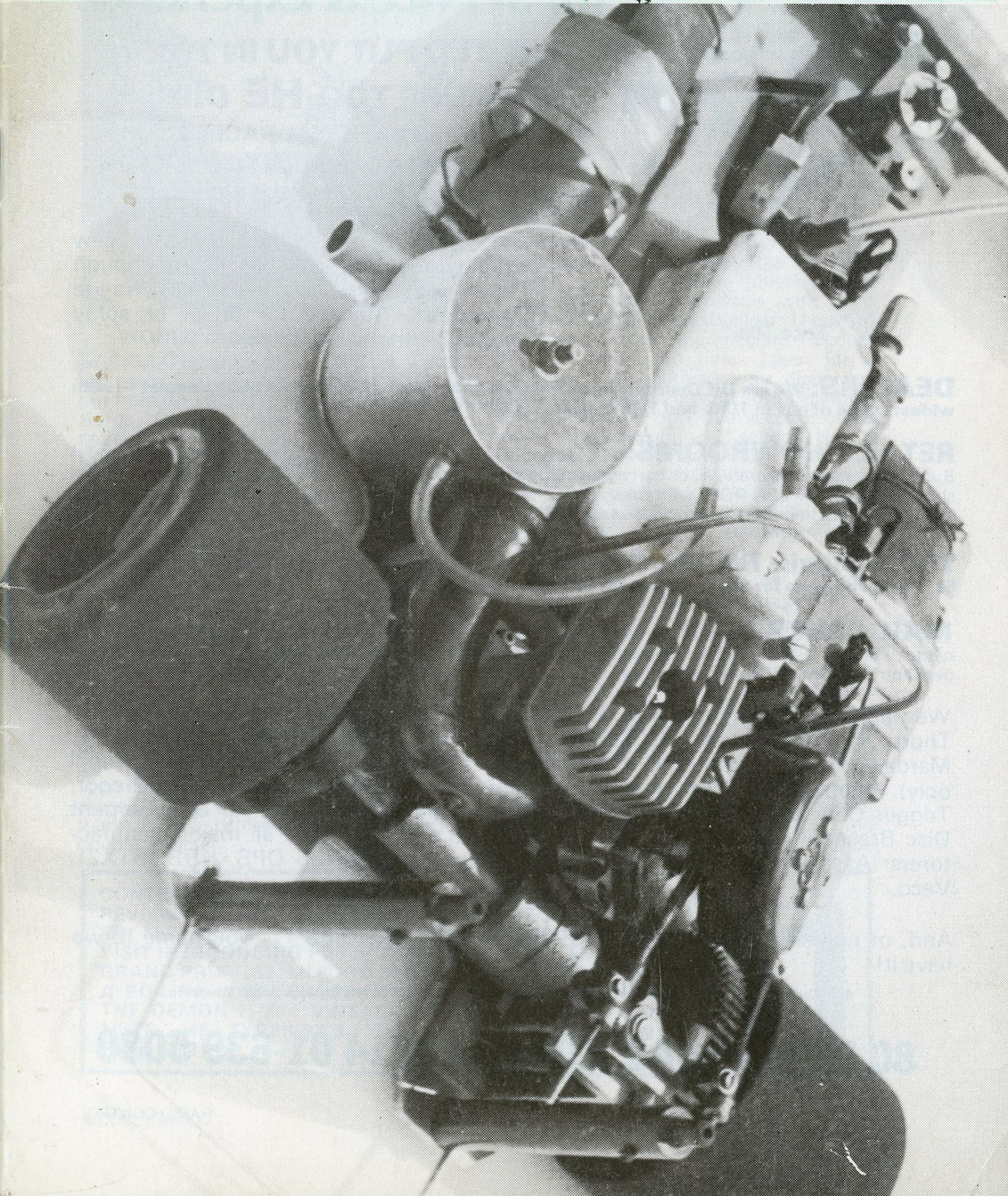
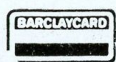


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radio control MODEL CARS

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Editor: "Dickie"
Laidlaw-Dickson

BRITISH TEAM FOR GENEVA

Walter Bailey	Keith Pledest
Phil Booth	Dave Preston
Bob Errington	Debbie Preston
Phil Greeno	Paul Padgin
Dave Martin	Steve White

LILFORD RACE TIMER

I have just been looking at the new Lilford Race Timer still naked in its hand-angle frame and running for the first time officially at their Spring Meeting. Ted Booker was at the controls with Tom Martin looking over his shoulder. There are eight stations and the machine records laps completed and times taken for a number of competitors. A six digit time display runs from zero up to 99 minutes with a resolution of 1/100 second; or 99 hours with a resolution of 1 second. Here's to the next 24-hour team race! There is a memory recall when race is finished. Should other clubs be interested the man to speak to is Jim Crawford, 8 High Street, Souldrop, Beds (Tel. Bedford (0234) 782262).

HURRAH FOR THE RABBITS!

We have a family twisted saying: "If a thing is worth doing, it is worth doing badly!" This goes for a lot of us who can never hope to rival the tigers of the sport but enjoy doing our thing badly so that Andy Digby's *Spring Races* at Lilford Park attracted a full quota of entries, were enjoyed by all in spite of atrocious weather, and are evidently to be followed by similar meetings not only at Lilford but wherever a goodly meed of scratch and high handicap would-be drivers can be



WORLD CHAMPS LATEST . . .

SACKCLOTH and ashes! I got it all wrong last issue. Crib was not even from *Adept* but from their associated publication *Minis Autos*. Beautiful new circuit idea was quashed by (1) Anti-noise petition by local residents, (2) Local political waste of public funds moan. Now club looking for some place else but not in time for champs. Meanwhile some clever people have duplicated published circuit layout so organisers have re-designed same and this will remain a closely guarded secret until the days of days! Ted Longshaw in his latest EFRA newsletter writes: "Though there is no official news I think it's fair to warn all intending competitors that it seems from the latest information I have that there will be VERY LITTLE TIME FOR PRACTICE. With 200 drivers and the possibility that the circuit will not be ready for racing until Monday, it will mean just two days for 200. Qualifying will start on Wednesday so come with your car well prepared, and set up, etc., and the fact that it is in the centre of town is making it doubly difficult."

CONTENTS : EDITORIAL . . 3 : CLUB AND TRACK REVIEW . . 5 : MARDAVE COMPETITION SPECIAL . . 9 : LATEST LECTRICAR . . 14 : FUTURA III TRACK REPORT . . 18 : PB VISIT INTRODUCING PB8 & OTHER GOODIES . . 22 : BRITISH GRAND PRIX . . 30 : LILFORD SPRING RACES . . 34 : BUILDING A BO-LINK . . 38 : SHOPPING AROUND . . 42 : DESIGNING THE DEMON . . 46 : VINTAGE ELECTRICS . . 47 : FIXTURE LISTS . . 48 : TYRES PT 3 : "HARD & FAST" . . 50 : RAIN . . RAIN . . 52 :

11



The Piazza Circuit at BP's Britannic House HQ in London, scene of a great racing week. Note balcony walk above. BP Photograph.

found. All anonymous newcomers — "village Hampdens" of local club championship or absolute novices who had hardly even started a motor before, but all learning and enjoying association with strangers not much more skilled than themselves. There are some problems to be ironed out still, such as the mixed nature of beginners' handicaps until they move into open meetings. Even the national handicapper Jeff Lindstrom could not offer an instant answer to that. Perhaps a secondary grading system "Junior League" type of thing could be devised, quite different from and not applicable to open meetings. Ideas welcomed for our correspondence columns.

CITY OF LONDON CIRCUIT!

A joint effort by Hadley Hobbies and BP will provide the City of London with its first r/c model car meeting ever in those august precincts — more precisely on BP's Britannic House Piazza just off Moorgate. Meeting will coincide with the City's Carnival and run from July 16th to July 21st with lunch time sessions daily 12 — 2pm and evenings 5pm to 7pm plus a 10am to 5pm Final on Saturday. Entry free for spectators and proceeds of programme sales go to the Lord Mayor's Charity — Motability, a most appropriate good cause since it is to provide vehicles for disabled persons as the controversial three-wheeler is phased out.

The Piazza Circuit is an ideal racing venue being smooth flat concrete large

enough to provide a sporting track of just under 500 feet long, basically two long dog legs in a U shape with a good sweeping curve that can be taken at high speed. In addition to spectator space at ground level the Piazza is surrounded by a first floor balcony walk to give excellent viewing possibilities.

The model car trade has rallied round with heat prizes and class awards and there will be a Victor Ludorum First Prize of seven days holiday for two in Spain. Racing will be to National Rules and events will be run principally for 1/12th scale electric cars. There will also be events for the sub-scales of 1/16th and 1/20th cars for stock Tamiya and similar cars. It may even be possible to run some stock car races using the outer oval of the track. "Fun Events" will include invitation races with "house" cars so that the uninitiated public can have a go — some well known figures — not car drivers, oh no! — may also be seen trying their hands on the Tx.

Just how much glow plug racing will be possible in the area — noise will not really be a problem since the BP Headquarters shields the circuit from much noise spread — remains to be worked out. The somewhat limited area for 1/8th scale cars remains a problem, particularly with regard to complete crowd safety, but certainly there will be at least demonstration races by club drivers.

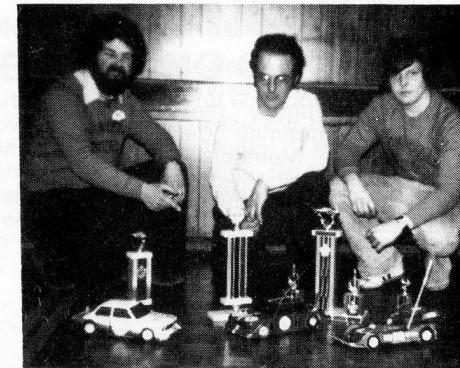
Race organisation will be in the hands of experienced race organisers and entrants can be assured of some good racing, not too serious dicing, and an opportunity to popularise the hobby and sport in what is still the world's leading financial centre. Entry Forms from Hadleys, 131 Middlesex Street, Bishopsgate, London E1.

CLUB & TRACK REVIEW

Swindon Electric Throttle Benders Club

Secretary: Jan Korda
Swindon Model Centre
2 Theatre Square (Tel: Swindon 26878)
Swindon Wilts

There seems a slight change of title since first announced. Membership now increased to twenty-five. As visiting competitors club got member F. Martin into semi-final at Exeter and just failed to get Ron Major qualified for semis at Maidenhead. Meanwhile club championship won by F. Martin, with Ron Major 2nd., and Kevin Neale 3rd. Meeting was great success and Trophy Meetings will be held now every six months.



Winners and their trophies at Swindon's Club Open: L to R Ron Major 2nd; F. Martin 1st; Kevin Neale 3rd.

Maidstone & Medway R/C Electric Car Club

Secretary: Steve Watkin
41 Chart Place
Wigmore (Tel: Medway (0634) 364006)
Gillingham, Kent

This is still a would-be club in a "chicken and egg" situation, in that without ten members secretary cannot afford to rent a hall, and without a hall, he cannot expect to get members. Hence this advance notice. Anyone interested in electric racing in the Maidstone and Medway area get in touch and be a founder member.

Wirral Model Car Club

Following recent note that Wirral MCC was still alive and kicking, the proposed electric car section is now in being with nearly a dozen members and cars ranging from Mardave and Lectricar to Kyosho and scratchbuilt. All newcomers to the sport and new members will be welcome whether novice or expert. Meetings take place on Wednesday nights. Electric contacts to Peter White (051-632-5534) or Dave Vinje (051-639-8306).

Chessington Radio Car Club (CRCC)

Secretary: Linda Woodger
1 Newton Close
Langley, Nr. Slough Berks

The club is now into its fourth season as CRCC with over one hundred members — although not all of them compete at the same time! The club's permanent track is located at the RAF Rehabilitation Centre, Chessington Surrey where races this year are being held practically every weekend. The club consists of 1/8th scale Formula 1 stockcars and 1/8th Formula 1 racing cars. Officers elected at recent Agm are Vern Cousins, Chairman; Dave Glasscock, Vice

Chairman; Hon. Sec. Linda, as above, to whom prospective new members should apply for welcome reception.

London R/C Car Club

Secretary: Bob Rosser
17 Hapgood Close (Tel: 01-864-7313)
Greenford Mx

Editor Dave Feven of club's newsletter *Wheel Spiel* a brimful three pages this month. We can welcome Robin Ellis as Winter Champion, driving on his latest appearance his new works Serpent III car. Also seen recently was Phil Greeno winning the final four laps ahead of that improving driver Pat Angelin. Phil was going really well with a Dave Price tuned Veco 19! A club handicap system on a laps start basis is going very well with novices ahead and the tigers on scratch marks hurrying to catch up — very like the Vintage Car Club meetings . . . you can get as many as eight laps start! Marshal trouble or shortage thereof provokes editorial comment, as well as track discipline — fines for taking Tx on track! Southern League first fixture at Taunton was rained off, so London will be having the opening event on May 13th. So we still have to see (*Perhaps a STOP PRESS Notice Ed.*) how it is likely to shape up.

Some members have expressed interest in 1/12th scale racing and enquiries at present afoot to find a suitable hall in the Harrow area since most of the members seem to come from those parts — after all the club was formed at Harrow R/C Assn., then became Bovingdon R/C Car Club before burgeoning into present title. Interested parties should contact Bob Rosser or Dave Feven.

Sussex Electric Car Club

Secretary: Bill Owen
16 Bridgemere Road
Eastbourne (Tel Eastbourne (0323) 29028)
Sussex BN22 9UB

This new 1/12th scale electric r/c club was formed in February and races fortnightly on Sunday mornings at the Polegate Community Centre, Windsor Way, Polegate. Membership at present is ten; new members welcome as well as visitors from other electric car clubs. There is no membership fee, just 50p race entry.

Gloster Throttle Benders R/C Car Club

Secretary: Roger Coates
128 Golden Vale
(Tel. 713607)

Churchdown, Glos.

Yes, at last Gloucester has its own r/c car club. The club is based at the Churchdown Community Centre where it has the full facilities of the centre — social club, ballroom for 1/12th electrics, dances, discos, etc. Membership is £5 per year, £1 of which goes to the CCA for membership of their association. Although the club is still in its infancy response has been tremendous and everybody is welcome, 1/8th i.c., stockers, 1/12th electrics. The club meets on Sundays and Wednesday evenings, and has the use of the CCA car park for racing. Negotiations are going ahead for the building of a purpose-built international circuit on adjacent land. A gap has been filled and the club is really going places. Details from secretary as above or from Membership Secretary, P. Raymond, The Model Shop, 79-81 Northgate Street, Gloucester (Tel. 410693).

Ally Pally Electric Car Club

Secretary: Jane Adams.
79 Northumberland Road,
(Tel. 01-866-5945).

North Harrow, Mx. HA2 7RA.

With a limited range of dates at the original Ally Pally venue (check with secretary for when) club is now also operating weekly at All Saints Church Hall, Oakleigh Road North, Southgate N2, 7-11pm Thursday evenings. This is a bigger and better hall than small hall next door used recently. Surface: dusty wood.

Winner Championship went to Mervyn Franklin with young Simon Clark runner-up.

Places to equal 7th all held by Demon drivers, fibreglass or polycarbonate chassis, Red Spot, Mabuchi or Red Stripe motors. Club Newsletter still the best of the bunch, scandalous, lively, amusing, instructive . . . Nick Adams writes in this issue.

Bath R/C Car Club

Secretary: Mrs K. D. McLaren
12 St Marks Road
Widcombe (Tel: Bath 20121)
Bath, Avon

Secretary points out that the club do *not* now race at Percy Boys Club as the floor is not too good and parking is difficult and this was indeed an embellishment of original club notice provided by another keen member who shall remain anonymous. Racing now takes place at Selwyn Hall, Box, Wilts., on Sunday afternoons between 1.00 and 5.00pm. The floor is smooth and clean, silicon tyres are recommended. It is a modern hall with ample car parking for members and visitors. New members and visitors welcome but should first contact the secretary.

Open University R/C Electric Car Club

Secretary: John Bicknell
2 Kimberwell Close
Toddington.

Chairman Paul Burrell gives news of club progress. Excellent facilities are available at the Open University, a large hall with a polished wood floor, plus an adjacent Common Room where drivers and their families can relax and even watch Grand Prix races on TV Sunday evenings. Championship winner was Geof Peters with Sec. John Bicknell in second place. Three championships a year are being held — Winter, Summer, Autumn, with every meeting counting towards points total, plus a small prize for each month's winner. Meetings take place nearly every Sunday evening at 7.30pm (NOT July 1st, December 16th, 23rd and 30th). New members very welcome.

Wessex Radio Car Club

Secretary: I. M. Russell
88 Seaton Road
Yeovil
Somerset

The club was formed in October 1978 and caters for all aspects of r/c car racing. Current membership is fifteen comprising an equal number of i.c. and electrics plus one Jeep! Recently acquired circuit is on the Sherborne Terrace Playing Fields Car Park, Sherborne. This circuit caters for both i.c. cars and electrics. Meetings are held every Sunday morning starting at 10am. New members most welcome on Sunday mornings, but please contact the secretary.



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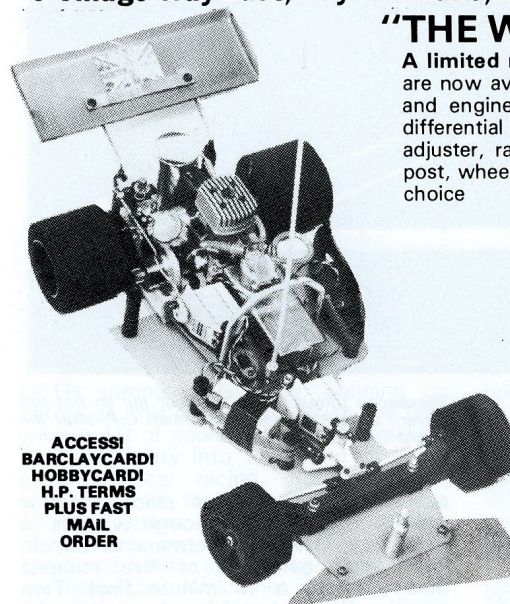
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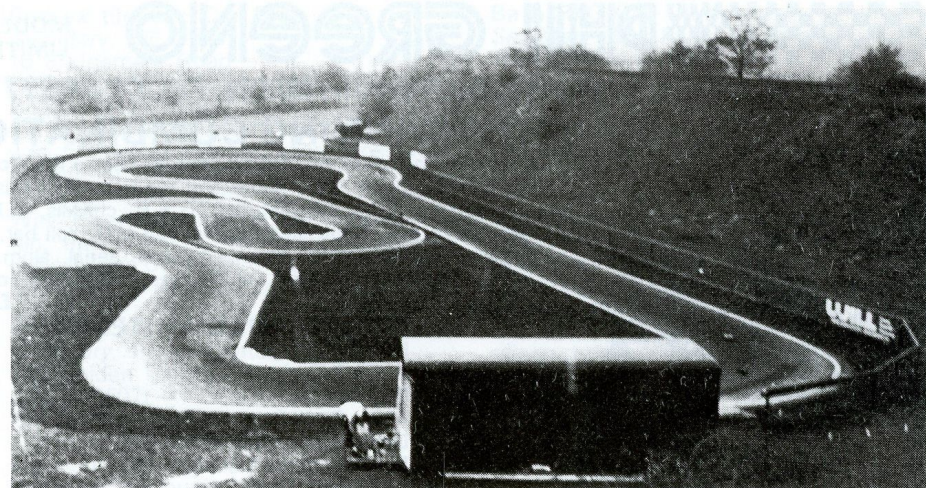
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CLUBS FROM OVERSEAS

We are beginning to get a number of overseas reports which we hope will prove interesting to readers, wherever they may be. So here goes . . .

NOMAC (Nederlandse Organisatie M.A.C.)

Franz Leharlaan 26
Heemstede, Holland

First Dutch Championship series at Utrecht found Ronnie Ton the winner (Serpent OPS) with surprisingly a scratch-built car (also OPS) in 2nd place driven by Ed Ijzerman, nearly two laps behind. Then followed a couple of PB Int. an Associated 200 (K & B) and another Serpent in 6th. Further down it was nice to see Eveline Ton (Serpent) . . . holding up the Ton Family team. The Dutch Grand Prix attracted a good international entry, but again local man Ronny Ton won F/1 with his Serpent, followed home by Denis Tassaux, again Serpent, then our own Phil Booth in 3rd place (PB Int.). Five of the first six places were all OPS. Sports/Proto saw Ronny Ton again the winner, chased by Phil Greeno (Greeno/PB), Dave Martin (PB Int.) 5th, Chris White of Wombwell made the semi-final.

Canterbury R/C Model Car Club

G. C. Carson
64 Vogel Street, Richmond
Christchurch 1, New Zealand

Club was started about 18 months ago in Christchurch. Membership runs at some twenty active drivers running a single class of racing mixed saloon, GT and Formula due to the small number of bodies

Wiesbaden Circuit (from a colour pic so not too clever): scene of follow-up German G.P. after the World Champs.

available. Racing takes place monthly usually in car parks, though work is in hand on laying a permanent circuit. Qualifying heats are of five minutes duration with a 15 minute final. Two trophies are competed for, donated by Air New Zealand and Christies' Model Shop. It is hoped to run South Pacific Championships in 1980, inviting entries from England, USA, Tasmania etc. A monthly newsletter is circulated and the club is prospering and expanding fast.

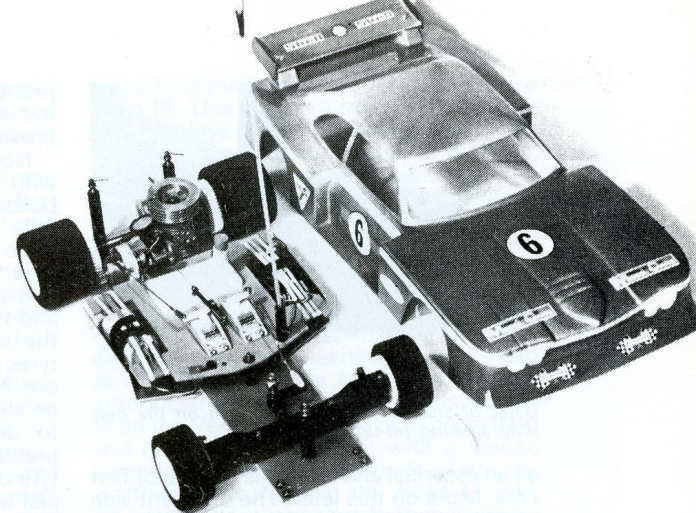
South Australia M.R.C.C.A. Inc

Secretary: David Hyde
6 Dewvale Road
O'Halloran Hill 5158, South Australia

Twenty plus strong the club has been running for three years and operates on a local carpark hired from Adelaide City Council. Nearest other club 400 miles away and at their first large meeting (32 entries) people from Perth and Sydney came along with some competitors travelling over 2800 miles round trip for the weekend! Cars mainly PB Internationals and Associated 100/200s. Motors mainly Veco, McCoy, K & B with a few OPS and SuperTigres. Differentials are the "in" thing. Other activities include Nobby O'Brien's dragster with a OPS 40 engine and a twin engine machine by Rob Morphett. Special steel track markers are used — you can only re-enter track through specified openings. Have a little trouble with noise — would welcome details of noisemeters.

MARDAVE

COMPETITION SPECIAL



The Competition Special with Turbo Capri body finished in two metal fluorescent shades and using the natural white for lining. Body is immensely strong and pretty to look at. Note epoxy glass chassis and radio plate; also nylon front steering beam and plunger blocks for rear axle.

WITH summer, we hope, opening up before us, this seems very much the time when a lot of newcomers will be making their first entry into the world of 1/8th scale r/c car racing. Some will be escapees from the crowded skies of r/c aircraft, others converts from 1/12th electric cars, and others quite new to the sport and hobby of building and running r/c model cars. Welcome! For that reason this review of the latest Mardave Competition Special will range over a somewhat wider ground to embrace a few of the usual beginners' problems.

It is right that this should be so, for probably more beginners, throughout the world (I don't know about Japan!) have started with a Mardave kit than any other make. The reasons? (1) That it has one of the longest histories in the European field: Wes Raynor of Mardave was responsible for building the first purpose-built racing circuit in this country and his Newbridge Circuit near Leicester is still in action. (2) The price! Wes started off and has maintained the policy of a sound basic

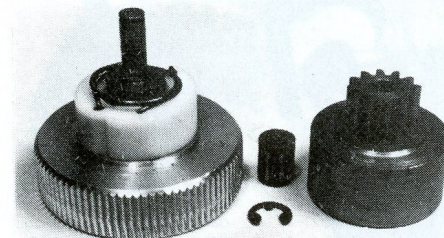
product at rockbottom price. The standard kit is still only a few pounds more than the original figure asked nearly a decade ago. This Comp Special is a little more than the "cooking version" but still under £30! (3) Simplicity. Everything works, and can be seen why it works, no frills and so less to trouble the beginner with adjustments (4) It was the original "cart" for the workhorse Veco 19 engine to pull . . . There are other practical reasons, like recommendations but that's enough.

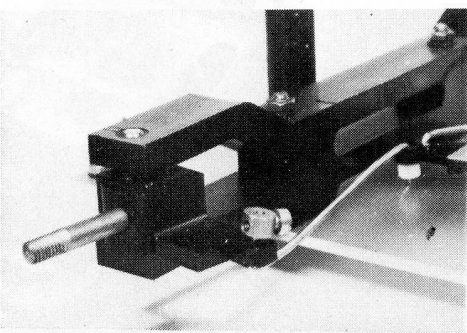
Now the company has just moved into bigger and better factory premises and updated their well-proven equipment. But I expect it will long continue to be a real family business with two generations of Raynors contributing to the work plus a background of long term employees. Don't be fooled by the low price, the Comp Special has all the latest essentials for the well-dressed driver to need. Chassis is two part with a substantial power pod in alloy at the rear with the "in" epoxy glass chassis to provide a flexy front end without risk of distortion and untweakable bends.

Front steering beam is in nylon with steering arms/stub axles ready installed. Spring loaded servo-saver is provided to take care of any undesirable stresses on the servo by driving into immovable obstacles and the like.

Big change from traditional Mardave is the provision of a radio plate. Earlier cars have all had the special plastic box that contained all the radio gear, away from dirt and oil, which seems splendid but had its disadvantages in slow accessibility and prevented the full flexing of the chassis by its location. Extensive racing all over the world has made a radio plate's reputation

The lightweight comp. special flywheel with needle bearing clutch drum and lower gear ratio.





Detail of stub axle and steering arm on the new style steering set-up.

as an essential and desirable feature of fast cars. More on this later. The excellent side plates which help to locate saloon and sports/proto bodies also serve as side bumpers to protect the radio plate (a feature not seen in many kits).

Another major change is the introduction of nylon plummer blocks to carry the rear axle. The original U-shaped bearing and reinforcing strip has at last been displaced. It still looks pretty good to me (and there will be a lot in use for a long time to come) but this again is progress in the right direction with useful weight saving and certainly in the modern idiom.

To go with the new plummer blocks comes a more competitive lightweight flywheel, needle bearing clutch drum and a lower gear ratio.

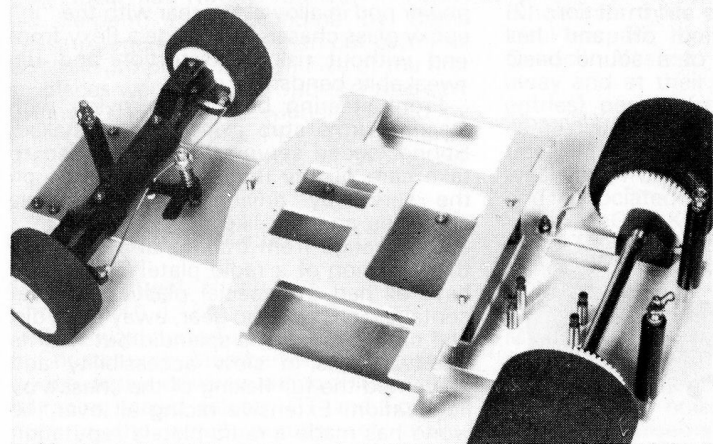
Choice of bodies is between the Formula Ferrari 312 T3 design, complete with front and rear wings and the Turbo Capri, an elegant saloon body again with small wing. I went for the latter because the whole chassis is decently enclosed and it gives some additional scope in making a

pretty job of finishing, what with the cut out windows and open rear window to provide access without cutting away bits.

Now on to the building job. I shall deal with items that extend the adequate building instructions provided where a little more comment will be of value, I hope to the newcomer. Making a start with the wheels — for the second time, I find an instruction that starts with wheel and tyres! Rough up the smooth plastic of the hubs with coarse glasspaper where the tyres are to slide on. Coat evenly with glue one hub and one tyre at a time and push on straight away. Don't wait for Evo-Stick to dry which is normal domestic use practice. Push from the front pressing the tyre down so that the front of the hub is just level with the tyre. This leaves a little over at the back, uncovered by the tyre. Clean off any surplus of glue straight away with lighter fuel, petrol or Evo-Stik cleaner and put aside. If you have a lathe an even better job is achieved by chucking up each hub on a suitable arbor (a bolt with a nut on the end to hold the hub in place) and pressing on the tyre whilst revolving the hub slowly by a hand on the belt. Tyres come in very good condition and should not need any rubbing down as hard edges have already been taken off and they are ready to run.

Instructions recommend that the plummer blocks have their fixing screws tapped in with the blocks in a vice in order to cut the thread with the selftapping action. Good idea; a little vaseline (petroleum jelly) also acts as a helpful lubricant. Watch screwdriver does not slip! Assemble with flat part to the front and the curved part facing backwards. Slip the axle through before tightening up the screws to make sure you have a smooth

Basic car assembled. Radio plate has been cut out to take tank and servos. Side bumper plates fitted also help locate body. Very much a new look car.



Radio gear in place, engine installed, silencer attached, air filter in place — almost ready to go . . . All that it needs besides fuel is to have fuel tank connected up to carb!

fit. Put on the rear wheels and tyres. They slot neatly into flat on the axle and are retained with the castle nuts. Required float is built in so they can be tightened up.

Bolt on the epoxy glass chassis with the four nuts and bolts provided, noting that the two rear bolts also carry the plastic sleeves which are stand-offs for the radio plate. Coming to the front the steering beam is next mounted (two nuts and bolts with shakeproof washers). Front wheels can go on and the car is now four wheeled.

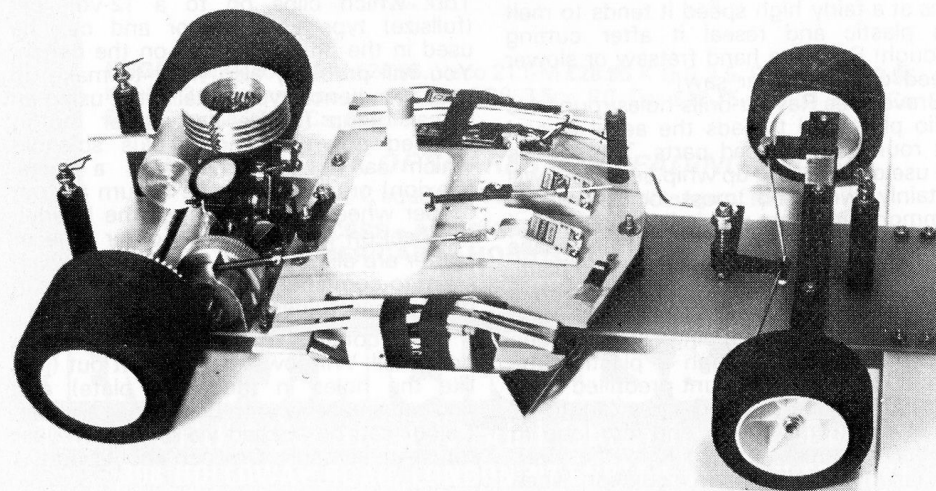
Screw on the steering failsafe. It comes in pieces and requires assembly but this should present no difficulty as parts are obvious. If when it is in place it seems a little low in relation to the steering arms then add another nut or two to the supporting bolt which will raise up the level of the two arms.

For greatest economy two plain lengths of piano wire (about 4 ins each long) will serve to connect up failsafe with steering arms. This gives 3-1/8in lengths each side allowing the rest to be turned up at right angles and secured with the little round collets provided. You may need some more of these useful collars before you are finished, so obtain a packet from the local model shop, as well as some of the tie-rod clips. However, there is no doubt that a little extravagance in acquiring a set of ball joints with screwed connecting rods is well worth while since fine adjustment of desired toe-in can be so easily made and they are very much stronger anyway.

Back to the other end now to instal engine. I am assuming that like the vast

majority of newcomers you will be fitting a Veco 19. This is such a trouble free engine that it enjoys great popularity. If, and this will apply to a good number of builders, you already have some experience with glowplug motors then you will already have very sound ideas of your favourite make . . . far be it from me to change your minds. A number are now coming along at prices which include integrated heatsink heads, such as Irvine and HB, whilst Super Tigre X21 also has an all-in-price complete with head. Veco 19 needs a heatsink head as an extra, and here Mardave have just introduced a neat round job that is a press fit on the Veco. You will have to press hard and open up the slit side with a wedge (screwdriver) to get it on. It might be worthwhile heating up the head to take advantage of expansion before pressing down. Handle carefully — old gauntlet, m./cycle gloves recommended.

Clutch/bellhousing unit screws down easily on to end of crankshaft. Be sure you get it good and tight — use a vice to hold the flywheel firm whilst you are doing this. It may be necessary to open out the holes in the engine lugs a little to take the fixing screws provided. Don't worry that the clutch drum is not held in place; when fitted to the car the rear wheel ensures its continuing location with a small amount of end float. At this stage decide what sort of air filter you are going to fit over the carb intake. *This is essential:* dirt and dust at ground level could ruin your engine in an afternoon's running without one. Mardave do a simple cheap type as shown in most of the photos. Others are available in a



variety of patterns and at varying prices, but have one you must.

Exhaust/silencer is another must. Rules are getting very strict about permitted noise and the 80dB requirement at 10 metres is being so firmly enforced that nothing but an efficient fitting will do. The simple little job shown which screws in place is another Mardave accessory. Some gasket sealant round the edges of the exhaust exit, and even a little cut out gasket ring will ensure that the most use is made of it. When you can use all your power you will probably want to fit a bigger "dustbin" type muffler (this is the American word for it) and pressurise your fuel tank by using exhaust gases for the purpose. There is a little nipple on the fuel tank provided for this purpose. For the moment this need not be done.

Now comes the preparation of the radio plate or "shaker plate" as our American friends so aptly describe it. This comes with the kit as a rectangular piece of thick ABS plastic with the three vital assembly holes and the hole for the throttle crank ready drilled. A fullsize drawing is provided and this should be stuck on the plate lining up the ready drilled holes. Cut out the necessary holes for fuel tank (this fits the one in the kit) and check that the servos you will be using will fit in the holes indicated. One or two makes may be smaller — those shown certainly fit Futaba and several of the other popular makes. Drill holes and cut round with a fretsaw, finishing off with a modelling knife and glasspaper. You can drill a line of holes all round the holes to cut out and then file clean. A little tip! I have used a power jigsaw for this sort of job — but when it runs at a fairly high speed it tends to melt the plastic and reseal it after cutting through! So use a hand fretsaw or slower speed on the power saw!

Brave Wes Raynor drills holes round his radio plate and threads the aerial in and out round the unused parts. This avoids the use of a sticking up whip aerial and will certainly work on most occasions. In common with other pessimistic operators I still cleave to a whip aerial. This means another hole to be drilled in the radio plate, conveniently near the Rx. I cut down a plastic body mount, drill through and fasten with a selftapping screw, then thread the aerial through a plastic tube wedged in the bodymount predrilled hole. Another way is to bend up a length of piano wire (turning over end into loop to avoid accidentally poking it in the eye). There is no need for any insulation when fixed directly to the plastic radio plate.

Battery and Rx can be looped round the supports with elastic keepers as shown. I use the postman's elastic bands which hold his letters together during delivery, or specially strong bands can be obtained as modellers' requisites. Stationery stores usually want to sell them in boxes of hundreds — not on! I have shown them bare — you will be advised to wrap them with a little foam plastic sheeting and a plastic bag, securing them cross wise with adhesive tape.

Linkages from the two servos remain to be done. Steering link will need a stepped kink, and you will choose which of the connecting holes according to how much movement you require in turning. Throttle/brake linkage is a push/pull arrangement. As you open the throttle the brake stays clear, then closing the throttle and the brake comes on, with a neutral tick-over period in between, when the engine runs sweetly but not fast enough to throw out the clutch shoes and produce forward motion. This is a state that you have to arrive at during a bench testing — getting it just right to avoid stalls during a run and *almost* producing forward motion at tickover. Mark this position clearly so that you can always achieve it easily.

Do not be too extravagant with the fuel. Normal low nitro content mixture is quite enough for a start and will help to prolong the life of the engine. You will need a fuel bulb such as the "Big Shot" to replenish the tank rather than pour in from the tin. Also needed will be accumulator and glow plug clip for starting (assuming you have not already got such items from aircraft days) and an electric starter. This can be a readymade type such as the Hi-Tork which clips on to a 12-volt car (fullsize) type accumulator and can be used in the pits as well as on the bench. You will probably also want to make up your own bench type installation, using an ex-car dump fullsize car starter motor, stripped down to motor plus solenoid which can be assembled in a metal (Dexion) or wooden frame to turn a stout rubber wheel which engages the knurled flywheel on the car. Some other type of starter are also now on the market which seem to come between these two types in point of usefulness.

Last comes the finishing of your bodyshell. Windows must be cut out (just like the holes in the radio plate) and finished smoothly with glasspaper and file. Colour can be applied via any of the car touch-up aerosols. One can should do the

(continued on page 19)

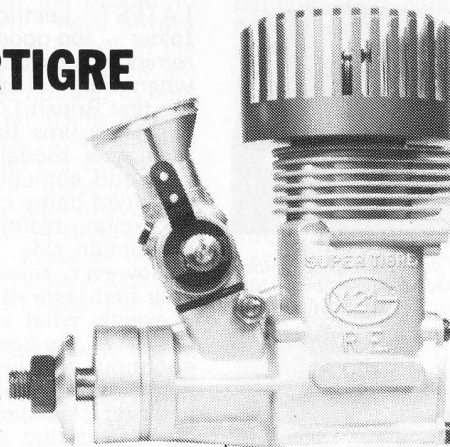
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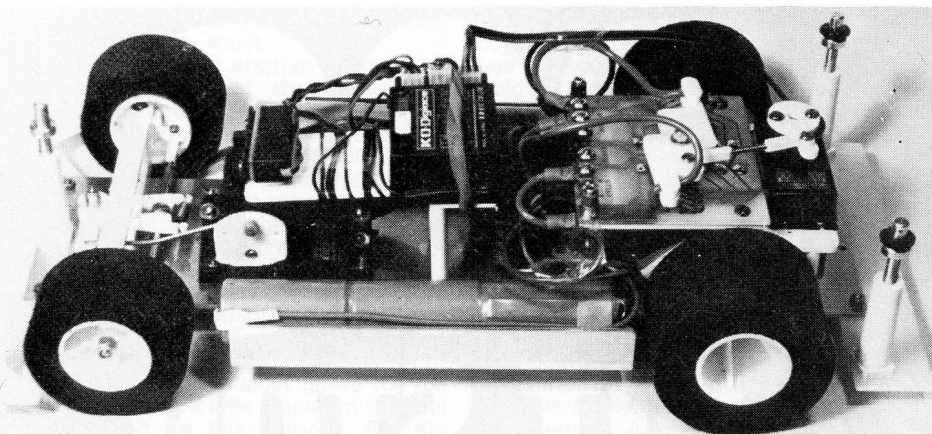
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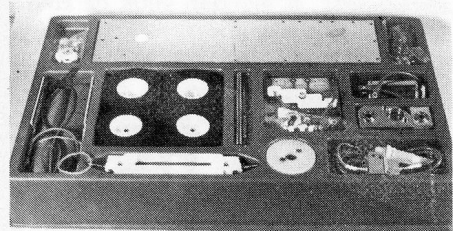
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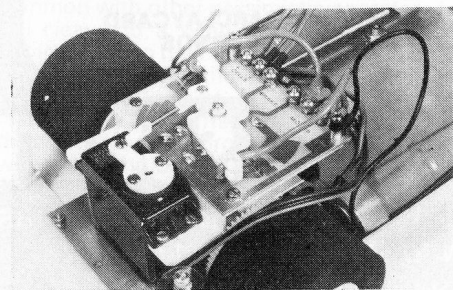
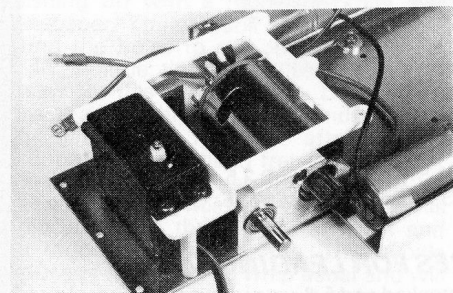
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LATEST Lectricar Racing instruction folder — too good to call a mere leaflet! — reminds us that it was as long ago as 1975 when their first car came on the market as the first British 1/12th scale electric racing car. How time flies! Like a bride's dress their new model combines "Something new and something old." The best and well tried items continue to be used with an exciting blend of new thinking on the production side.

However, since for many this may be their first taste of electric car racing, here is exactly what you get for your money. First of all the box — yes the box! It looks enormous and indeed it is. Inside the car items are laid out on light plastic tray pressing, clearsheet covered to hold goods in place during transit. A splendid shop window item. On top of this is a cardboard spacer that holds the body shell in place. The whole is enclosed in another stout cardboard container that is like the one you carry home the Christmas turkey in complete with handles cut in it. This becomes your model box — the body shell spacer goes to the bottom to locate your radio gear and the completed car sits on top and you just pick up the handles. Don't waste a thing:

Box contents are listed and there is a new identification diagram. Exploded centre spread shows all the parts and their relation to each other. Basically, there is a ready drilled chassis with side plates to take the two strings of three nicad cells

Installing the throttle servo and the speed control printed circuit.

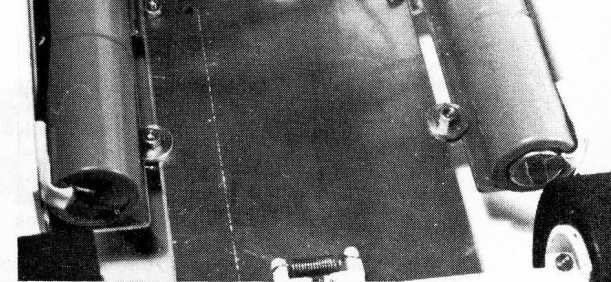
Ingenious method of varying flexibility of chassis with stiffener bolts.

which rest each side, strong alloy plummer blocks for the backaxle, motor and general rear end stiffening, moulded steering unit, steering fail-safe, and an elaborate speed controller. Tyres, wheels, hubs, and miscellaneous nuts and bolts complete the pack, all neatly set out. Front and rear bumpers are provided and a set of charging leads with built-in charging resistor. Nor must we forget the strong ABS moulded bodyshell. I have made up the BMW as it is a new body to me. Alternatives are Formula 1 and Porsche 917. These are provided with their appropriate body mounting posts, grommets and retaining clips. Standard gear ratio of 4.5:1 is provided. Other ratios of 4.08:1 and 3.7:1 are available.

For the first time I have seen kit instructions start by telling the builder to glue tyres to wheel hubs. I have always done this first, but usually it comes in the middle of building. It is a nice leisurely job to do — I still have found nothing to beat Evo-Stik as the glue, but using an old palette knife to apply same have managed at last to do it without getting covered in sticky. Beginners are urged to use a plastic bag "mitten" to do the job. Anyway, it comes off with a little lighter fuel or even Evo-Stik cleaner. It also provides a little time to digest the building instructions and sort out which is what amongst the nuts and bolts.

You could get the chassis upside down, so a white sticker indicates topside. Front axle beam and steering failsafe is one of the "something old" in items in the kit, and could hardly be improved upon for simplicity and function. I have seen one or two people who have made up their own stub-axle/steering arm units in metal in place of metal and plastic but in over two years use my own original grey plastic unit has stood up to all the local children have managed to do to in holiday time!

Batteries come in two long snakes already joined with a jumper lead. These fit along the L-angle side pieces, fixed with servo tape. Now comes the choice — rear mounted motor or mid mounted. For the BMW body mid mounted was the choice, and of course, mid-mounted is the "fashion" location these days. In practice I think it is largely a matter of personal opinion, both sides can convince me, dictated as much by choice of prototype body as anything. Rear mounting, which brings the control panel right to the back has the advantage that the various con-



necting wires are all way back, more accessible, and less likely to be accidentally loosened: otherwise they are in the central well and may make fitting in the other bits and pieces more cramped.

Speed controller panel screws down on top of the motor mounting and is really a little beauty of a printed circuit. It is arranged for either six or four-cell running (the slower 4-cell may be a good idea for beginners in theory, but just running slower on 6-cells saves a lot of alteration of batteries later). Note that all the leads have nice little round terminal tags fitted with suitable insulation sleeves. At this stage take a look at them by sliding back the insulation sleeves to check that they are firmly attached since fixing is by squeezing the tag end and not by soldering. The careful builder will take time to solder tags before proceeding. Where to put what is very thoroughly explained in the instructions. Tags are held in place with finger knurled round nuts for the most part, except for those which are not likely to require loosening. Tip here is to Loctite the permanent nuts (Studlock 270 is the one I use) and to slip a short length of darning wool between bolt and nut when screwing down which will hold them together against quite a lot of vibration in action in the case of the nuts that will be used more frequently. When all is fitted in place you may also find that you have a superfluous amount of wire leads which can be profitably shortened to the minimum lengths needed. It then looks a much neater job and less like an untidy bird's nest.

I have used my KO-Digiace r/c this time as I wanted to try-out the round DEAC pack that Colin Thompson sent me. I could of course have dispensed with a RX battery altogether by tapping into the nicads for 6-volts or fitting in dropping diodes to the leads to tge RX. This saves a little space and is one less item to worry about. I have also wrapped up the Rx in foam packing and held it in place with elastic bands. Alternative method looks pretty and uses the little white platform provided on which the aerial can be wrapped round. However, I still like a whip

aerial since I often drive on a quite large car park site assisted by the "destruction gang" mentioned above who have only the vaguest ideas of distance. One other r/c point to mention. You can of course stick your steering servo down with servo tape: it works. But sometimes it does come unstuck and I have now made a good resolution not to be lazy and to fit a proper servo mounting piece every time. This time it is a hybrid, i.e. Digiace servo but MacGregor mount which is useful two piece affair and so can be set up to take very nearly any servo size. (Sorry Mr MacGregor the rest of your equipment is installed in another car q.v.) A Delta servo wheel, heavy duty type, cut down proved most suitable for the steering. At the other end Lectricar provide an additional piece to screw on to the normal servo wheel to take care of the speed controller movement arm.

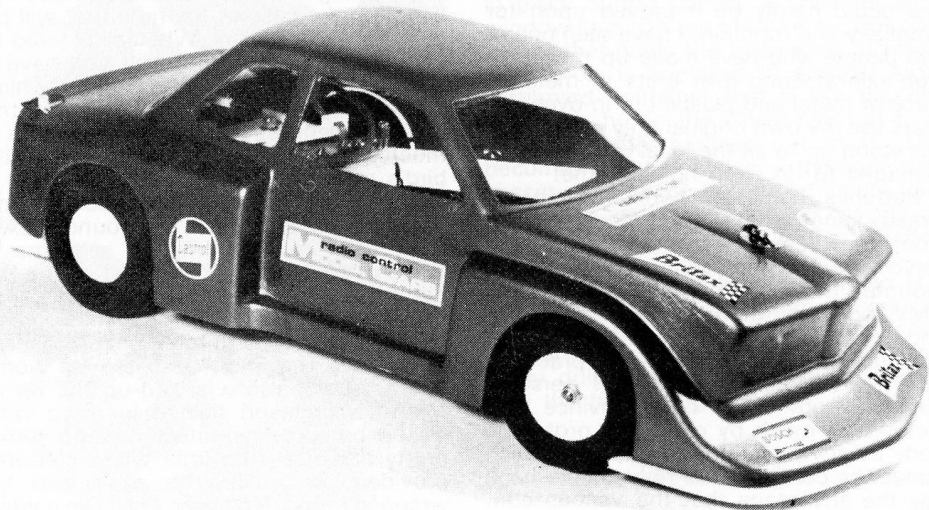
Last, but not least on the chassis we come to the ingenious variable flex device. The battery carriers on each side do not extend their full length along the chassis, but only come about halfway down. The resultant channel provides a slot on each side for round locating discs to be screwed. By moving them forwards or back a degree of flex or rigidity can be given to the chassis. This may well vary from circuit to circuit and for different tyre combination or track surfaces thus providing an all-purpose chassis. I have found a location about one back from the front gives a good "average" fitting for a start, but weight and position of radio gear will also influence this.

I like the work of cutting out window and window screens on ABS bodies, not

to mention wheel arches and other trim. I have tried doing it the hot iron way but the smell is horrible and it still needs cleaning up with a knife; even using my pyrography outfit (pokerwork if you will) it is still not too pleasant and my cutting wires get all twisted up. So drill a few holes strategically and get going with the modelling knife, good old Xacto or Multicraft. Templates are provided to cut out the clear sheet to fill the frames cut out. Once again Evo-Stik will fix — but this time coat both surfaces and allow to dry (as against tyres put on at once). They are very firm. I sometimes cut a hole in one side window to get a finger in the switch rx on/off which saves taking off the body. Happily any of the car touch up aerosols can be used, and should be sprayed before fitting clear windows. Since it was a BMW I tried out out of the metalised paints a fox-brown shade which has come up very happily and encouraged me to use it on another car. Decals to choice can be added and the job is done.

Newcomers are reminded that charging is via the charging cords provided which must be connected up to a 12-volt fullsize car/motorcycle accumulator for 20 minutes, which will provide running power for 10 minutes (i.e. half the charging time) Alas, you cannot exceed about 20 minutes to get longer running times without possible harm to the nicads. The charging resistor gets quite hot during charge time so that a heatsink is a good idea. I have screwed mine to a four inch square piece of sheet alloy, screwed in turn on a wood block.

The attractive BMW body is worth taking extra care with in painting.



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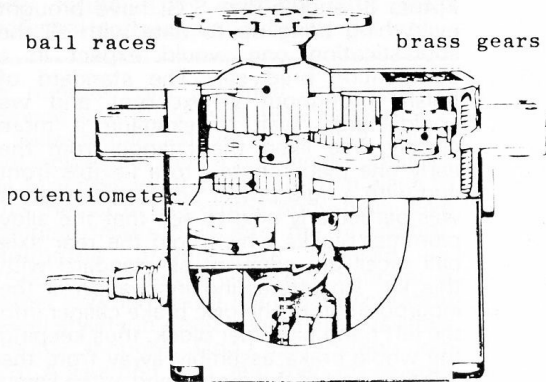


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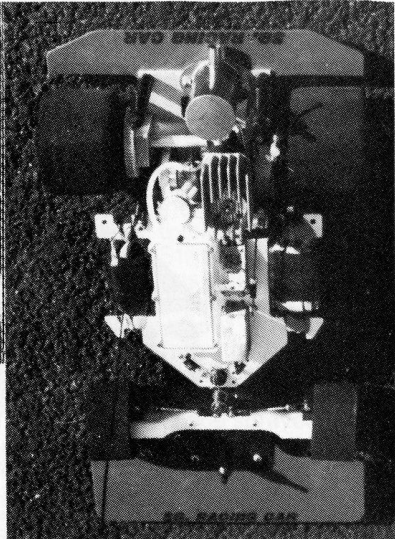
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S.G. FUTURA TEST

BY DAVID FEVEN &
BOB ROSSER

READERS of R.C.M.C. Issue No. 8 will recall that your editor built the Futura III from a standard kit, then passed it over to us to be track tested at the London R/C Car Club's circuit. Having both started racing with S.G. cars about 2 years previously we were most interested to see the latest goodies from the Italian S.G. factory. Unfortunately, the early cars with which we started, although well engineered, were not really able to utilise all the zip of the latest generation of A.B.C. racing motors which were, at that time, just arriving on the scene, and required a lot of modification to make use of the power available. Just a glance at the Futura III shows that S.G. have brought everything bang up to date with all the sophistication one would expect in a competition bred car. The standard of finish throughout is excellent and we could hardly wait to examine it more closely. We liked the change from the early one piece chassis to a flexible front and with a rigid power pod to the rear. It was particularly nice to see that the alloy plummer blocks which hold the rear axle ball races are supplied as standard with this kit. An interesting innovation is the incorporation of the disc brake caliper into the left hand plummer block, thus keeping the whole brake assembly away from the "dirtier" end of the motor, and at the same time creating a bit more space around the engine. Changing a drive gear in a hurry will present no problems with this car.

The rear wheels are positively located on to the axle with just one grub screw

and the drive gear fits over two short dowels on the right-hand rear wheel. Simply remove the wheel, pull off the old gear, push a new one into place and refit the wheel. Moving on to the front of the car, the front axle assembly is a substantial affair incorporating plenty of castor angle and Ackerman geometry.

Dominating the whole rolling chassis is a large radio plate which holds battery, receiver, and both servos. Also included in the kit is a whip aerial. The only thing we were not too keen about was the way that the steering pushrod normally runs from the top of the servo to the top of the servo saver. This means that any flexing in the chassis causes the steering to move, and may put unnecessary load on the servo output shaft. We turned both the servo and saver upside down to completely eliminate this situation. Apart from this very minor change, the car was in absolutely standard form for testing purposes. The tyres supplied with our car were medium/hard foam on the back and very hard foam (moulded?) on the front. The motor in the test car was, of course, the Super Tigre X21.

It was brand new and unmodified in any way save for the Perry 61 pumper carburettor which we fitted. By the time all the finishing touches were completed and the car was ready to race, winter was well and truly upon us and we were forced to shelve it for a few weeks. We were determined not to test the Futura III until good weather conditions prevailed in order

to be able to give a fair assessment of what was, after all, a standard car with standard tyres. Finally THE DAY arrived, mild, dry and calm. Everything had been charged up ready and off we went to the track for the test session.

We took the precaution of taking some photographs before starting the engine (just in case!) then filled the tank. The engine was cranked over to suck in some fuel with the Perry set 1½ turns open on the main jet and just a fraction on the rich side on the idle disc. With the Tigre duly primed, and the glo-clip attached, it started first time. Carb. adjustment was about right, giving a slightly rich idle with crisp pick-up so we tried a couple of quick excursions around the pit area just to check the settings. The clutch set-up was just perfect. There was no drag at idle, and even a mild blip on the throttle would not cause the clutch to bite. At first we thought it was going to be too soft, but with the car on the track, given a boot-full of throttle the engine picked up cleanly until the clutch bit smoothly at just the right speed with no sign of snatching nor over-revving of the motor. Out on the track a couple of steady laps to bed the engine down without over-straining it (this was the first time it had ever been run) we found the car to be stable, very easy to drive and pretty quick too. The car ran very true on the straights, but did understeer rather on the tight bends. However, this is certainly due to those ultra hard front tyres which have, no doubt, been supplied by the manufacturer to make the car stable in the hands of relative newcomers to model car racing. The back end gripped very well indeed and it was hard to go wrong provided the

MARDAVE COMP. SPL.

(from page 12)

job. Parts not required to be coloured (or ready for second colour) should be masked. Sellotape will do the job, though I prefer the old fashioned parcel tape that is moistened with water since it can be washed off when the paint is dry and has no tendency to lift earlier paint colours. Body comes in white so do not neglect this as a colour — leaving it as stripe between colours, or as a major part of the colour design. Front bumper should be shaped to match front of car. Windows can be filled with clear sheet provided. If you have the saloon, then leave rear window unsheeted to give access to motor and for cooling. Body posts (three

twisty bits were approached at a reasonable speed. The car showed no signs of spinning out if cornered too hard, those front tyres just took it a smooth, wide line. With the engine freeing off we peaked out the carburettor and had a bit of a dice with the others. Performance was good and although the understeer proved a bit of a snag at first, entering the bends slowly then powering round — in slow, out fast — made the car pretty competitive in its standard trim.

Having suffered with a multitude of teething problems with other cars in the past we were very pleased to note that nothing broke or fell off of the Futura on its first outing, and that must be a good sign! The only problem encountered was that the plastic fuel pick-up pipe in the tank kinked, and we had to replace it with a length of silicon tubing to resume running. Apparently it's a fairly common problem with what is otherwise an excellent tank, with internal baffles, built in sump, and which, being clear nylon, allows one to see how much fuel is inside at a glance. Use of a silicon rubber tube when building the tank should solve this potential kinking problem.

To sum up, then, the S.G. Futura III is a fast, easy to drive and competitive car in standard form. Some experimentation in tyre compounds will certainly give more responsive handling for the experienced racer. We understand several special go-faster goodies are now available for the car including glass fibre front chassis plate, special front axle assembly and, of course, the latest Super Tigre Rear Exhaust racing motor. We look forward to seeing Futura III's appearing at more meetings in the near future. They certainly have great potential and will undoubtedly do well.

in number) are provided and body is clipped into place with wire keepers.

Rules require a driver to be fitted. This is not included in the kit but can be obtained as an accessory. It can be fitted in place to suit the car in use (some bodysells have integral drivers built into the moulding). Helmeted drivers are desired — "Snoopy" or any animal TV character is rather frowned upon! For other decoration decal sheets in great variety are available.

Final thought. Don't be solitary: join BRCA as a first step, and then off to your nearest club to learn the ropes. You will find fellow enthusiasts most understanding and eager to help the newcomer. If you are an old hand — remember you too had to start once and welcome the new boy.

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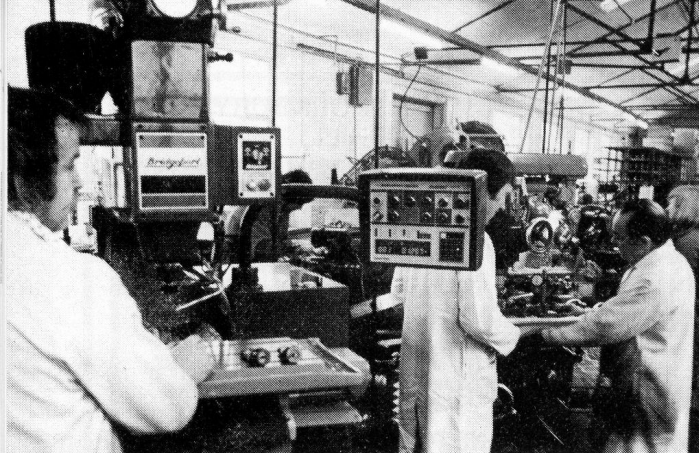


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INTRODUCING PB8 & OTHER GOODIES

Factory picture showing "Bridgie" in use. Panel on right shows all with lights and dials a-flickering. Works manager John Robinson stands just behind it partly screened.

I HAVE just been down to Havant to see the new and enlarged PB Racing Products Ltd factory and enjoy the Bridgeport computer engineering machine, which can do nearly everything short of calling the teabreak, as well as see some of the latest PB goodies. I went away positively loaded, including the first off the line, label still damp, of the mail order/export PB8 kit, which becomes very much the lead figure in this story, though what with the special bits has grown up from the standard version with due acknowledgements.

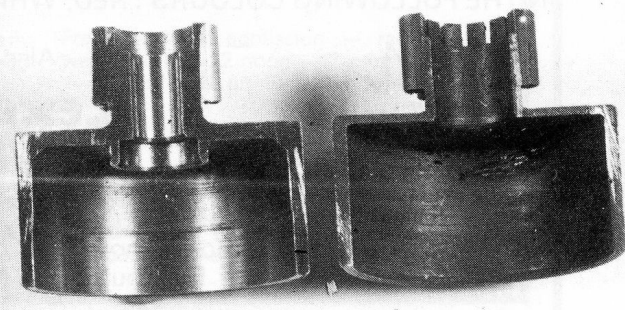
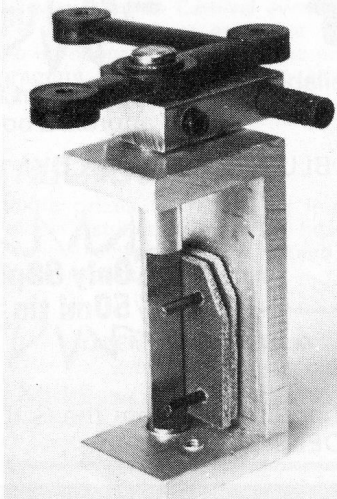
First of all the factory itself, now about twice the size it was when visited and written up in our Issue No. 1 though still on the same and adjoining sites. Increasing sophistication has meant that straightforward turning and auto work no longer earns its floor space, so much of the elementary work is now made out and

only comes in for the finishing processes. The 20 ton press has been joined by a 40 ton press which can stamp out a power pod in one bang. Pride of place is enjoyed by the Bridgeport which works to an accuracy of .0005 inch repeat, has a programme on tape which does its sequence of jobs with a display board giving progress flashes; can be fed alteration instructions and instructed to insert them in the proper place; then finish the day with a revised programme all ready for next use. If some other job is required then a new programme tape is slipped on and work proceeds merrily without elaborate setting-up time.

A really adequate bin storage system has been set up at the packing and despatch end which will soon be computerised. This will mean that part numbers will move from three-digit to five-

Disc brake unit: alas you cannot see ballraces top and bottom of brake lever.

Two bellhousing/gear assemblies cut away to tell a story. On the right standard style 12-teeth gear with possible weakness at gear/bellhousing junction. Left shows new design with much more metal at the "weak" point, rounded to equalise strain and with provision for ball races top and bottom to take crankshaft adaptor.



digit reference and of course provide instant stock state reports. Distribution agreement with Parma did not materialise after all, but had the good result that the space intended for extra storage has now become the plastic moulding department taking all plastics out of the main factory floor space. This has given Keith adequate space to make his Lexan moulding machine a special dustfree enclosed work area. Already bodysells are coming off the line with that super gleam and finish unknown before. Other Lexan improvements include true airfoil shape to car aero foils: other experiments will be producing front bumper aerofoils capable of adjustable incidence rates.

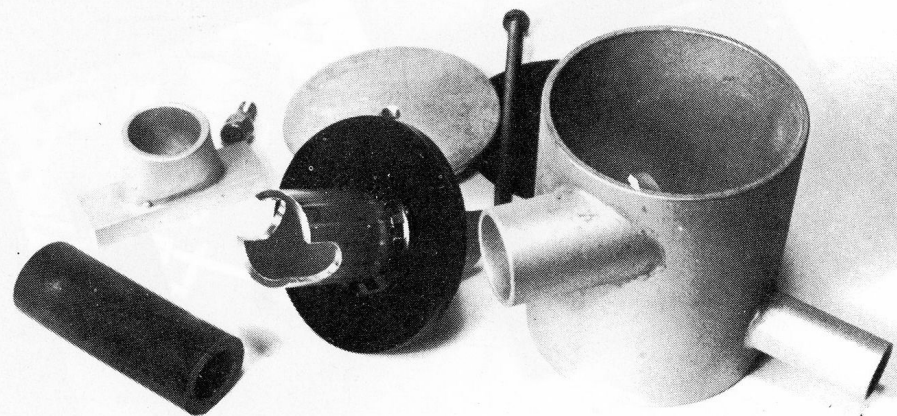
Another interesting bi-product of the extra space is possibility of storing rubber for tyres to enable it to age and so avoid some of the shrinkage problems experienced. That power press can now stamp out thirty tyres at a time, and these are left stacked to mature. There is still, alas, a small "black hole" section where the final truing up of tyres takes place.

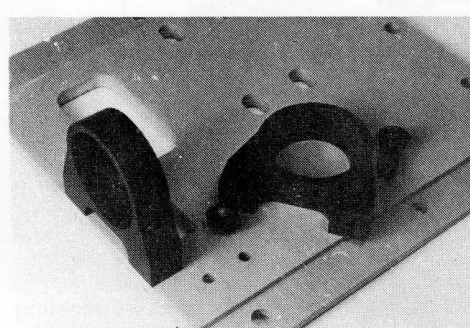
So much for the premises. Let us take a look at the new developments taking place. If we use the PB8 as the focal point we can work from back to front of the car. Item No. 1 must be silence. Horrid threats of stricter enforcement of silencing rules has made this a priority. Latest from the production line is an insert which goes into the dustbin silencer, together with a special length of silicon tube which must be pushed right home on both dustbin and manifold. Making it longer or cutting it shorter will strangely enough have the effect of making it *noisier!* The quieter motor fairly purrs, but do check your laps

against the clock: you will find that under given conditions the quieter car is just as fast though because of lower noise it may not seem so! Experiments have also taken place and are continuing with where to put the silencer. Cover picture shows it brought amidships and with battery position pushed ahead to give it room. In spite of over ¼lb of weight shift this has only brought balance point forward by ¼in from 4¼in ahead of back axle to 4½in ahead. So far this season Keith's car has been a little different at every meeting to test these potential improvements. Keen spies who have followed his lead have sometimes been very disappointed, only to be told, "Sorry chum, that was an unsuccessful experiment!" However, cover picture does show a variation on battery and Rx attachment via a radio plate in lieu of the upright body posts which are standard. Just for the record on this car, the chassis shape is different too, shaped roughly like a wine bottle in side view.

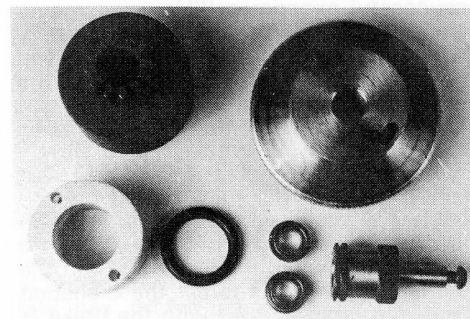
Disc brake caliper kit should be plain bearing for the PB8, I am lucky I got the double ball raced version that goes with the PB9. Brake lever is ingenious. With a pumper carb where movement of throttle lever is transverse to the car the L-shaped brake lever is assembled with the brake & throttle override kit without alteration. If a slide carb is installed with a lengthwise movement, then the simple back and forth carb and brake action means that the leg of the L-lever is cut off. The override pivot moulding have also been improved with a metal sleeve insert to enable them to be safely tightened up.

Silencer with new inner piece that assembled to instructions quietens engine, improves fuel consumption without loss of power.



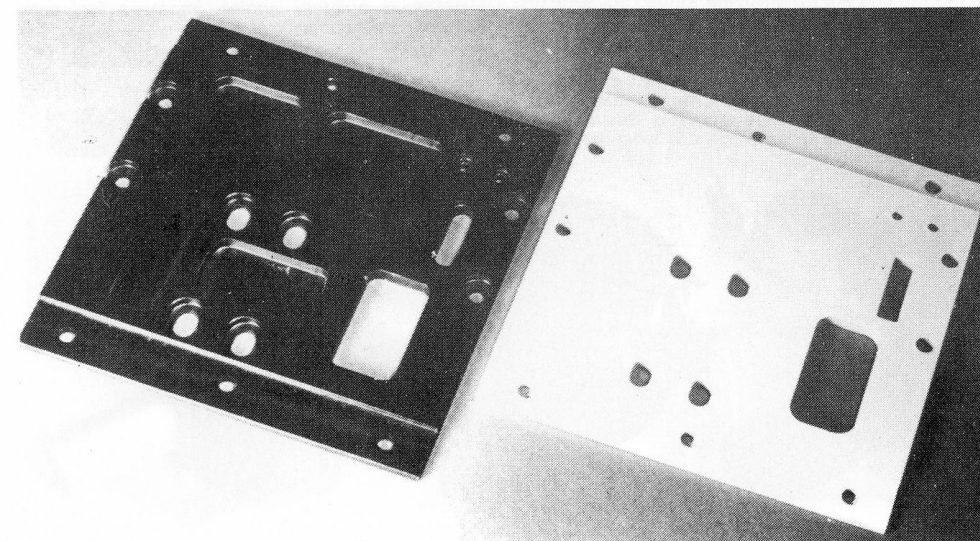


These are the smart anodised alloy plummer blocks that save weight and reduce CG slightly.



Parts of spur gear/clutch/bellhousing assembly. Note two ballraces. Shoe must be cut and trimmed to take O-ring.

Standard satin finish power pod on right; black anodised super accurate highly lightened pod on left. The button screw heads are all recessed as can be seen making it additionally snag free when overriding the other chap.



With the demand for special parts it seemed a pity not to let the Bridgeport do something on these lines. Hence the anodised in fashionable black alloy plummer blocks. The arch milled out between attachment holes makes a saving in weight and design permits a lowering of the back axle by some 3mm. The PB diff. continues to hold its place with a terrific demand now being met. I saw an enormous box of tested and run ready to go diffs all in their bright orange anodising. Must have been several hundreds of them.

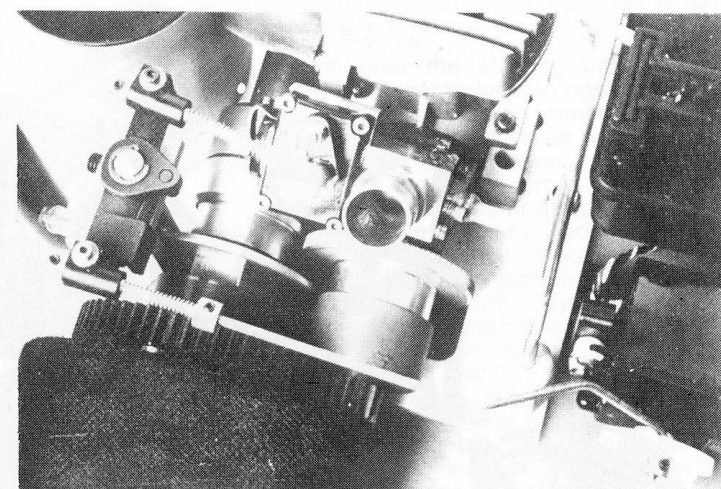
Still, by the way, the cheapest diff. on the market, but likely to last indefinitely by virtue of the gear design which provides maximum bearing surface to working parts.

These all have a pre-run before despatch but this does not mean the user should flog them unmercifully. An initial run of say five to ten minutes on the track, then a check to see that all screws are good and tight will ensure long and problem free life, not forgetting the use of a little oil from time to time.

While I was there "Bridgie" was working on the new lightweight power pod taking out all the excess metal and drilling the various holes all to guaranteed accuracy of .0005in from focal point at top left hand corner of pod. Again I have been lucky and can install the super pod in all its black anodised glory. Weightsaving is yet another step towards higher speed so every little gram begins to count.

Engines are becoming more and more powerful making the need for higher gear ratios desirable. This poses all kinds of problems. The 12-tooth gear/-

Linkage set-up for use with disc brake and slide carb. This also shows that slide carb, completely sheathed against ingress of dirt. Air filter removed for viewing.

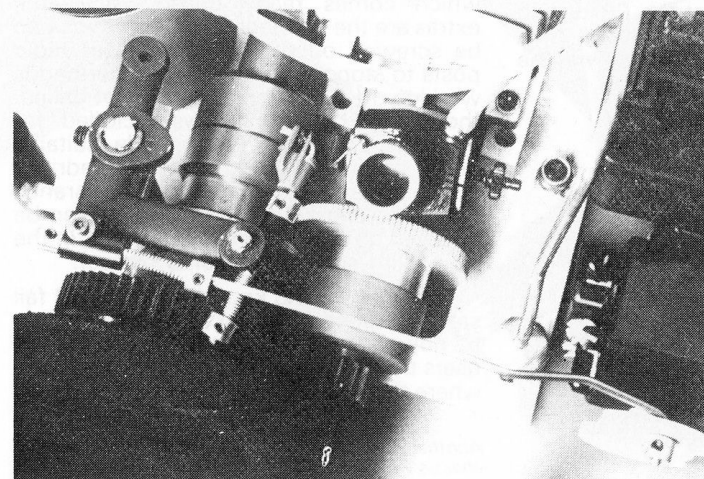


clutch housing has been regarded as about the smallest that can be safely obtained. As the number of teeth decrease the diameter of the gear is also reduced until there is a very limited amount of metal to hold the teeth on, particularly as the gears have to be undercut to enable the gear cutting tool to be withdrawn without damage. Some experimental 11-teeth gears were cut leaving additional space which effectively ruined an expensive tool after making a dozen. Considerable new thought has now gone into the question, with a revision of stress points, rounding of cut back areas and made additional metal available at the tooth junction. Originally in this country teeth were to 32dp whereas in USA a 24dp design was followed, involving larger diameter gears. Now with increasing reliance on metric sizes experiments with

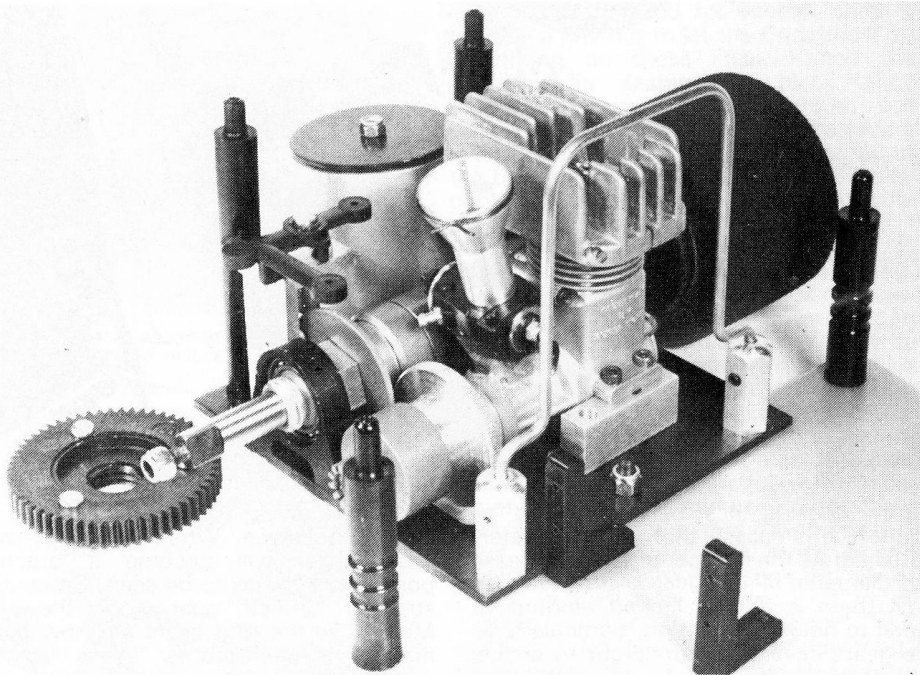
Module 1 gives us 25.4dp close to the American choice. Whether the 11-teeth gear wheel will become a practical possibility remains to be seen. Certainly a stronger 12-teeth gear is on the way. Meanwhile the ring gears are now being made in a much stouter "glass" so that power "bites" of two or more teeth at a time are a thing of the past. The new material has a melting point around 100 deg. Centigrade so there is little chance of softening or melting by reason of transferred heat on the track.

Moving forward we come to the rollbar which is shaped to go into rollbar supports and locate in place of the existing screws which hold power pod to chassis. A very useful extra, serving as lifting handle as well as engine protector.

The super fine airfilter has already been adequately discussed in earlier issues.

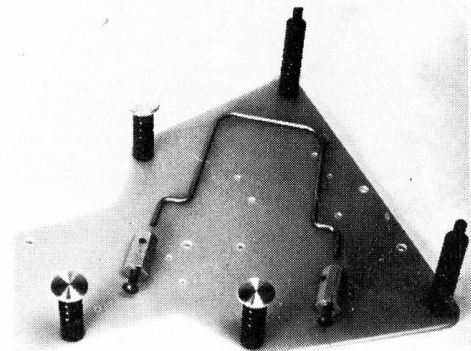


Linkage set-up for pumper carb. Here the leg of the disc brake L has been retained to provide transverse movement. Air filter removed.



SuperTigre X21 in place (carb will have to be turned round); rollbar fitted; lightened power pod in use, plus anodised alloy plunger blocks.

Promised new slide carb. has still to see the light of a production day. At the moment less than dozen prototypes have been made and are in use with the PB Team. I understand that all the problems have been ironed out and that they can be expected to come off the line about the time of the world champs at Geneva. Feature of special importance as against any other slide carb is that the PB design will have the sliding part enclosed thus preventing grit and dirt entering via the



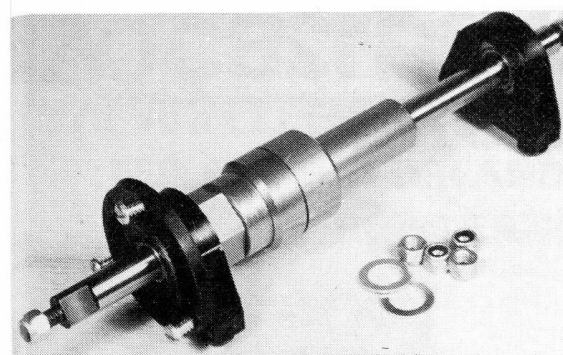
slide and undoing the good work of the air filter.

New fuel tank is also still awaiting its final shape. Those seen in white are efficient but alas the customers have said that they look like bathtubs and don't want to know. New shape will be cosmetically more elegant though to meet demand will probably be in black. White ones show the level of fuel in the tank, black ones don't.

We are now on the glassfibre chassis which comes ready drilled. Nice little extras are the knurled alloy caps which can be screwed on top of the shorter radio posts to stop risk of holding rubber bands working off. Servo brackets are not drilled, though selftapping screws included for them. A 2mm drill will provide suitable holes. I also just run through the predrilled holes so that the self-tappers are clearance fits in the chassis. The radio posts can be screwed on much more easily if held in the vice (with soft metal clamps please).

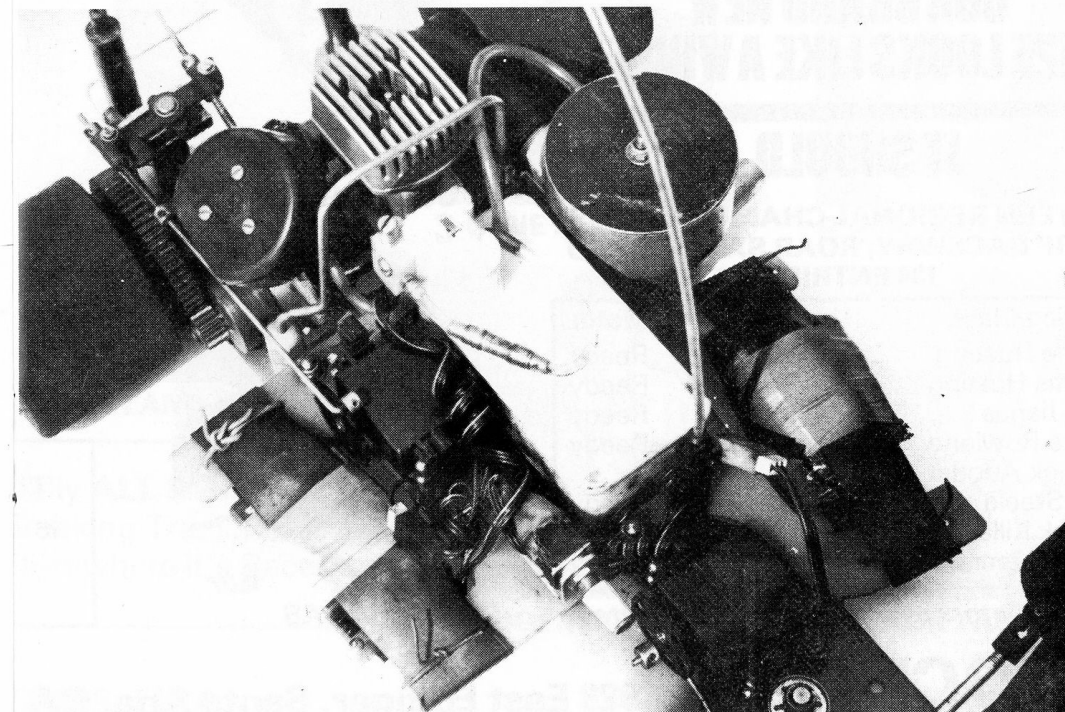
Everyone should know about the PB fail safe and steering layout for full Akermann by now, but I would just remind would-be users that it is the only commercial system where the ballbearings for front wheels are

Another shot of the rollbar, shown on fibreglass chassis with radio rubber retainers screwed in place.



THE COVER PICTURE

Shows a PB Experimental car with wire rear bumper, new location for silencer — note its "sugarbasin" shape instead familiar "dustbin". Differential and disc of course. Moving now to centre of the car as shown below there is the massive airfilter — you must take our word for the prototype slide carb — and the prototype fuel tank with flitop, due to come out in fashionable black. Forward mounting of battery to allow silencer to come in its place, all fitted to low lying radio plate, with ex-inner tube rubber laced to supports. Warning: Danger to wealth! Follow PB experiments with caution: they are not all successful!



The PB differential now a must for all self-respecting Internationals!

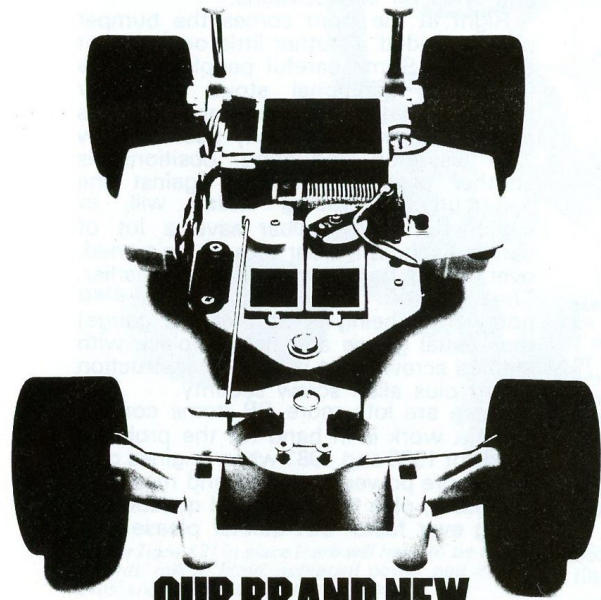
integral with the steering unit so that wheel hubs themselves do not have to be ballraced. This saves an immense amount for the well-stocked driver with wheels and tyres for all occasions.

Right at the front comes the bumper plate provided. Another little one goes at the back. Some careful people are now fitting an additional stout wire rear bumper. . that cover picture again. This is a tip to follow. Front body post in allow with assorted mounting positions is another protection device against the hurly-burly of racing which will, in conjunction with rollbar save a lot of damage should the car turn, or be turned, over. Wing has been mentioned earlier. The wire supports are also noteworthy being of stouter (12 gauge) than usual gauge and held in place with knurled screws (not hex as on instruction sheet) plus allen screw security.

There are lots more PB items coming along. . work is in hand for the probable needs of 1980 and 1981 when engines give even more power and ways and means to harness it; plus the ecological question of going ever faster but quieter please.

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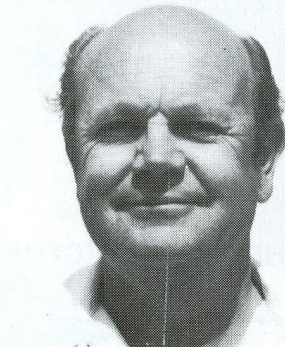
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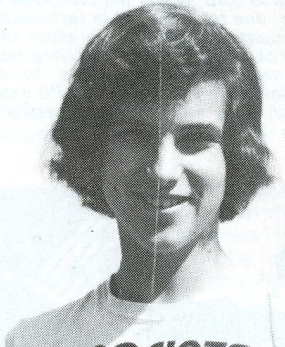
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7 Frank Killam		
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2 Mike Rowland	RC300	USA
3 Gene Husting	RC300	USA
4 Phil Greeno	Greeno-PB	England
5 Bill Jianas	RC300	USA
6 Roger Curtis	RC300	USA
7 Arturo Carbonell	Delta	USA
8 Phil Booth	PB	England
9 Keith Plested	PB	England
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BRITISH GRAND PRIX

BOB ERRINGTON of Bournemouth scored a convincing double at Wombwell in winning both Formula and Sports GT events in the British Grand Prix. Entries were fully subscribed with over a hundred for Formula and a terrifying one hundred and twenty for Sport GT: enough to make any organisers blanch in the cold and rainy weather that obtained on Saturday. Brave solution was to race eight-car heats, semis and finals. In spite of some wisehead-shaking it proved entirely successful. Over the two day main events there were only three reported radio problems (and two of them were the result of reversing Tx/Rx crystals!)

Overseas support came from a strong Serpent team from Holland headed by Peter Bervoets and Rony Ton plus Frank Cromberge and supporting cast; a group from France and two groups from Sweden with Challenger. Serpent and Challenger cars were also supported by the home sponsored drivers which included Steve White and Paul Padgin for Serpent and Mick Newman in the Challenger seat. Some of the recently signed up SG drivers were also in evidence but did not figure in the main finals. Strong for the home side was the PB contingent with Keith Plested, Phil Booth, Dave Preston, plus Phil Greeno with the PB/Greeno Special sprouting more and more Greeno goodies. Debbie Preston as leading Associated supporter must not be forgotten plus Walter Bailey, displaying also the very latest OPS combined slide carb and air filter, a test example also appearing on the PB/Greeno.

Wombwell is not an easy circuit; the

long straight which forms part of the original Go-Kart track though good and wide is not particularly smooth, and slippery, certainly at the first bend from the start which usually saw a minor pile up at the start of each heat. Saturday's cold weather and early rain meant that only the first round and about half the second round enjoyed (?) good ground conditions. This meant that those who had not achieved a double figure lap result were out of the running. Ten and eleven laps were achieved by all the expected people so that the ultimate contenders were clearly the fastest present. Phil Greeno got FTD. In spite of the weather heats continued albeit with some lack of enthusiasm by drivers and marshals alike. Happily the rain eased and the track was almost dry by the time the main final came along.

Local man Steve White took the semi from Debbie with Dave "riding shotgun" to her, with Rony Ton a limping seventh, following collapse of a crankshaft ball-bearing when he was going well in second place.

In the final Debbie got off to a good start to be passed by Ron Bates followed by Phil Booth, Phil Greeno, Peter Bervoets. Then as the fast Bates slowed Bob Errington took up the running with Phil Booth slipping in behind him, followed by Debbie Preston, Bates beginning to lag still further behind. First fuelling by everybody. Greeno was fast but seemed to be finding a bit of difficulty handling his car. Peter Bervoets then began to show in 3rd place just past the halfway mark. Then Phil Greeno took over in 3rd place momentarily to be passed by Ron Bates. Errington still

leading Bervoets in 4th position, whilst hasty pit repairs made to Steve White's fast disintegrating body. Greeno's car in for attention, several minutes off, but rejoins race. So cold drivers' hands practically freezing. Bates comes in for pit attention. Errington holds his lead to the end with Phil Booth finishing half a lap behind (both on 66). Bervoets leads Debbie on 62 laps, again less than half a lap away. Dave Preston on 59 then as result sheet. A convincing win though by no means fast.

Sunday dawned much brighter and racing started earlier with 120 cars in fifteen heats times three to be run. Track dry, but still cold, marshals more on the job and smooth progress. First round produced a bevy of 10 and 11 lappers, then with second and third rounds, 12s began to show with Peter Bervoets snatching FTD at the last moment from Phil Booth and Debbie who had also made 12s plus Bob Errington, who with Dave Preston made up the straight through finalists.

Surprisingly both Ronny Ton and Phil Greeno had to dispute the semi final. Ton held the lead throughout with some changes to the follow-up roles. Greeno's car not running well, panic pit work when car cut out towards the end, but restarted and finished second taking Fred Martin into the final as No. 3.

Final start was delayed for Phil to replace and run in new engine. First thought was for new clutch shoes only, but full engine change deemed necessary. Start produced the usual mix-up at first bend with Dave P. car rolled over. Phil G

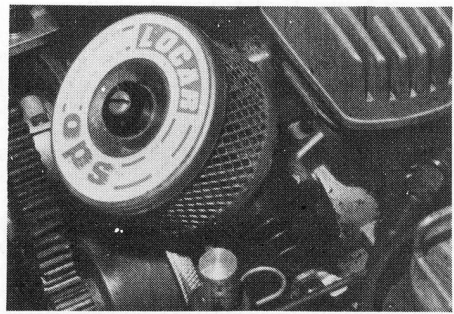
Start of eight-car line up for Formula Semifinal. Kindly sponsors' demonstrator in the rear.

Right Bob Errington, as rigged for Arctic Formula Final conditions: below, Bob again with his winning Sports/GT car supported by his faithful pitman Allan Sturgess.

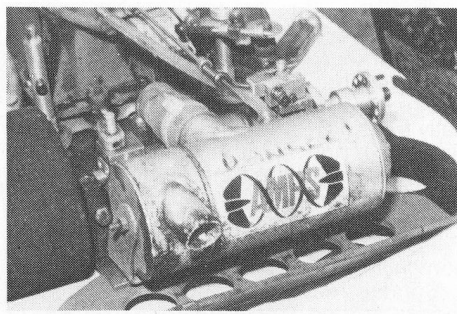


ran off in the lead followed by Bervoets, Ton and Bob Errington. Debbie showed in 3rd place, then Peter B. came into the lead, with Debbie 2nd and Bob in 3rd place. Bervoets cuts out and is restarted. Debbie leads from Bob Errington. Refuelling stops begin, and Errington takes the front. Then Phil Greeno takes 2nd place, Bervoets rejoins the race.

Greeno drops out, Dave Preston comes up to 2nd; more trouble in the Greeno camp, new engine doesn't want to go. Past thirtieth lap and only six cars going now. Bob Errington two laps ahead with 34, Dave 2nd with 32. Debbie still chasing to get with the leaders. Bervoets back in 3rd place, having taken Dave Preston., Errington 41 laps, Debbie 40 laps, Bervoets and Dave P 33 laps. Bob Errington lapping fourth place. Only four cars on the track at that moment. Then five cars on the track. Debbie a lap behind. Troubles with Debbie, binding at the rear. Phil Greeno back in the race. Dave Preston up to 2nd. Positions Errington, Dave Preston, Debbie Preston, Bervoets, Martin and Greeno. Errington four laps ahead of 2nd. Greeno in again and out. Peter Bervoets in pits. Four cars still on the track. Five now in the race. Martin out with broken clutch pin, back but very far behind. Two minutes to go and only Errington, two Prestons, Ton and Martin still running. Errington virtually uncatchable. Bervoets has rejoined but gear wheel touching the track as he limps along. So to the finish Bob Errington with 75 laps, five ahead of Dave Preston and



New style silencer by AMPS on Mike Newman's Challenger. Not unlike that seen on latest 24-hour record Delta.



Air filter/slide carb prototype from OPS on Walter Bailey's car and with variants on Greeno's and Dave Preston's (who has his own slide carb of course).

eleven in front of Ronny Ton in 3rd place.

So Bob Errington achieves a splendid double, ably assisted by his fellow-clubman and pitman from Bournemouth Alan Sturgess. It was a harsh race with half the field out for some of the time with troubles great and small.

In each of the two days' finals diffs were in all cars. PBs with the PB diff, others sporting AMPS (Serpent, Associated). Works PBs also had prototype slide carbs from PB and some prototype fuel tanks, plus the new quieter fuel saving silencers. Other silencers in evidence were some from AMPS Ian Agnew seen on Mike Newman's car and several others, very

much on the pattern being developed by Delta. Other interesting design features noted included Dick Winder's (Model Racing Car Developments) latest spring-heel rear suspension now much modified and improved to operate on shock absorber slide valve system; a neat stay to support the PB airfilter, and the latest SG Futura mod. where failsafe is floating attached to the radio plate front bolt.

In the Handicap Finals C. Wilson also achieved a double victory for the 0-15% event. A. Micklethwaite won the Formula (20% +) with J. Moon 4th. Then in the Sports/GT Moon took the flag with Micklethwaite 5th.

FORMULA *Semi Final*

1 Steve White	30 laps
2 Dave Preston	30 laps
3 Debbie Preston	29 laps
4 L. Wheldon	29 laps
5 Fred Martin	26 laps
6 A. Micklethwaite	25 laps
7 Ronny Ton	24 laps
8 K. Wheldon	12 laps

SPORTS/GT *Semi Final*

1 Ronny Ton	37 laps
2 Phil Greeno	35 laps
3 Fred Martin	34 laps
4 A. Gilbert	32 laps
5 Steve White	30 laps
6 Paul Padgin	30 laps
7 Frank Cromberge	26 laps
8 Mike Newman	18 laps

FORMULA FINAL

1 Bob Errington	66 laps, PB International, PB diff, OPS.
2 Phil Booth	66 laps, PB International, PB diff, OPS.
3 Peter Bervoets	62 laps, Serpent III, AMPS diff, OPS.
4 Debbie Preston	62 laps, Associated 200, AMPS diff, OPS.
5 Dave Preston	59 laps, PB International, AMPS diff, OPS.
6 Phil Greeno	57 laps, PB/Greeno Special, AMPS diff, OPS.
7 Ron Bates	56 laps, PB International, AMPS diff, OPS.
8 Steve White	50 laps, Serpent III, AMPS diff, OPS.

HANDICAP FINALS

Formula 0-15%

1 C. Wilson	
2 J. Taylor	5%
3 B. P. Coombs	
4 C. J. Caisley	
5 L. Bailey	
6 C. Elmore	
7 S. Byrne	
8 S. Wragg	

20% +

1 A. Micklethwaite	20%
2 C. Williams	25%
3 M. Draycott	30%
4 J. Moon	20%
5 F. Martin	35%
6 H. Mason	30%
7 K. Wheldon	40%
8 L. Wheldon	35%

Sports/GT 0-15%

1 C. Wilson	
2 S. Wragg	
3 R. Andrews	
4 C. J. Caisley	
5 J. Porter	
6 I. Woodhams	
7 P. Noone	5%
8 C. Elmore	

20% +

1 J. Moon	20%
2 M. Simms	20%
3 M. Draycott	30%
4 M. Newman	30%
5 A. Micklethwaite	20%
6 A. Gilbert	20%
7 A. Russell	20%
8 C. Williams	25%

SPORTS/GT FINAL

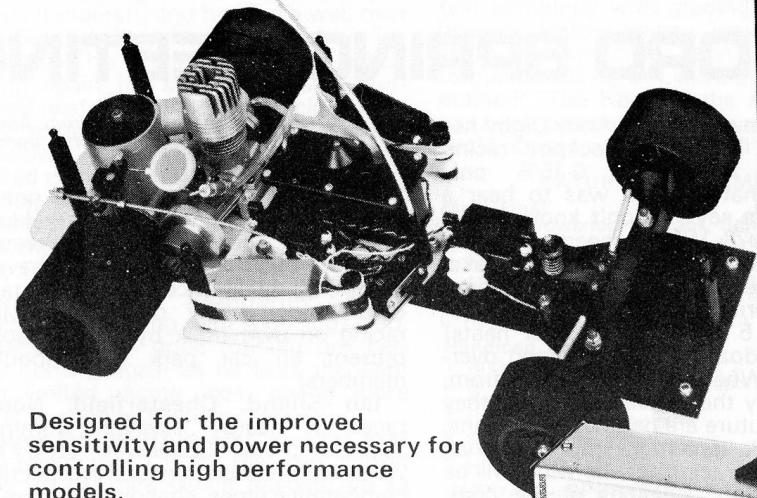
1 Bob Errington	75 laps
2 Dave Preston	70 laps
3 Ronny Ton	64 laps
4 Peter Bervoets	61 laps
5 Debbie Preston	50 laps
6 Fred Martin	46 laps
7 Phil Greeno	33 laps
8 Phil Booth	51 laps

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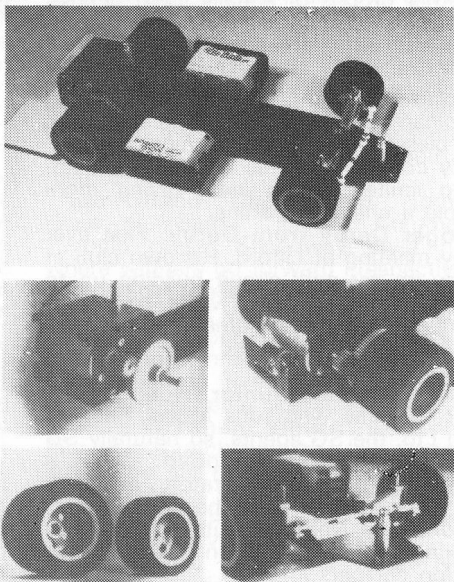
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PRICE TO BE ANNOUNCED
*Speed controller with heat sinked metal encased resistor, reverse and dynamic braking.

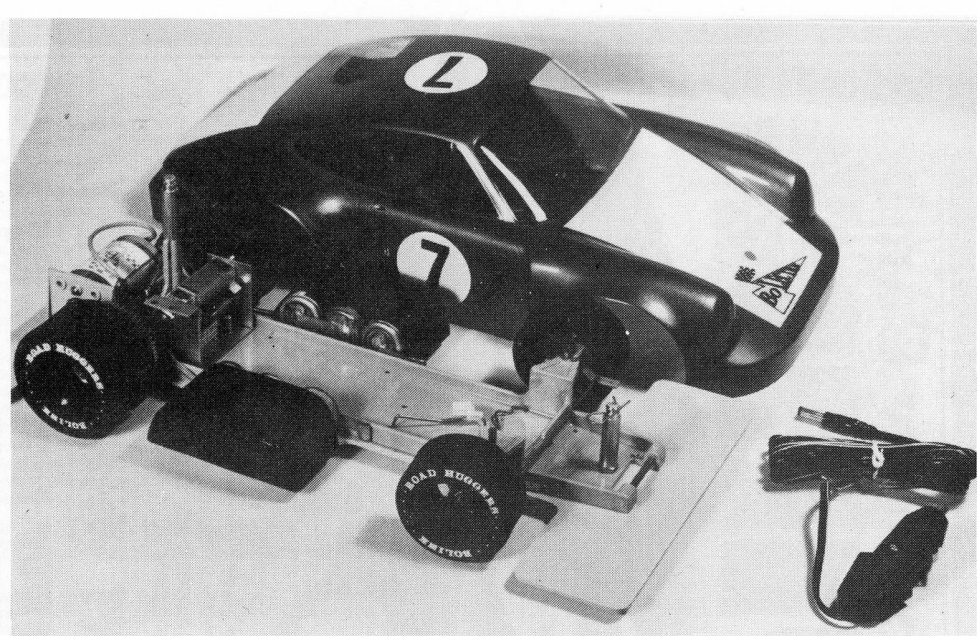
* RS54 motor with suppressor and low slung twin encased battery packs mounted on preformed aluminium tray.

* Charging leads with no hot external resistors.

* Detailed moulded body shell, tough front and rear bumpers for maximum protection.



SENSATIONAL FRONT WHEEL DRIVE CAR
Look for this kit in your model shop soon



BUILDING A BO-LINK

BO-LINK 1/12th scale cars enjoy a terrific reputation in USA and were quickly taken up by the experts in the UK as the car to win races with when Ally Pally first became available for racing. As experts will they were produced with all the refinements including proportional "black box" power control which put the price up somewhat and left the impression that they were exotic products not for the common herd. I fell too, and still run my car complete with Electro-Craft "black box" though I have never aspired to expert status. Meeting Bob Rule who is Mr Bo-Link at two Nuremberg toy fairs and chatting to him it is quite clear that his range of cars are by no means "expert only" but suited to all classes of racers and would be racers.

Meanwhile, from a trickle of imports, Micro-Mold down in Sussex are bringing them in by the plane load, and their Sales Manager John Dean, who is something of an electronics buff himself has not only sent me a kit to make up but also given me a number of useful tips to make the most of it inexpensively and without extensive alteration or additions. So remember all the clever bits probably come from John, and the run of the mill comments are mine.

Originally, the first electric cars came from Bob Rule using as a basis the ex-

Nearly completed Bo-Link with ready painted body at rear. Charger cord on right. The kit being made up has black chassis and sub-base, some wiring has to be completed, and body painted (Lexan).

cellent Jerobee chassis from 1/12th glow plug cars which enjoy a high degree of popularity stateside though have not caught on over here. This chassis has not been improved upon and is still the basic element. Underneath goes a shaped Kydex plate which incorporates front and rear bumpers and two shelves on which the two three battery nicad packs are located. Underplate is attached to Jerobee chassis via a series of remarkably small countersunk head screws which are self tapping. So assemble over a sheet of white paper or you will mislay some.

American practice is to enclose the nicads in a stuck on cover to hold them firmly and for ever in place. These are not provided with the import kit, instead cable ties are supplied to fix them. This is not entirely satisfactory since it allows an undesirable degree of wobble. John drills four holes on each side plate and slots them out to take the cable ties, just in-board of the ends. This gives a neater and much more secure fixing. The two 3-battery packs are not joined together but a plate brass jumper strip must be soldered between them. This slides between the

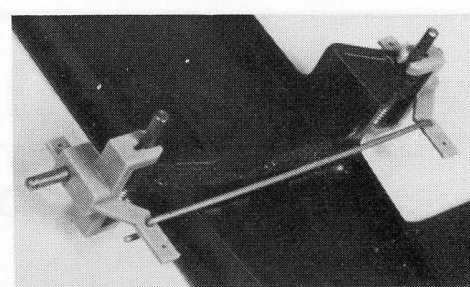
chassis and the Kydex underplate, and is turned up to meet the nicad connector strips. These from fine Ever-Ready batteries have insulating sleeves on them, which can be slipped off and put aside for use elsewhere if so desired — they won't go over the jumper connection.

Apparently also in USA the builder is expected to assemble his nicads one by one with connecting strips, which is very carefully explained in the instruction sheet. So you can ignore that bit! Indeed the very detailed description of every electrical move to my mind tends to make it all seem much harder, when a look at the wiring diagram provided will prove much more rewarding. I also find the lead wires supplied rather stiff and unbending, so have cheated and substituted more malleable leads from my odd box. But take note of their lengths since instructions are careful to say how long to cut them (and like a Chinese tailor leave none over) so that their lengths indicate where they are to go with just enough length to fit in.

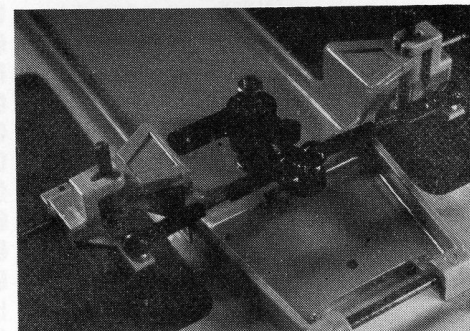
Unlike the printed circuit type of speed control in vogue with some British kits, Bo-Link use the wound ceramic type of resistor originally created for slot-race had speed controllers, with a wiper-arm attached to the throttle servo. These take up rather less space, have good forward speed range and braking but no reverse is fitted. Some British groups are now campaigning for reverse to be mandatory. This is a matter of opinion, but I would just mention that fullsize racing cars do not normally have this facility installed — they are complicated enough without it: nor do 1/8th scale i.c. cars.

A nicely shaped bracket comes to carry this resistor and should be fixed to the base of the chassis where indicated. Self tapping screws are supplied to hold it there but I preferred to use a couple of nuts and bolts instead to be really secure. I have read of devices to hold servo and resistor together when the latter comes adrift so take appropriate precaution. Now we come again to a slight variation in practice. It is suggested that the charging resistor (which on British kits is embodied in the charging cords) should sit under the speed resistor anchored to base of the bracket with Zap or epoxy and be wired into the circuit there.

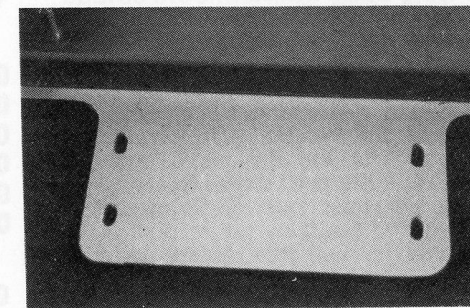
The Bo-Link charging leads are very beautiful, and there is a neat little charging socket to go at the back of the car. It is intended to fit into the cigar lighter on a car dashboard to obtain charging power. This need not mean you need the family car every time — you can obtain a suitable



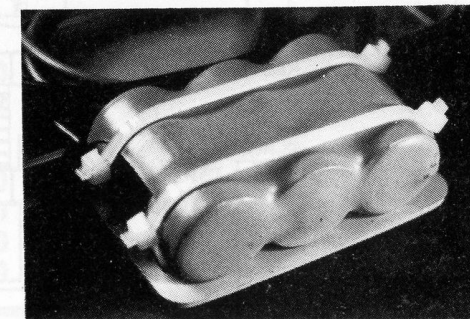
Steering unit assembled as per standard kit.



John Dean's failsafe device using Micro-Mold fail safe and their low-priced ball link and threaded rod set. Well worth fitting.



Another John Dean notion. Drill and slot nicad platforms to secure batteries with cable ties (these are provided in the kit).



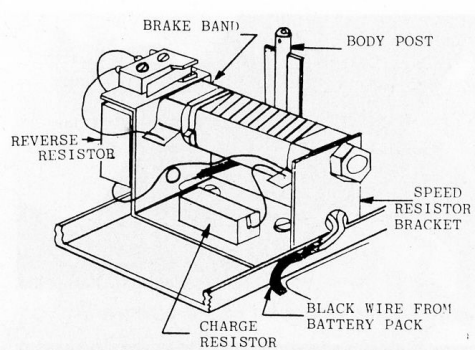
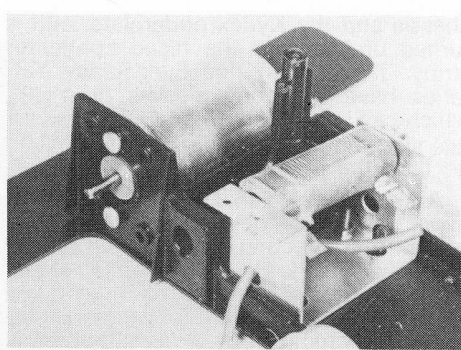


Diagram showing additional wiring for reverse kit. On right is standard resistor rig. Microswitch for reverse is screwed into two holes seen on left if desired.

socket for the plug provided and have this installed on your charging panel. Many of us still clamp a couple of great bulldog clips on the neg and pos ends of the charging battery and I have made provision for this. John Dean has fitted his resistor on a hi-fi heatsink (15p he told me at his electronics shop) Mine goes on a 4in square alloy block and is part of the charging lead. If you leave it where told — it gets hot and you are advised to see that it is not too near the servo in case it melts it so I have followed the sound practice of keeping it off the car.

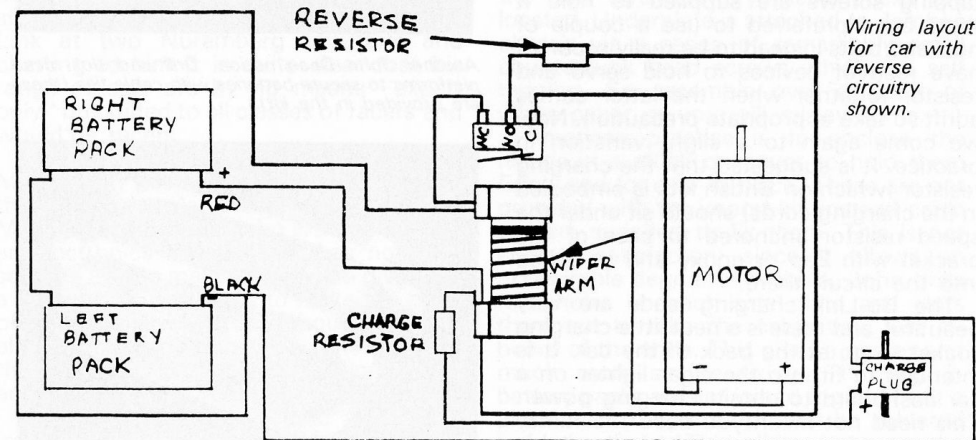
Harking back to reverse or not to reverse. There are two little holes on the resistor bracket side piece which is folded over at right angles. This device is intended to take a micro switch which forms part of the reverse unit which can be acquired for the Bo-Link as an extra if required. Rather than waste an opportunity I telephoned Ted Longshaw who lists it and got it by return post. There it sits with its own little resistor underneath,



cunningly wired up as per diagram, giving the best of both worlds . . . It's there, no need to use it if you don't want to . . . like . . . the starting handle on a Rolls Royce.

The two stub axle units are sprung onto the kingpin unit on chassis frame, remembering to slip in one end of tie rod into the first after fitting and into the second before springing into place. This makes an effective unit when joined with the addition of the steering linkage with its "servo saver" bend. John Dean rather naturally prefers the Micro-Mold ball joint accessory and the Micro-Mold failsafe unit to take the place of this. His photos and brief description show what is needed. In passing I have used the Micro-Mold ball joints as part of the steering set-up on my Jerobee for nearly two years and haven't lost a servo yet — the unit springs apart under great stress, but normally just takes it and carries on. Front end is sprung and requires only an occasional drop of oil to function perfectly. Wheels and tyres (supplied t & g — trued and glued) slide on to stub axles and are secured with circlips. (E ring retainers in American). Very

(continued on page 44)



Wiring layout for car with reverse circuitry shown.

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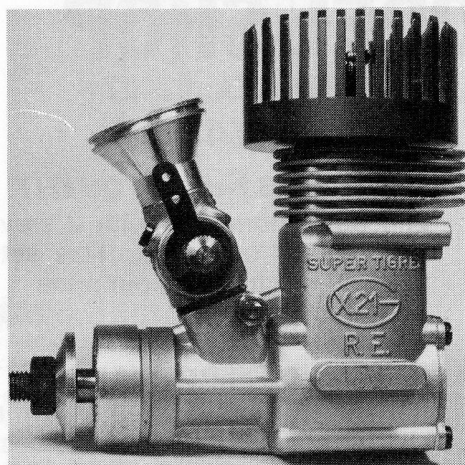
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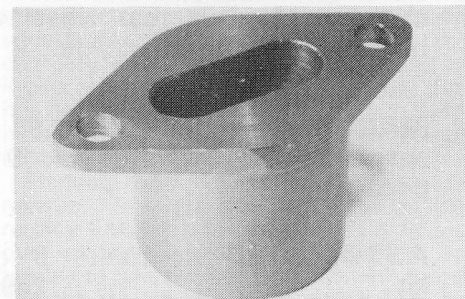
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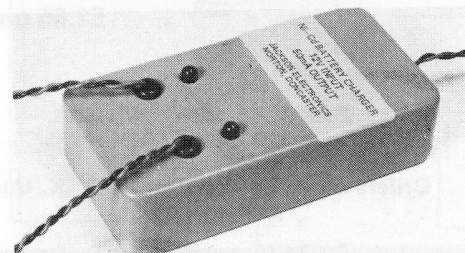
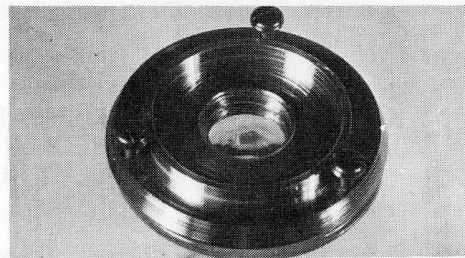
SHOPPING AROUND



SuperTigre X21RE rear exhaust now well into the market with and without silencer, manifold. Heatsink and airfilter part of the deal.



Nice little red anodised manifold for the OPS made by PB, precision drilled holes and all.



THE Super Tigre X21 RE is in the shops and indeed already in some of the cars. Who the lucky people are going to be with the ten tuned works motors as offered by Mick Wilshere of World Engines in our last issue I do not know — a number of good drivers have been put forward as deserving cases. Meanwhile there seems something of a mix-up on prices with two suppliers apparently offering terms which provide a widely differing selling price. The engine itself looks good; I like the screw-in type of airfilter trumpet, though why a gauze retaining ring is not supplied with the engine I don't know! I hope by now suitable manifolds are in good supply. In the world of international sport OPS seems to have the edge very much over most other makes if result sheets mean anything, though elsewhere we report with delight a Phil Greeno win in quite good company with a tuned Veco 19! Old soldiers never die! Reverting to OPS PB Racing Products have just produced a custom made manifold for this engine, finished in red anodising (jewel fiends please note) and with precision drilled holes to match up. (Price £2.90)

Model Racing Developments are marketing an alloy gear carrier to suit the PB differential, designed to overcome the following problems (1) Drive thread stripping on nylon carriers (2) Selftapping screws stripping ditto (3) Distortion of gear on nylon carrier. The alloy carrier is claimed to true up even a distorted gear to within four thou, as against as much as 15 thou on some nylon ones. It will be selling at £3.24 inc. VAT. MRD are also sole distributors of a new field charger. This charges from either 12v battery or 24v (two batteries in series) any voltage nicad pack up to 12v at constant 50ma. Can be used simultaneously to charge both Rx and Tx nicads overnight or two Rx. It is transistorised and fully protected against being shorted out by careless wiring up. It sells at £5.95: single 50ma output at £4.95 or dual 50ma with jackplugs at £6.50.

Micro-Mold's own 1/12th electric car is now well on the way and should be available by time issue appears. It relies on quite a number of Bo-Link parts — a good thing! — such as their hexagon type rear axle to take hex wheel hubs. Chassis is aluminium with battery trays, speed

Ally gear carrier for the PB differential marketed by Model Racing Developments with several useful virtues.

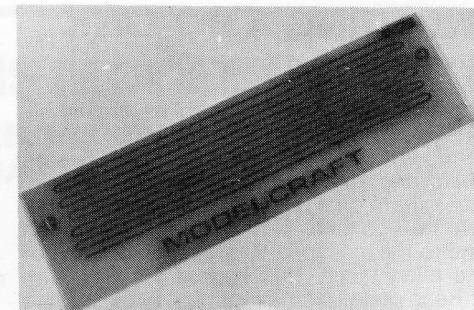
MRD also have the agency for field charger for Nicads operable from 12 volt car battery.

controller as well with reverse. I have not as yet handled one so cannot say more at this stage. Look out for it. Another new electric now in production is the Nova made by Burrell Racing of Milton Keynes. It is available with either resistor or electronic speed controller (both made by Burrell Racing). Batch production will be followed so that minor improvements can be added without trouble. At the moment prototypes are on test by club members and John Bicknell will be running one at Filey Holiday Camp week.

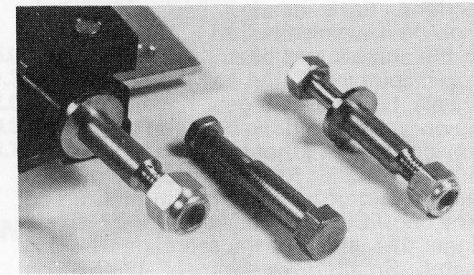
Roger Wilding has now started to produce his printed circuit encapsulated aerial which would put a stop to that ball of knitting wool arrangement of wrapping it round something, or threading it through the radio plate. First seen on one of his vintage cars and now proven it should be a boon to all those not dedicated to a whip.

Once upon a time nearly all the r/c car aces and the other cards come to that were firmly reliant on the Futaba range, either twinstick or car wheel type of 2-channel gear. The special Futaba bargain month will no doubt bring a lot more adherents into the fold — a number of model shops to my knowledge sold out of stock and had to re-order (I grabbed a quick Medallion Rx and noted that the crystal is no longer visible on top. However, it is no trouble to open the case — there is a little indentation to press a small screwdriver in and lid comes off to reveal changeable crystal). But a far more catholic approach to equipment is now evident, with a good following for MacGregor, KO Digiace and Talisman. I have one each of these and they all work quite happily — which goes where depends on car, with a yearning to make mini-scale vintage I think Talisman is likely to be the choice. Now I hear that the PB Team will be trying out Sanwa possibly for use at the World Champs in Geneva. Continental visiting drivers from UK find the 27mc band very uncertain in foreign climes and tend to move over to other frequencies there. Utrecht is a good example where nearly always 27mc equipment gives trouble but locals on their own frequencies are laughing.

This means that Keith and other PB works drivers will not be relying exclusively on MacGregor gear during the current season but will be opting for the more trouble free at any given place. Waltron is another make that I associate with the early days of r/c car racing and still see some in use at meetings. They are now offering a very attractive Mk3 Super Series in 2 channel form based on new



It had to come! Modelcraft's encapsulated aerial — takes no room at all and fairly extensive tests have not faulted it.



Another by Modelcraft: Replacement stub axles for Mardave electrics for ease of wheel change (ideal for scratch built vintage).

continental standard circuit and a new tight band, I.C. Rx. Tests show a genuine 20 KHZ separation: used with its own kind of clean Tx output and correct Tx discipline then a separation of 10 KHZ can be achieved. Easy conversion to new VHF frequencies as and when they become available is also promised. Waltron also market a range of frequency monitors for personal or club use.

Suddenly it is all paint! Simultaneously two new British paint options are open to us for Lexan and polycarbonate use produced specially for such use by development sections of famous paint firms though offered under "modelling" labels. First off the mark with labelled cans is Phil Greeno with an eight colour range all intermixable plus larger cans of thinners, with a promise of metallics, etc. to come. GB Models of Weston-super-Mare have the U.K. agency for their range starting with six basic colours and thinners, but also produce Lexan glue, not until now available as a British product. Prices are the same for both makes 95p for 50ml tin. Paint is designed for thin spray coats rather than brushing (though you can wastefully always leave the can open for a bit to thicken it).

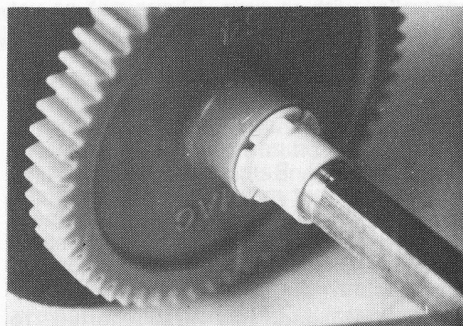
BUILDING A BO-LINK

(continued from page 40)

valuable tip here! The circlips are small, the wheel recessed: it is impossible to grip them with ordinary needle nose (snipe) pliers and they drop easily and invisibly. Stick them on a piece of sellotape with the two prongs clear and then introduce each one to the axle, pushing on with the end of the pliers. Easy this way.

Rear axle is hexagonal with turned sections to run on. Hex shape makes driving wheel location positive. A pair of split nylon bearings are provided to open up over the hex part and slip into the turned sections. Each bearing has a tiny little knob on it which fits into a matching hole on the chassis axle bearer thus locating to stop it spinning round at random with the wheels. Large plastic gear has hex hole to slip on to axle on drive side and a spacer is provided on the other side. (I had a bit of a Biro as a spacer for ages with my original car until out of very shame I turned up an alloy one!) Circlips that hold wheels on are bigger this time, but the sellotape trick still useful. Small drive gear of course on motor shaft and should align up nicely. If stiff loosen screws holding on motor and ease off fractionally. About a cigarette paper thickness clearance does the trick. Some of the hex axle cars have threaded ends that take button screw retainers.

Body mount posts remain to be fitted before doing the body. If you are a careful type you will have got this moving whilst assembling the kit. Paint the inside (using paint acceptable to Lexan — NOT car aerosol! Several good brands on the

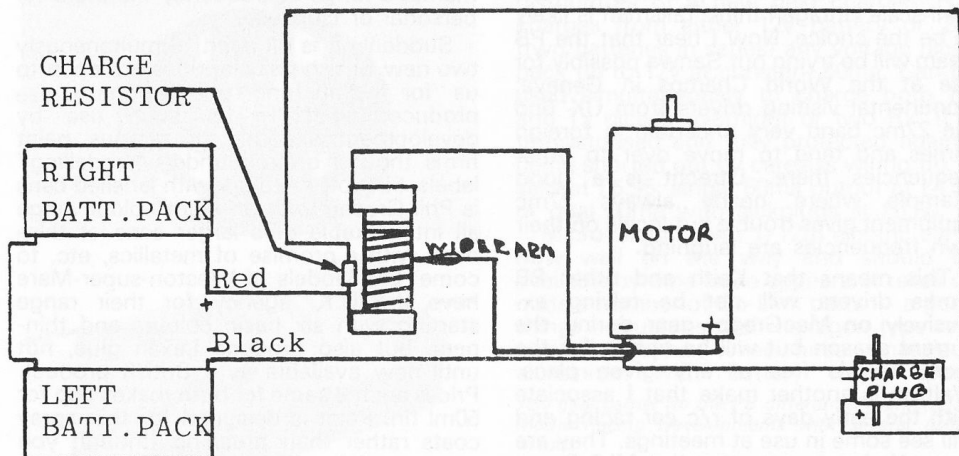


Cunning little knob that locks nylon bearing on chassis axle bearer.

market now — check with your model shop and still test on a bit that would be cut away anyhow). Mask windows and roughen up inside with steel wool or similar and paint inside before trimming. Remember that any stripes needed are done first (next to the clear part) and main body colour last. A final spray with white paint, I am told, gives a richer finish to any colours used. Slide transfer (decals) can be added to the outside as desired.

Radio installation follows usual practice. With a strong recommendation to fit servos on brackets certainly for speed servo, and not rely too much on servo tape. I am also still addicted to a whip aerial which can be fixed nearly anywhere to choice since none of the chassis or underplate is of metal.

Final word: If you are lazy or unhandy with the paint pot remember that a whole host of ready painted bodies are available — they only need money but really are worth it to make a real job.



Wiring diagram for standard arrangement without reverse facility.



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DESIGNING THE DEMON

BY NICK ADAMS

of highest performance with minimum component cost.

The power control to the motor could be realised by a straightforward constant current pulsing of the motor or by utilising feedback from the motor's back e.m.f. to vary the power delivered to the motor at different speeds. Tests revealed that a simple output, transistor stage without feedback could give excellent performance, allowing sufficient current to the motor for rapid acceleration without too much torque which would give undesirable wheel spin. Also it was revealed that the very small voltage drop through the saturated transistor output stage at full speed caused no noticeable loss of speed and therefore a full power relay was, conveniently, not required since it had been decided at an early stage not to use any moving parts in the interests of reliability.

The overall circuit was designed for high efficiency to give maximum running time and minimum heat generation by the control circuit, although tests had shown that running time is hardly affected by the efficiency of the circuit.

Two circuits were developed side by side, one giving forward and brake; the other giving forward and limited reverse which would also act as a brake. The printed circuit board to be designed would be able to incorporate either circuit. Although the forward and reverse circuit gave excellent performance, the cost of the components in the transistor bridge made it uneconomical to produce and therefore a new design incorporating a third transmitter control to select reverse will be made available if demand requires it.

Tests had also shown that the car receiver and steering servo could be run off the main nicads, thus eliminating the bulky receiver battery, by means of an integrated voltage regulator and this incorporated into the design.

It was found necessary to include adjustable potentiometers to enable the off or neutral position of the motor to be set to the transmitter; and the gain of the pulse stretching circuit to be set to cater for the different pulse lengths generated

by the various transmitters in use.

It was then a fairly simple task to finalise the design, select the components and draw out the high quality printed circuit board. Since there was to be only limited production of DEMON I no special parts were to be used. Investigations found a plastic case on which could mount a flat heatsink which in turn could easily be jig drilled. All components were to be totally enclosed and isolated against damage or short circuits. The heatsink plate would mount all the power transistors and also be of sufficient size to dissipate heat generated under fault conditions, such as a short circuited motor, the output circuit being designed to withstand such a fault without damage. It was found that by extending the heatsink and providing appropriate mounting holes it could be used to fix it in a car such as the Bo-Link and Mardave in common use at that time. Components on the printed circuit board

were mounted so that they were away from the heatsink and therefore least affected by heat generated under arduous conditions.

For maximum performance no protection could be given against incorrect connection to the nicad battery supply. Therefore a suitable non-reversible plug and socket were fitted to the supply leads to protect against this and also provide a foolproof method of connecting the charging lead to the nicads.

Many DEMON I's have been in constant use now for nearly two years without any problems and the performance enables it to compete at the highest national level, which is testimony that all of the original design specifications have been met. Please note that DEMON I is available to special order, price on application, from Phil Greeno Models Ltd of London.

VINTAGE ELECTRICS

ROGER Wilding and the Midland Club have come up with a novelty class of 1/12th electric that deserves wide support. In the endeavour to get away just for now and then from the serious business of beating the other chap they have devised a strictly for fun class for vintage cars of the period 1930/39. Not vintage of course — really PVT or post vintage thoroughbreds as purists will point out — but embracing a whole host of interesting vehicles such as Brooklands Riley, single-seater OHV Austin, sundry Alfas, Astons, Bugattis . . . in fact any car of that time that raced without wings or spats.

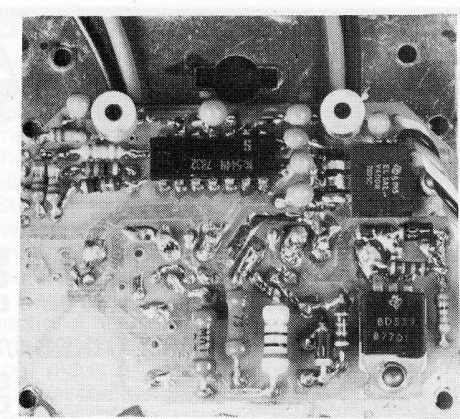
Half a dozen mixed cars have been made up looking very "period" and Roger has had one or two bodies vac. formed as well as providing suitable wheel hubs. For tyres recommended answer is to split Lectricar MkII rear tyres making one front and one back tyre. Four cells only are used and cars must have reverse. The complete schedule of rules is given and I hope some more people will have a go building them. My choice is the single seater Austin, followed perhaps by the Dowson Special (which Alec Issigonis rightly insists is the Issigonis Special!). Narrow cars may require in-line motors and bevel drive, but it all brings in an element of design. Bodies too can be made up perhaps on a balsa mould, using papier-mache with a final glassfibre skin . . . a change for assembling kits. Some of the smaller servos may also be desirable: Talisman (Mick Wilshire) do

a very nice mini size and not too expensive).

Hopefully I'll be doing a round-up of these little cars next issue — any pictures or suggestions or indeed whole cars welcome. Meanwhile here are the draft rules and regulations:

CONSTRUCTION RULES

- 1 Motor 30 turn standard Mabuchi RS54
- 2 4 only Nicads 1.2 ah x 1.2 volts.
- 3 Bodies to be scale representations of any open front wheeled body, between 1930 and 1939 which was used for racing. i.e. No front wings or spats to be incorporated.
- 4 Maximum chassis size 29½ CMM LONG X 7½ cm wide.
- 5 All running gear, i.e. motor, rear axle mounts, nicads, radio and speed control must be fitted within the chassis.
- 6 Minimum ground clearance 1cm.
- 7 Maximum front tyre width 12mm
- 8 Minimum front tyre diameter 55mm
- 9 Maximum rear tyre width 15mm
- 10 Minimum rear tyre diameter 55mm
- 11 Maximum track 15cm
- 12 All cars must have reverse
- 13 All cars must have head & shoulders driver figure
- 14 Windscreens or flyscreens must be fitted.
- 15 Front and rear bumper plates must not extend beyond the body more than 1/8in.



EARLY in 1977 it was decided to design an electronic speed control for small volume manufacture to cater for a demand by racers at the Ally Pally Club for a high performance, high reliability, speed control for 1/12th electric cars.

When designing any piece of equipment the parameters must be defined as completely as possible before starting. However, some requirements are more important than others and with the DEMON I the main parameters considered at all stages were Highest Reliability and Performance vs. Cost and Ease of Manufacture. At the outset it was decided that production would be very limited and therefore costs could be higher than a large market, high profit, article.

Other parameters to be considered were the case, weight, component availability and quality, method of mounting and assembly and connections to the unit. Also some parameters such as the power requirements of the motor were not known and therefore tests on the popular motors in use at that time, Mabuchi RS54 and Igarishi 05, would have to be carried out under actual car racing conditions.

A number of solutions are normally possible for any design problem to meet the specification and from these the most promising are selected and tested until the final design emerges.

The design of the circuit resolved itself into two main areas; the power control to the motor and the generation of the power control signal by an interface to the receiver.

The interface could be realised in discrete component form, but since integrated circuits, custom-designed for such applications, were readily available, it was an easy task to select the appropriate integrated circuit and reap the advantage

**RADIO STOCK CAR ASSOCIATION
FIXTURE LIST, 1979**

JUNE

- 10 Leicester: Club Members Only. World Championships Qualifying Round.
- 17 Coventry: Open Meeting. Series Championship — Tile Hill.
- 23 Belle Vue, Manchester: Open Meeting. British Drivers Championships.
- 24 Keighley: Club Members Only. World Championship Qualifying Round.
- Leicester: Club Members Only. World Championship Qualifying Round.

JULY

- 1 Coventry: Club Members Only. World Championship Qualifying Round.
- 7/8 Chessington: Open Meeting, Wandsworth Sports, King Georges Park.
- 8 Keighley: Open Meeting. John Hillam 229 Trophy, Marley Track.
- 14 Chessington: Club Members Only. Stanford Gree School, Epsom.
- 15 Coventry: Club Members Only. World Championships Qualifying Round.
- 22 Chessington: Club Members Only. World Championships Qualifying Round.
- Haywards Heath: Club Members Only.
- Keighley: Club Members Only. World Championship Qualifying Round.
- 29 Leicester: Open Meeting. Series Championship Mencap.

AUGUST

- 5 Coventry: Club Members Only. World Championship Qualifying Round.
- Haywards Heath: Club Members Only.
- 12 Chessington: Open Meeting. Plumpton R/C Show, Worthing.
- Keighley: Open Meeting Sam Ostle 351 Trophy, Marley.
- 19 Coventry: Open Meeting. Tile Hill.
- Leicester: Club Members Only. World Championship Qualifying Round.
- 26 Keighley: Club Members Only. Marley Track.

SEPTEMBER

- 2 Coventry: Club Members Only. 1st Semi-Final, Bickenhill.
- Keighley: Open Meeting. Series Championship — Airedale Models.
- 16 Coventry: Club Members Only. 2nd Semi-Final, Bickenhill.
- Haywards Heath: Club Members Only.
- Keighley: Club Members Only. Marley Track.
- Leicester: Open Meeting. Batchelor Bowles Handicap Event.

- Chessington: Club Members Only. Linda Woodger Series Championship.
- 30 Keighley: Open Meeting. RSCA World Championship Final.

OCTOBER

- 7 Coventry: Open Meeting.
- 14 Chessington: Club Members Only. Linda Woodger Series Championship.
- Keighley: Open Meeting. Stu Smith 391 Trophy — Marley Track.
- Leicester: Open Meeting. Mencap.
- 21 Coventry: Club Members Only. Trackmasters Trophy — Bickenhill.
- 28 Keighley: Club Members Only. Marley.

NOVEMBER

- 4 Coventry: Open Meeting. Tile Hill.
- Leicester: Open Meeting. Mencap.
- 11 Haywards Heath: Open Meeting.
- 18 Coventry: Open Meeting. Tile Hill.
- 25 Haywards Heath: Club Members Only.

DECEMBER

- 9 RSCA Annual General Meeting.
- 30 Leicester: Open Meeting. Newbridge Track.

**BRITISH RADIO CAR ASSOCIATION
Eighth-scale Calendar 1979**

EURONAT CALENDAR

JUNE

- 9/10 Tibshelf Open.
- 23/24 Wrexham — Welsh G.P.

JULY

- 7/8 WORLD CHAMPIONSHIPS — Geneva.
- 14/15 Euro G.P. — Weisbaden. Invitation Calendar — Lilford — limited H' Cp.
- 21/22 Bristol Open.
- 28/29 Lilford Open. Invitation Calendar — Carnoux Marseilles, France.

AUGUST

- 11/12 EUROPEAN CHAMPIONSHIPS — Nuremberg.
- 25/26/27 BRITISH NATIONALS — Tibshelf.

SEPTEMBER

- 1/2 Euro G.P. — Belgium.
- 8/9 Mintex Open — Bradford.
- 15/16 Invitation Calendar — Wrexham G.P.
- 22/23 Bournemouth Open.
- 29/30 Invitation Calendar — Bristol 24-hour.

OCTOBER

- 6/7 Euro G.P. — Monaco. Invitation Calendar — Lilford Invitation.
- 13/14 Invitation Calendar — Bristol G.P. (1-day).
- 27/28 Invitation Calendar — Duckham 4-hour — Bradford.

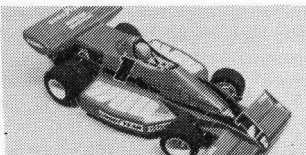
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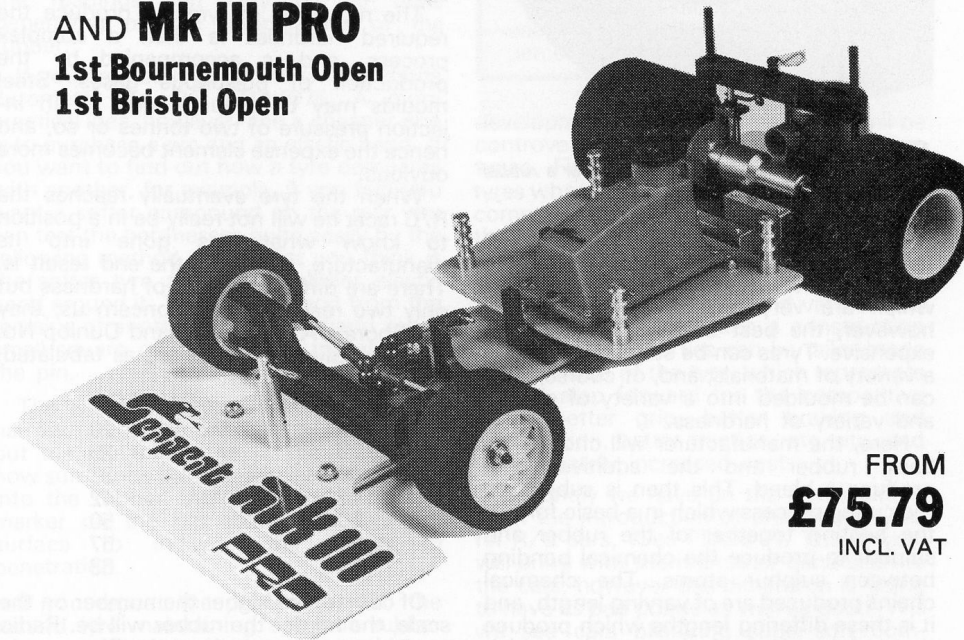


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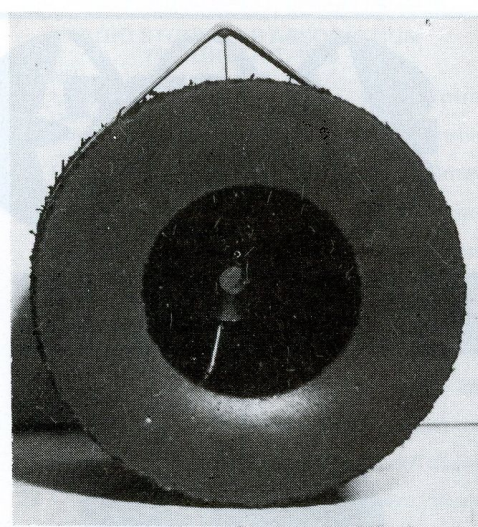
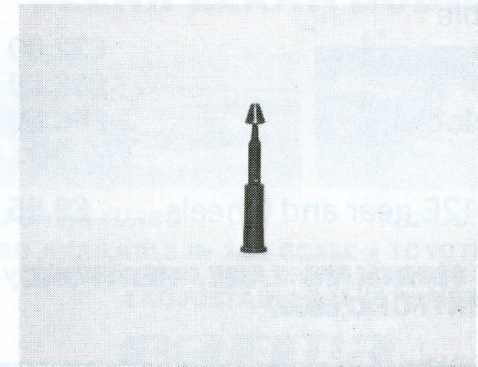


Figure 6
A home-made comparative durometer, or a rubber band and a pin!

RADIO Control Car Tyres can be manufactured by a variety of methods, some of which are expensive and some of which are very expensive. Regrettably, however, the best usually are the most expensive. Tyres can be stamped out from a variety of materials; and, of course, they can be moulded into a variety of shapes and variety of hardness.

Here, the manufacturer will choose his basic rubber and the additives and produce a blend. This then is subject to the curing process which in a basic form is the heating together of the rubber and sulphur to produce the chemical bonding between sulphur atoms. The chemical chains produced are of varying length, and it is these differing lengths which produce the variety of physical properties which the R/C racer can employ. The longer the particles of rubber the less resistance to



TYRES PT. III

"HARD & FAST"

BY D. H. JENKINS

wear, etc. The smaller the particles, the more dense the rubber. The addition of a variety of chemicals to blend will affect the properties of the tyre markedly; these include accelerators, softeners, hardeners, exciters and tack producers.

The moulding of tyres to produce the required hardness is then a complex process, and is accompanied by the production of poisonous gases. Steel moulds may be required due to an injection pressure of two tonnes or so, and hence the expense element becomes more obvious.

When the tyre eventually reaches the R/C racer he will not really be in a position to know what has gone into its manufacture, and what the end result is. There are different scales of hardness but only two really need to concern us; they are Shore's A Durometer and Dunlop No. 3. The equivalent values are as tabulated:

SHORE	DUNLOP
30	20
35	25
40	33
45	42
50	50
55	57
60	63

Of course, the higher the number on the scale, the harder the rubber will be. Radio control car tyres vary from the Shore scale readings of 30 to 40, Go-Kart tyres will range from 60 soft, 65 medium, 70 hard, and 75 very hard. So although a rubber will be classified as hard or soft, it must be specified what type of tyre you are dealing with — a soft rally rubber is hard formula 1 rubber.

As a rule of thumb a tyre of Shore 30 will feel almost slimy to the touch.

A 35 rubber will feel as springy as the top of a retractable biro.

A 40 rubber will be of the pencil eraser hardness.

A 45 rubber will be of finger nail hardness.

Figure 7
An experimental pneumatic valve. A desirable development?

A 55 rubber will be as hard as an ink eraser.

The hardness is measured by a wretched machine called a durometer which at first sight is simple to use; it however, is not. It consists of a hand held clock dial which is linked to a plunger which presses into the rubber surface, and then one can read off the Shore number. Simple you think? No.

There is a definite technique in its use, and consistent results are difficult to obtain. The thickness of rubber is important, and the temperature at which the reading is taken is important (68 deg. F) as the readings can vary by 10 units depending on the temperature of the rubber.

If you are keen, get a British Standards durometer No. BS 2719:1975. A more practical idea, however, and a cheaper one is to purchase a pin and an elastic band. If you want to find out how a tyre compares with another, for example, if you feel you want a softer compound on the rear you can test the hardnesses quite easily by the following method. Pick what you think is the softer tyre and put a rubber elastic band around it. Take the pin and from the remains of another old elastic band put a small square of rubber onto the shaft of the pin.

The wider the elastic band the better; narrow bands slip off the pin head. Now put the pin under the elastic band that now surrounds the tyre and let the pin sink into the rubber. Adjust the little rubber marker on the pin shaft onto the tyre surface to indicate the depth of penetration.

If you repeat the procedure with the second tyre maintaining the little rubber marker on the pin in the same position, and use the same rubber band, you will find that the pin will penetrate to a different level. If it penetrates further and the little rubber diaphragm has to be moved up the shaft the second tyre is obviously softer and has a lower Durometer Number. If the pin does not penetrate as much, then the second tyre is obviously harder and has a higher number.

A rubber band and a pin are not the most expensive of items fortunately, but everyone will be aware of the increasing costs of racing. Increased sophistication means increased costs and in the world of tyres this is all too true. Tyres undoubtedly win races, although at the present time with the type of tyres readily available, skill will still shine through. However, there are

ELECTRIC HANDICAPS

BRCA assistant secretary (electric) Mike Newman, has produced a Handicap Table for 1/12th scale electric drivers based on Open Meetings at Exeter, Hinckley, Bradford and Maidenhead.

Your copy will be forwarded free if you send Mike a SAE (largish) at 92 Templars Way, Fairweather Green, Bradford, West Yorkshire. BD8 0LR. (Tel. Bradford 881789).

System is exactly the same as used for 1/8th scale handicaps on a percentage basis.

developments in the pipeline which will be controversial. These basically are of two types. Firstly there is the availability of tyres whose construction enables different compounds to be used in different parts of the tyre. As we have seen in a previous article sidewall rubber needs different physical properties from tread rubber, and tread rubber hardness should vary across the tyre width. With such a construction the physical properties can be tailor-made for each area of the tyre, which represents a large step forward for the competitive racer: better grip, better braking and acceleration, better traction, etc. etc. and unfortunately increased cost.

Secondly we have on the development front the introduction of pneumatic tyres for R/C cars. (See Figure 7). These tyres will bring with them another dimension to the cars; however this dimension is going to have its bad points as well as good. Will we see cars blistering super-soft compounds under braking? Will R/C racing degenerate into a contest between those who can afford the latest gimmick? I hope not.

How long before somebody says, "I would have won but I had a puncture on the last lap".

WEIGHT & OVERSTEER

IN last issue we managed to contradict ourselves authorwise about as absolutely as possible on the subject of weight and oversteer. Whilst the Editor should not really take sides I think it is fairly clear (and the consensus opinion) that too much weight at the front produces oversteer which is curable, hopefully, by a more rearward c of g.

RAIN..RAIN..

MOTHER Goose certainly had it right in the nursery jingle: "Rain, rain go away! Come again another day." It is one thing that can always upset form at a meeting. After the frustrations and aggro of the Euro Champs at Lilford Park EFRA wisely took steps to produce a suitable rain check for future occasions. I publish Rule VI (e) below with explanatory chart. Broadly speaking it means and ensures that if there is another rain to matter — and this is carefully set out — then everybody takes their share and within limits victims get re-runs.

(e) Rain
For European Championships and official EFRA meetings, the following procedure to be followed in case of rain.
1. The Race Director will ensure that a record is kept noting conditions in EVERY HEAT. i.e. 'WET' or 'DRY'. The

Race Director will decide IN ALL CASES OF DOUBT. A copy of this record must be sent to EFRA with all race results.

- If the total number of 'WET' heats is less than 30% of the TOTAL NUMBER of heats that day, *all* qualifying times will count, *EXCEPT* if they are ALL IN ONE SERIE. In this case the SERIE will not be counted.

If the total number of 'WET' heats is between 30% and 66%, ALL RESULTS WILL COUNT, EXCEPT that should 10- or less of the drivers have had NO DRY heat then time and weather permitting the Race Director may allow these drivers one 'DRY' heat. If more than 10% with no 'DRY' heat, no re-runs.

- If more than 66% of the heats are WET, ONLY the heats declared WET WILL COUNT. DRY heat times will be ignored.

IF ALL DRIVERS HAVE HAD ONE DRY HEAT, ALL RESULTS COUNT.

Example I

	1	2	3	4	5	6	7	8	9	10
1st Serie	D	D	D	D	D	D	D	D	D	D
2nd Serie	D	W	W	D	D	D	D	D	D	W
3rd Serie	D	D	D	D	D	D	D	D	D	D
'Wet' heats		1	1							1
Re-run		2	3							10

Total numbers of heats =
3 x 10 = 30

Therefore heats 2-3-10 get one re-run

All results count

Example II

	1	2	3	4	5	6	7	8	9	10	11	12
1st Serie	D	D	D	W	W	W	W	W	W	D	D	D
2nd Serie	D	D	D	D	D	D	W	W	W	W	D	D
3rd Serie	D	D	D	D	W	W	W	W	D	D	D	D
'Wet' heats				1	2	2	3	3	2	1	1	
Re-run					7	8						

Total number of heats =
3 x 12 = 36

Wet heats = 15 = c 42%

Heats 7 + 8 have 3 x wet

2 heats are less than 10%
so 7 + 8 get one re-run

All results count.

Example III

	1	2	3	4	5	6	7	8	9
1st Serie	D	D	D	D	D	D	D	D	D
2nd Serie	D	D	D	W	W	W	W	W	D
3rd Serie	D	D	D	D	D	D	D	D	D
'Wet' heats				1	1	1	1	1	

Total number of heats =
3 x 9 = 27

Wet heats = 5 = 18.5%

All wet heats are in 2nd Serie, so that serie does not count at all.

Results serie 1 + 3 count
No re-runs.

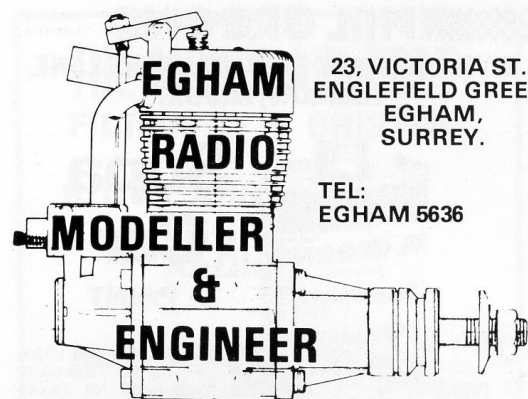
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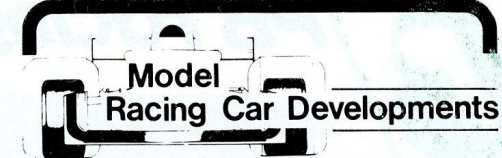
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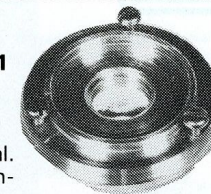
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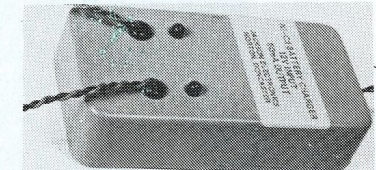
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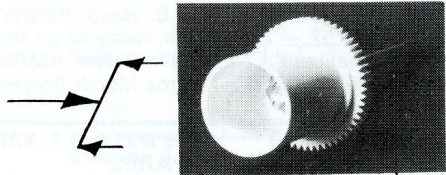
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