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FREE INSIDE

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PEUGEOT

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Damon Hill provides Williams with a much-needed fillip, but Michael Schumacher provides the main talking point. He completes the last 40 laps of the race in fifth gear. . .



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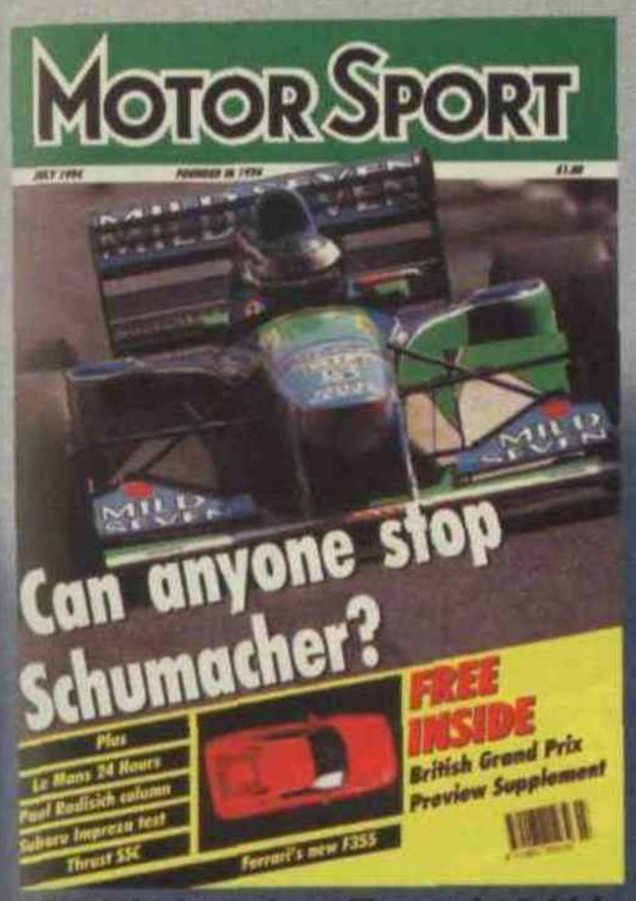
The Subaru Impreza: as discreet on the road as it is auspicious in the WRC.



754 NEW CARS

Say farewell to the Ferrari 348; the F355 arrives this autumn.





Michael Schumacher will start the British Grand Prix as clear favourite. See our comprehensive free guide for details.

MOTOR SPORT

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Volume LXX JULY 1994 Number 7

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Founder Editor: William Boddy

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Motor Sport SUBSCRIPTIONS: SURFACE MAIL: Home £21.00; Overseas £25.00 AIR MAIL: Eire and Europe £26.00; Australasia £46.00; Elsewhere (except USA) £43.00 Annual rates include postage. Subject to increases of postal rates and cover price. Net amounts payable in sterling on London. If payment is made in a currency other than sterling please add £2.50 to sterling rate prior to conversion. USA: (Airfreight) per annum $42.00. All enquiries to: Motor Sport, Box 188, Berkeley Hts, New Jersey 07922, USA. Telephone (908) 665-7811. Fax: (908) 665-7814

Next issue out July 29

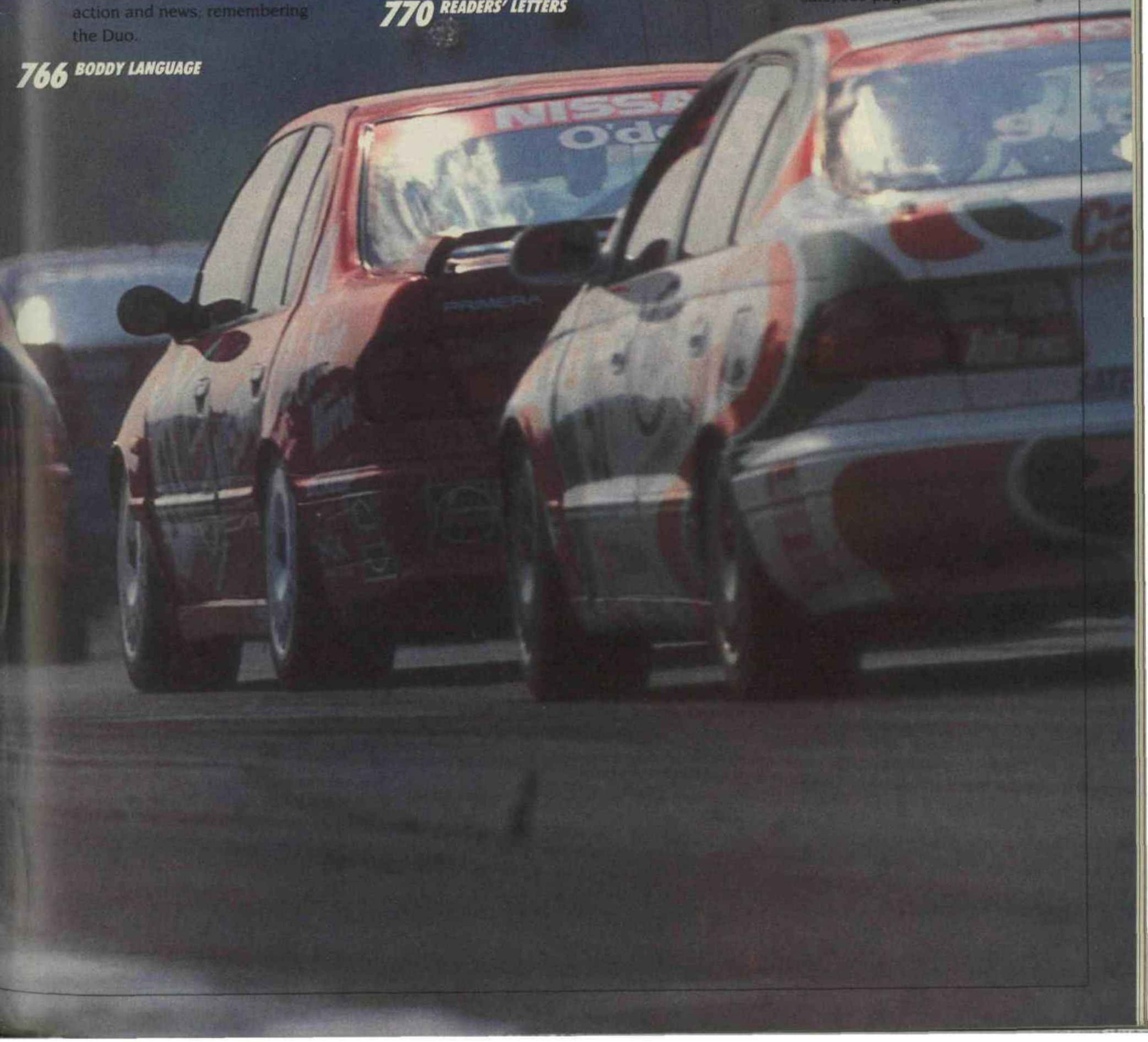
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The Willment Ghia Cobra is for sale; see page 781.





The month in MOTOR SPORT

MAY

19: After 256 starts, Riccardo Patrese confirms his retirement as a Formula One driver; speculators had tipped him as a possible candidate for the late Ayrton Senna's Williams seat. At Jerez, meanwhile, David Coulthard (pictured) joins Damon Hill for four days of testing. In doing so, the young Scot forsakes the Pau F3000 race, thereby strengthening the belief that he will graduate directly from his role as Williams' test driver.

22: In the Japanese F3000 series Marco Apicella makes it two in a row with victory at Suzuka; Michael Krumm wins the F3 support race. In Europe, Emanuele Pirro's Audi takes twin victories in the ITCC at Binetto whilst Gianluca Paglicci and Giancarlo Fisichella share a win apiece in the weekend's Italian F3 rounds at Magione.

23: Gil de Ferran wins the second round of the European F3000 championship at Pau; victory in the Supertourisme support event falls to Laurent Aïello's Peugeot and the F3 event to Christophe Tinseau.

23: Ford is known to be working on a fully automatic seven-speed transmission for its WRC programme, though it won't be ready soon enough to accelerate François Delecour's return.

24: Formula One's unhappy season continues. In an accident during testing at Silverstone Pedro Lamy breaks both knees. His Lotus comes to rest in a spectator tunnel, following a long and destructive flight after it spun approaching Abbey. The young Portuguese is taken to hospital in Northampton for remedial surgery. H recuperation will keep him out of the spo for a long time. The team had been testi new specification wings complying with th FIA's emergency safety regulations; Lotu later says that failure of the rear wi mounting system was to blame. Test driv Alessandro Zanardi is nominated as Lamy replacement for the Spanish GP.

26: David Coulthard is confirmed as Damo Hill's team mate for the Spanish Grand Pri speculation persists that Nigel Mansell w rejoin Williams for selected events. Saub names Andrea de Cesaris as Karl Wend linger's replacement from Canada, whic will be the Roman's 200th Grand Prix star

27: In Barcelona, the newly formed GPDA flexes its muscles, threatening a drivers' strike if a temporary chicane is not erected at Nissan. The work is carried out with haste, and consists of two rows of tyres through which cars must thread, single file. Even so, several teams miss the first free practice session as arguments about technical regulations rage on. The atmosphere in F1, already tense following recent accidents, is becoming desperately unpleasant on a personal level too. There is talk of a rift between Bernie Ecclestone and Max Mosley, while Mosley and Benetton's Flavio Briatore become embroiled in a spat after the latter released an open letter to the press, criticising the manner in which the FIA had implemented its new safety proposals.

28: F1 debutant Andrea Montermini breaks a heel when his Simtek hits a wall during qualifying in Spain. In many ways, news of Montermini's relatively minor injuries is a relief. For a time, it was feared that he had been more seriously hurt. Montermini was to have contested just two GPs with the team; Jean-Marc Gounon will take over from the French GP onwards.

28: Massimiliano Papis scores his first F3000 victory in Barcelona, leading home Mythos team-mate Fabrizio de Simone.

29: Victory for Damon Hill in Spain is a timely morale booster for Williams, but it comes only after Michael Schumacher completes the final 42 laps stuck in fifth gear. . .David Coulthard makes an encouraging debut for Williams, before an electrical problem forces his retirement.

29: Alfa Romeo withdraws from round seven of the BTCC at Oulton Park after scrutineers declare its controversial front airdam/splitter to be illegal.

29: The Indianapolis 500 is won by Al Unser Jnr, his Penske powered by the debutant Ilmor-built Mercedes engine; rookie Jacques Villeneuve finishes second. Nigel Mansell is eliminated when he is struck from behind by Dennis Vitolo, who had mortgaged his house to raise the funds to take part.

29: NASCAR's Coca Cola 600 at Charlotte is won by Jeff Gordon. The Lime Rock IMSA race falls to Eliseo Salazar's Ferrari 333SP.

MATTERS OF MOMENT

The way forward?

Until this year's British Grand Prix has taken place, we won't know how effective the latest modifications to Silverstone will prove to be. From what we have seen so far, however, we are encouraged, particularly in the light of what we have witnessed elsewhere.

The temporary chicane erected in Spain was a farce, but it was either that or no race; the edifice in Canada didn't look quite so silly, and was a touch more practical, but it was hardly what you'd call an enhancement. Quite what will be done about Spa's Eau Rouge this coming August remains to be seen, but it is already known that one of motor racing's greatest challenges will be emaciated by a temporary chicane this year, until more suitable, permanent arrangements can be made to permit the increased run-off areas that will enable the existing circuit to remain unmolested.

No question, the upgrading of circuits to suit F1 cars is a thorny problem.

Recent events have given motor racing little choice but to implement drastic changes at a time when there is already one Hungaroring too many (and other circuits are in danger of becoming clones of Budapest's tiresome labyrinth).

Silverstone's response, however, offers us hope. On the surface, the changes will unquestionably have improved the standard of the existing safety installations, in line with recommendations. This has been achieved, however, without detracting from the circuit's capacity to entertain. Indeed, those who have driven on it report that the revised layout offers greater overtaking opportunities than its predecessor.

This, surely, has to be the way forward as the sport strives to regain credibility following its bleak spring? **S A**



Above, the Alfa Romeo 155s are still the centre of attention in the BTCC. Below, CART series leader Al Unser Jnr and the Penske team pose with the Borg-Warner Trophy after their Indy 500 win.



29: Giancarlo Fisichella's run of Italian F3 victories ends when he goes off at the first corner in Magione. Gianluca Paglicci wins, but Fisichella bounces back to take part two.

29: Henri Pescarolo/Jean Claude Basso (Venturi 600LM) win the Montlhéry 1000 km; Britons Harry Nuttall, Ray Bellm and Charlie Rickett are a class-winning second in their Porsche 911 RSR.

30: In the hands of Alain Menu, the Renault Laguna takes its first victory at Oulton; Jan Magnussen predictably wins the Thruxton F3 race; the British F2 series restarts at last, Phil Andrews winning at Brands Hatch

30: Will Gollop's Peugeot 306 wins the Lydden Hill round of the British Rallycross Championship.

JUNE

1: Subaru's Carlos Sainz wins the Acropolis Rally, his first WRC victory since November 1992. Juha Piironen, making a good recovery from the stroke he suffered last year, is an interested spectator.

2: With victory in round seven of the GTCC at the Nürburgring, Alessandro Nannini retains a slim championship lead over Klaus Ludwig, whose Mercedes wins round eight.

3: In Geneva, the FIA World Motor Sport Council announces new regulations for Formula One, including a reduction to three-litre engine capacity from 1995. Pump fuel will be compulsory in Canada, while holes will be cut in airboxes to reduce the ram effect. In rallying, a ban on 4WD from 1998 is ratified whilst manufacturers will be compelled to compete in all rounds of the World Championship in order to score points. In touring car racing, manufacturers will be allowed to use wings and spoilers in 1995, but a 25,000 build requirement rules out homologation specials. F3000 chassis regulations are frozen until 1996, but power will be limited by means yet to be decided. A Portuguese GP support race is announced, in place of the formula's previously scheduled Nogaro race.

5: Al Unser Jnr leads a Penske 1-2-3 at the Milwaukee CART round; another disappointing showing for Nigel Mansell heightens speculation that a return to Williams is imminent. Steve Robertson wins the FIL support event, and stretches his series lead. NASCAR spoils at Dover go to Rusty Wallace.

5: In the Italian touring car series two victories for Antonio Tamburini at Misano end Audi's run of success; the BMW M3 of Frank Katthöfer/Karl-Heinz Wlazik wins the Nürburgring 24 Hours; Yannick Dalmas heads a Peugeot 1-2 in the Supertourisme round at Dijon, where the F3 support race is won by Jean-Claude de Castelli.

5: José Luis di Palma wins the British F2 race at Silverstone.

5: Malcolm Wilson wins the Scottish Rally. His Ford team mate Stephen Finlay finishes second.

5: A chaotic British F3 event at Oulton ends in another victory for Jan Magnussen. Three cars collide on the finishing straight, *after* the chequered flag.

5: Jean-Luc Pailler (Citroën Xantia) wins the third round of the European Rallycross Championship, in Alençon.

6: Having been roused from his coma, Karl Wendlinger is transferred to hospital at Innsbruck to be nearer his family. A complete recovery is said to be likely.

11: The RACMSA reinstates Alfa in the BTCC, putting the airdam/splitter controversy down to "different interpretations" of the regulations. The Turinese concern will be permitted to continue racing its 155 in current specification until July 1, when its front splitter will have to be retracted in line with FIA guidelines.

12: The Canadian Grand Prix is dominated by Michael Schumacher, who now leads the World Championship by 33 points. Damon Hill takes second place ahead of the resurgent Ferraris of Jean Alesi and Gerhard Berger. David Coulthard earns his first points with fifth place.

12: John Cleland's Vauxhall takes victory in both BTCC rounds at Donington with Paul

Left, Paul Tracy won in Detroit, but not by using the prescribed, nor indeed preferred, method. Below, chaos reigns at Oulton Park as the F3 field becomes entangled *after* the chequered flag

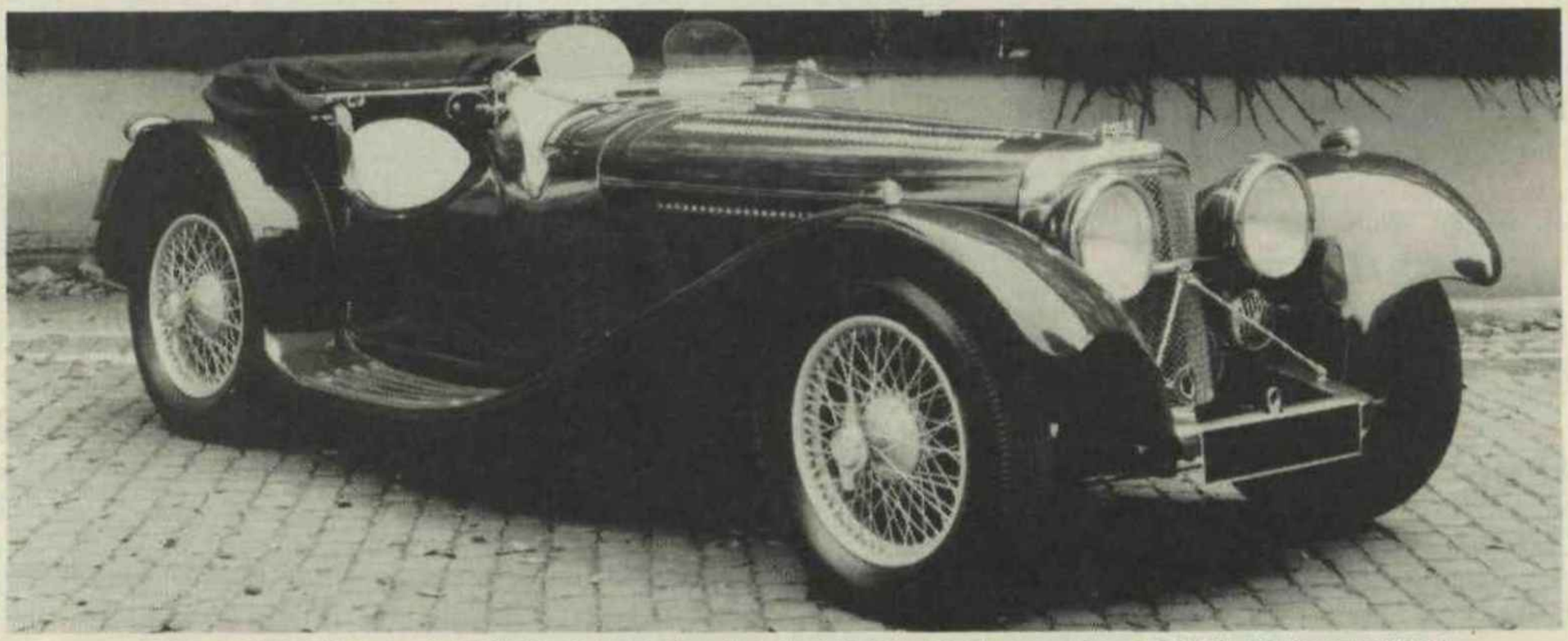


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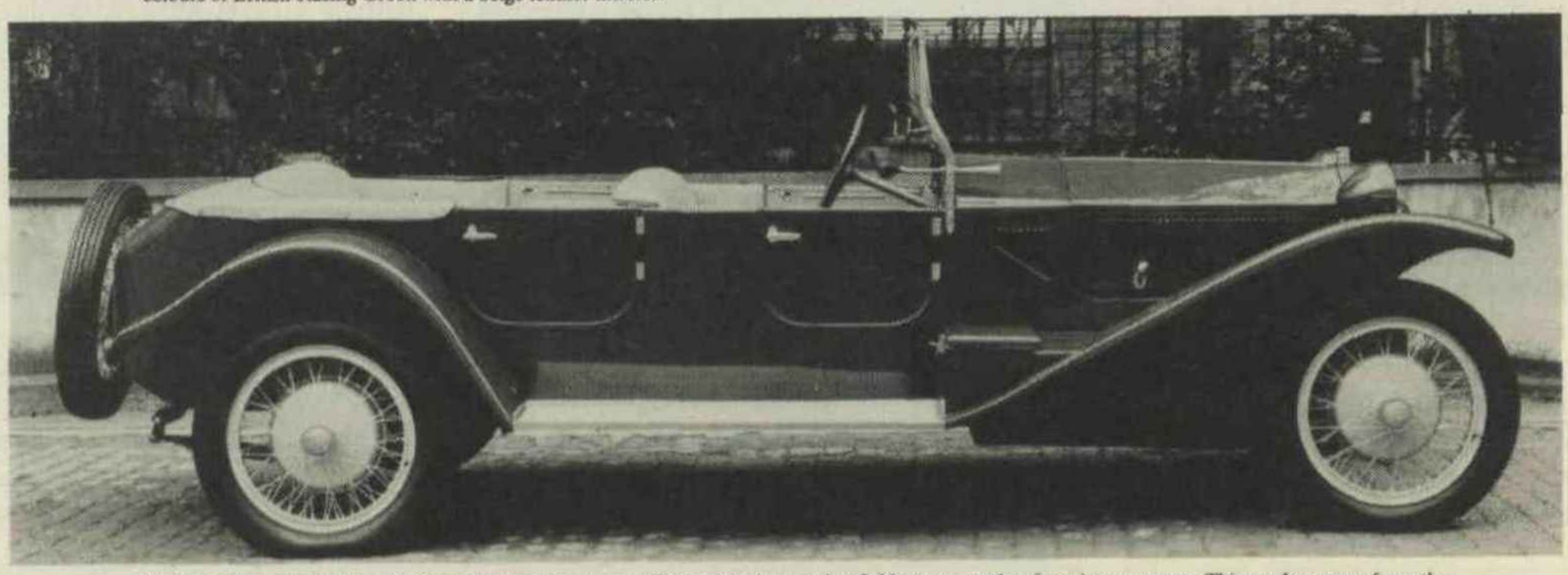
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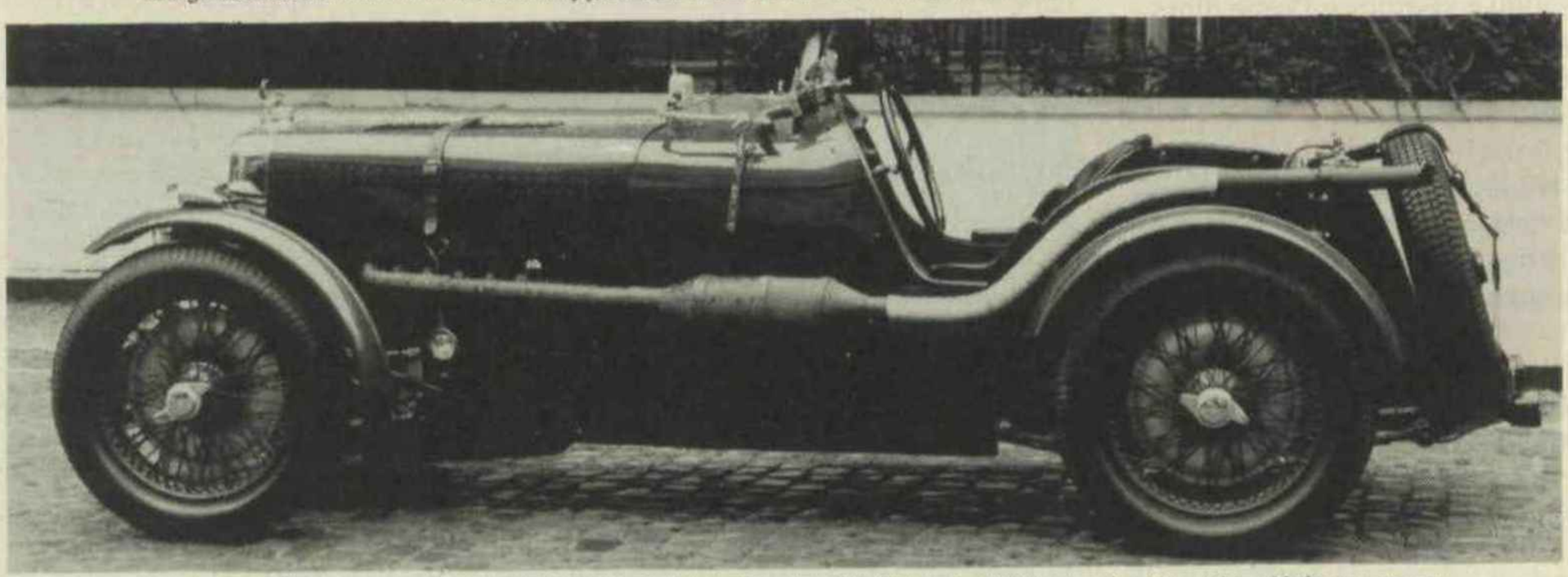
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1934 Bugatti Type 51 Grand Prix
1931 Cadillac Phaeton
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Radisich twice runner up for Ford. The Alfas take a single third place through Tarquini, who now shares his championship lead with Radisich.

12: Having bumped team mate Al Unser Jnr out of the race, Paul Tracy takes his first IndyCar victory of 1994 in Detroit. Emerson Fittipaldi makes it another Penske benefit, in second, and Steve Robertson takes yet another FIL victory.

12: In NASCAR, Rusty Wallace wins the Pocono 500.

12: Laurent Aïello wins round five of the French Supertourisme at Clérmont-Ferrand. Frank Biela is GTCC victor at Wunstorf.

12: At Binetto, Giancarlo Fisichella and Gianluca Paglicci again share the spoils in Italian F3; Germany's Michael Krumm emerges victorious in the Japanese F3 series at Sendai; in Krumm's homeland, Wunstorf F3 honours are shared by Norberto Fontana and Jörg Müller, though class B racer Arndt Meier steals the limelight, by finishing on the podium in both races; Phil Andrews wins the F2 race at Oulton Park.

12: Jean-Luc Pailler takes another ERC win at Mondello Park.

13: Ford recruits Ari Vatanen for the Rally of Argentina.

17: Nigel Mansell's immediate plans continue to be a source of focus; Williams says it won't announce Damon Hill's team-mate for the French GP until the week before the race.

18: Japanese F3000 constructor Dome hints that its has an F1 project on the stocks; a liaison with Honda is likely.

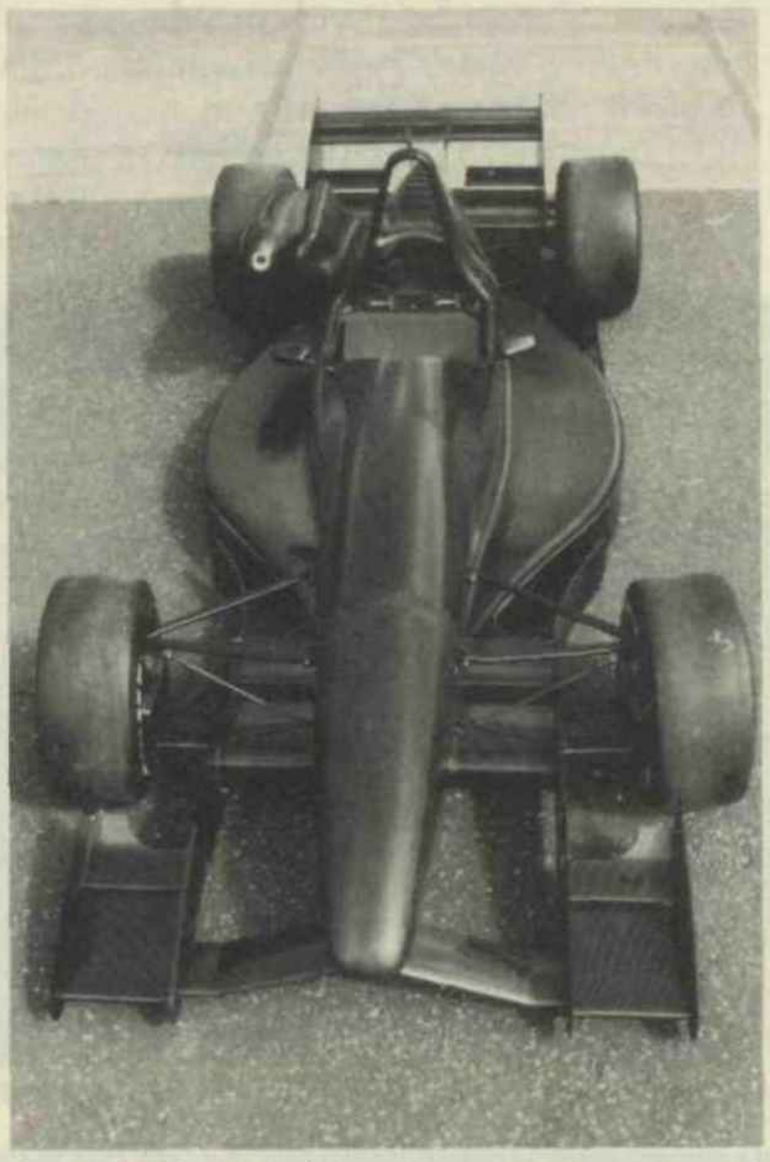
19: The Dauer Porsche 962 GT LM of Yannick Dalmas, Hurley Haywood and Mauro Baldi wins the Le Mans 24 Hours. Porsche also wins the other GT class, thanks to the 911 of Dominique Dupuy/Jesus Pareja/Carlos Palau.

19: Stefano Modena and Emanuele Pirro share ITCC wins at Vallelunga; both are subsequently fined for their on-track conduct during the races. Anthony Reid retains his JTCC lead after taking a win at Tokachi, where Masami Kageyama takes F3 honours. Rusty Wallace takes a third straight NASCAR victory, at Michigan.

19: Martin Brundle ascends the Goodwood House hillclimb in 47.8s to win the second Festival of Speed. The event is marred when popular veteran Mike Wilds sustains leg injuries. Full report, details and pictures next month.

19: Martin Schanche takes ERC honours at Croft.

20: Following Mercedes-Benz's successful exploitation of the Indy 500 engine regulations, USAC confirms that 209 in pushrod engines will have their maximum permissible boost reduced in 1995.



20: François Delecour drives a works Escort Cosworth for the first time since the road accident which curtailed his WRC programme. The Frenchman tests the car at Boreham.

20: Toyota hints that it might withdraw from international rallying, rather than building a 2wd car in preparation for the 1998 regulations.

21: Silverstone introduces its revised GP circuit.

21: The radical Pilette PWT 94c F3 car is launched at Brooklands (left).

Goodyear competition

Congratulations to reader Richard Wilson of Ilkley, West Yorkshire, who won first prize in last month's Goodyear competition. Mr Wilson receives three tickets to this year's British Grand Prix, complete with a full hospitality package. Winners of the 275 runners-up prizes will be notified in due course.

JULY FIXTURES

Date	Venue	Event	Type
Jun 29-Jul 3	**Cordoba, Argentina**	**Rally of Argentina**	**INT**
Jul 1/3	Snetterton	Willhire 24 Hours	N
Jul 1/3	**Magny-Cours, France**	**French Grand Prix**	**INT**
Jul 2	Castle Combe	Pre '90 FF1600, ProSport 3000	R
Jul 2	Oulton Park	HSCC; Classic F3, FF1600, Sports	R
Jul 2	Daytona, USA	NASCAR	INT
Jul 2/3	Lydden Hill	FF1600, saloons	N
Jul 2/3	Brands Hatch	Historics	N
Jul 3	Mallory Park	Monoposto, saloons	R
Jul 3	Donington	AMOC, Porsches	R
Jul 8/9/10	**Silverstone**	**British Grand Prix, BTCC, F3**	**INT**
Jul 10	Lydden Hill	FF1600, saloons	R
Jul 10	Cleveland, USA	CART, FIL	INT
Jul 10	Loudon, USA	NASCAR	N
Jul 16	Oulton Park	Modsaloons, FF1600	R
Jul 16/17	Donington	DTM, Ferraris	INT
Jul 17	Brands Hatch	FF1600, GpN, Porsches	N
Jul 17	Cadwell Park	Rovers, TVRs, VWs, Minis, F/First	R
Jul 17	Snetterton	750MC formulae	R
Jul 17	Mallory Park	VSCC	R
Jul 17	Enna-Pergusa, Sicily	European F3000	INT
Jul 17	Toronto, Canada	CART, FIL	INT
Jul 17	Pocono, USA	NASCAR	INT
Jul 23	Kirkistown	FOL, GTs	R
Jul 23/24	Spa-Francorchamps, Belgium	Spa 24 Hours	INT
Jul 23/24	Snetterton	F3, F2000, ProSport 3000	N
Jul 24	Thruxton	Classic F3 & FF1600, Historic F1	N
Jul 24	Mallory Park	Saloons, FF1600	R
Jul 24	Pembrey	Jaguars, MGs	R
Jul 24	Cadwell Park	HSCC	R
Jul 24	Talladega, USA	NASCAR	INT
Jul 24	Laguna Seca, USA	IMSA	INT
Jul 29/30	Belfast	Ulster International Rally	INT
Jul 29/31	**Hockenheim, Germany**	**German Grand Prix, F3000**	**INT**
Jul 30	Oulton Park	Rovers, Tuscans, VWs, F/First	R
Jul 30/31	**Knockhill**	**TOCA, HTCC**	**N**
Jul 30/31	Donington	Trucks, GpN Saloons, Hondas, VWs	N
Jul 30/31	Lydden Hill	750MC formulae	R
Jul 30/31	Jurby, IoM	Saloons, Jaguars, F500	R
Jul 30/31	Silverstone	Coys Historic Festival	INT
Jul 30-Aug 2	**Auckland, New Zealand**	**Rally of New Zealand**	**INT**
Jul 31	Michigan, USA	CART	INT
Jul 31	Portland, USA	IMSA	INT
Jul 31	Sugo, Japan	F3000	INT
Jul 31	Brands Hatch	FF1600, Saloons, Sports 1600	R

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A timely triumph

When Michael Schumacher's Benetton stuck in fifth gear, Damon Hill was there to scoop the spoils for an intensely relieved Williams team

There were many, it must be said, whose scepticism got the better of them after the Spanish GP. Could Michael Schumacher really have done the last two-thirds of the race in only fifth gear, including a pit stop?

You can try to calculate what percentage there could possibly have been for Benetton to lie about the problem (bar the obvious wish to detract from something else that was really wrong), but there would seem to be little point in making such a claim were in not true, and certainly the on-screen telemetry readings as we rode onboard with Schumacher indicated precisely that he was indeed mono-geared. McLaren actually ran a simulation on its computer programme after the race, and came up with the same answer: it *was* possible, and if you adjusted your style you could get by without losing more than a couple of seconds a lap. Which is exactly what the Heir Apparent did. He had a couple of very lurid slides around the 41 lap mark, perhaps on oil but possibly because he was still adjusting, but with or without first, second, third, fourth and sixth gears the German was coping brilliantly.

"In the beginning I was doing lap times of 1m 32s. I found a way to use fifth gear differently – which meant I could do 1m 26s again. It surprised me very much, but with my GpC experience I know a lot of ways of running differently, of saving fuel and changing my style of driving. It was this style of driving which helped me very much today. It got me out of the worst trouble."

Benetton chief Flavio Briatore was all smiles afterwards. "This, for me, was Michael's best ever race, even if he didn't win. He was brilliant."

And, indeed, he was all through another of those weekends when F1 seemed set to tear itself apart. It began with threats of a drivers' boycott, because all bar one piece of the safety work they had asked for had been carried out. This, however, was the most important piece. The drivers were worried by the concrete wall on the exit to the Nissan corner, a quick right-left-right flick. "We come out of there at 240k," said Martin Brundle, chairman of the newly reformed Grand Prix Drivers' Association. "It could have been Tamburello all over again."

They had asked for the section of track to be straight-lined, as the wall shielded a drop and could not therefore be removed. "The circuit organisers either didn't want to, or had been told not to, make the change," Brundle continued. "Maybe somebody wanted to see how much the drivers were going to stick together."

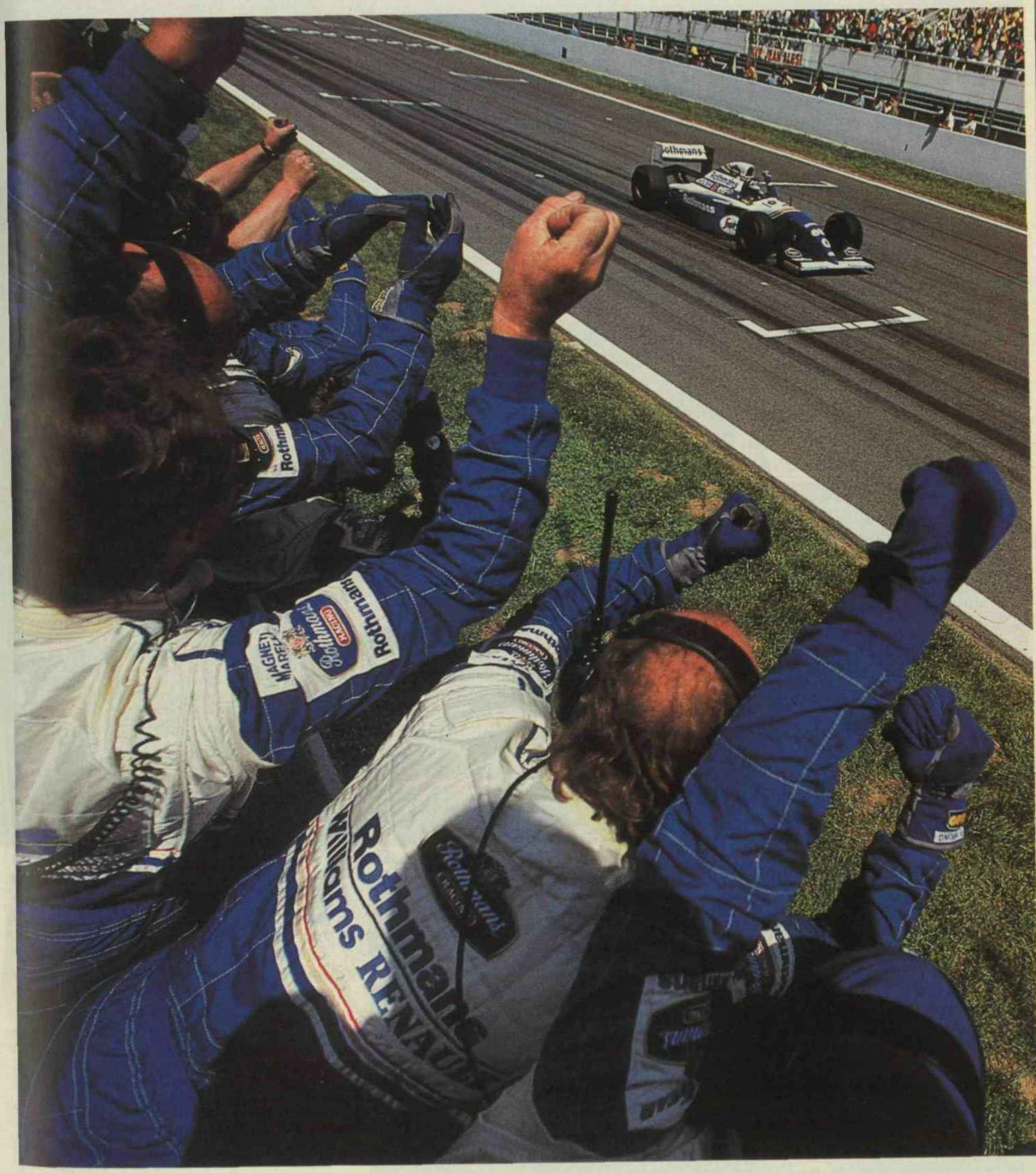
They did, and for a while things looked doubtful.

"We said, 'Okay, we don't race'", said Martin, and eventually nobody called their bluff, if indeed bluff it had been.

A makeshift tyre chicane went up in time for Friday's free practice session, but even then it was not quite plain sailing. This time it was Benetton, Williams, McLaren, Lotus, Jordan and Footwork on strike seeking an angry audience with Max Mosley to discuss the desirability or otherwise of the regulation requiring the cars to be run in modified guise that weekend, and the feasibility of the timescale he had imposed in Monaco for significant modifications to be made to the cars by Hockenheim. As Ferrari, Minardi, Sauber (with Heinz-Harald Frentzen only), Larrousse and Tyrrell went out that morning, Simtek and Pacific kicked their heels with the other big teams. "We've been advised it would not be in our best interests to go out," said a member of one of the two new teams, "and in the circumstances we understood the message we were getting. . ."

Earlier in the week Flavio Briatore had written a critical, open letter to Mosley and

"Without first, second, third, fourth and sixth gears the German was coping brilliantly"


Rothmans
Rothmans
Rothmans
MAGNETI MARELLI
Rothmans
Rothmans
Williams RENAULT



First lap scramble: Schumacher eases away from Hill, Hakkinen, Alesi, Lehto and Coulthard. Further back, Berger finds himself a touch off line, courtesy of Barrichello.

circulated it to the national media, while Ron Dennis had been privately critical. The mood of the meeting in the Williams motorhome between Bernie Ecclestone (as President of FOCA), Briatore, Dennis, Frank Williams, Peter Collins, Eddie Jordan, Jackie Oliver, Nick Wirth and Keith Wiggins on the one side, and Mosley on the other, was far from cordial, despite what the various parties might have had you believe. "We had a frank and positive exchange of views," said Frank Williams, but he had the grace to laugh when it was put to him that it might better be said that Mosley had a received a positive exchange of Frank's views.

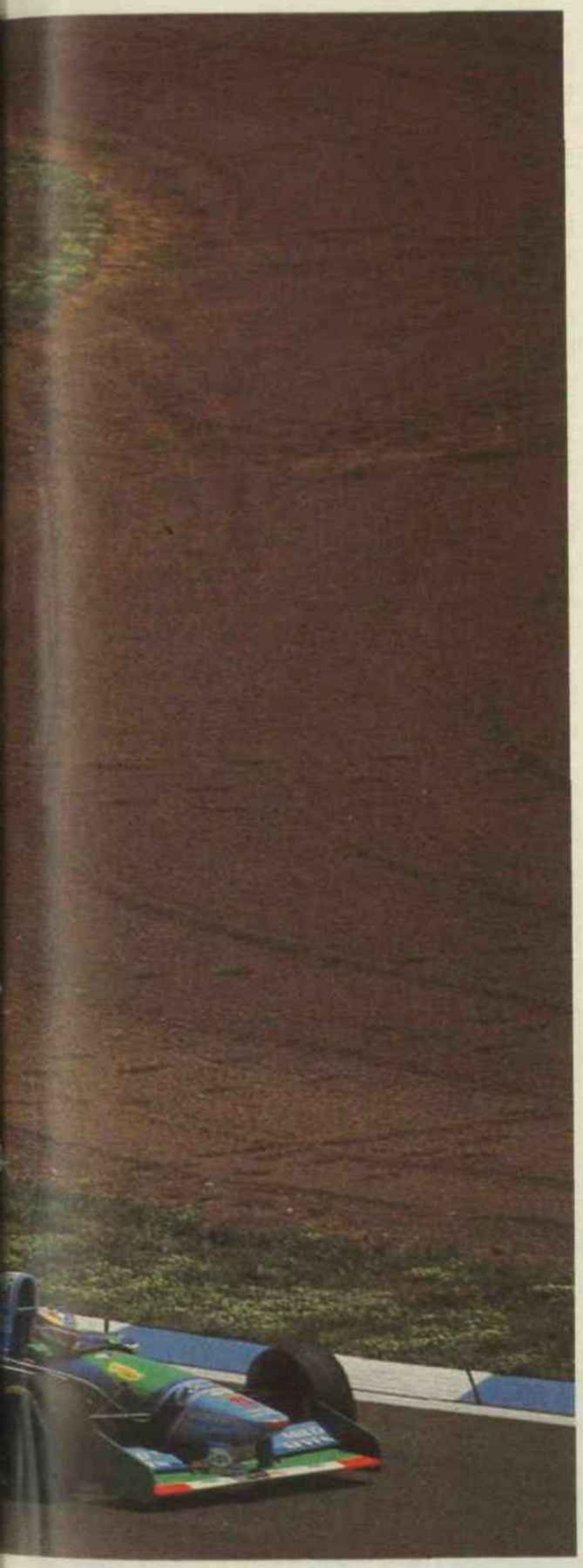
The real outcome of this little squabble is still moot (see *Diary*), as Mosley denied any climb down or any threat of boycott, but both Benetton and Lotus, to name but two teams, were prepared to sit it out as long as it took.

Whatever, it was business as usual in the afternoon, and despite his lack of experience running his Benetton in the new 'Barcelona' specification, with truncated diffusor and shallower front wing endplates, he comfortably dominated practice. *Plus ça change, plus c'est la même chose*, as they say.

At last, as Hill joined the German on the front row in a Williams FW16 that reacted well to a less bumpy track surface, and Mika Hakkinen and JJ Lehto in the second Benetton lined up on the second, everything seemed well again on F1's surface and it was momentarily possible to forget about the troubled undercurrents, but there had been another horrible shock at the end of free practice on Saturday morning when the Italian Andrea Montermini had crashed his Simtek exiting the final corner that leads on to the pit straight. He had got all four wheels off into the dirt and made the mistake of trying to fight the car too much, to the point where it suddenly found some grip and speared sharp left into the concrete wall that leads the run-off area back into the straight itself. The Simtek was thrown back on to the track where, minus its front wheels and with Montermini's feet sticking out the open front end of the monocoque, it slewed to a halt right opposite the pits.

It was as if cruel gods were reminding the sport of just what they could do if they wished, and in places in the press room which overlooks the scene there was something uncomfortably close to hysteria as people looked down on the sight of a crumpled Simtek whose driver lay with his head at that horrible, still angle. It was unpleasantly reminiscent of Ratzenberger's accident at Imola, the more so because Montermini was his replacement within the team. The whole thing was chilling, until word filtered through that he had had a miraculous deliverance and was nursing only minor injuries (see *Diary*). The collective sigh of relief could have been heard in Indianapolis.

By the time Schumacher blasted neatly and without wheelspin into the lead on Sunday afternoon most just wanted things



create much interest. Williams found out the hard way in Brazil that one stop makes Jack a dull race, but in Barcelona McLaren opted to run Hakkinen on a three-stop policy, so when the Finn came in again on lap 30 and surrendered an eight second lead over Hill, the Briton moved into the lead and Mika had to work all over again to catch and pass Schumacher.

The German actually got a respite when Damon stopped gain in lap 41, as he retook the lead against all expectations. But his own final stop was eagerly awaited and he duly came in on lap 45. How was he going to get out of the pits with only fifth gear?

Here he was fortunate, for the pit lane speed limit certainly worked to his advantage since everyone had to leave gently, and with a lot of revs and no small helping from the Ford Zetec-R's beefy torque curve he managed to stagger back into the fray without even losing a place to Lehto.

Hakkinen, too, made his last stop on lap 45, losing a 14s advantage he had nursed over Hill and dropping back to third again, the position he had occupied in the opening stages. Now the battle was on, for the three leaders were now all set to run to the flag. By lap 48 Hill had a 7.5s lead over Hakkinen, who was 2.9s adrift of Schumacher but clearly on a charge. Sadly, however, that came to nothing when his Peugeot V10 let go in a significant way on the following lap.

Whether Schumacher could do anything about Hill became another moot point as the race progressed, for though the gap had fluctuated a few tenths either side of those seven and a half seconds, the track was getting very slippery and in the end Schumacher elected to bank six points rather than push too hard for 10 and wind up with nothing. From lap 55 onwards the Spanish GP rather fizzled out.

Lehto's strong run – his best in his three outings so far for Benetton – ended with engine failure on lap 54, which was a great shame. Destroyed by Schumacher's speed in his own B194 at Monaco, where his neck also troubled him, JJ looked far more in the swing of things this weekend, and was actually fastest in the morning warm-up on race day.

Brundle, too, would be unlucky. He'd been stuck in eighth place behind Schumacher, Hill, Hakkinen, Alesi, Lehto, Coulthard and Barrichello in the early laps before steadily moving up the leader board, and a blend of good stops and sound driving had him up to fifth when Hakkinen expired. That became fourth with his team-mate's demise and third when Lehto retired, but any hopes of a second consecutive podium finish for McLaren evaporated in a cloud of smoke and a sheet of flame as his car exploded going down to the first corner on his 60th lap. The transmission had blown up, according to the official source, but the cynics put more store in a second Peugeot breakage, such was the mechanical carnage at the back of the MP4/9.

Alesi should have taken third place, then, but the Ferrari looked a ponderous handful,



Podium celebration: Schumacher, Hill and Blundell. Coulthard:impressive F1 debut.

to end, and there was further relief that the real business, the reason why everyone was in Spain in the first place, had finally arrived.

And, in one of those quirks, it was actually a good race. True, Schumacher blew into the distance in the early going, so that by lap 21 when he made his first of two scheduled fuel and tyre stops he was more than 15s ahead of Hakkinen (who had temporarily got ahead of Hill during the stops). But then that fifth gear problem arose on the German's car, and by lap 25 things were looking decidedly different as Hakkinen led from Hill, with Schumacher and Lehto at respectful distances. A little further back, Alesi had his hands full containing Brundle, the Ferrari set up for straightline speed and thus able just to stay in front, the McLaren all over it all round the circuit, but unable to squeeze by down that long, long pit straight.

So far this year strategies on fuel and tyre stops have tended to be far too similar to



Following Pedro Lamy's testing accident, Lotus recalled Alessandro Zanardi to the front line. He finished ninth.



Hakkinen led for a while, but eventually succumbed to engine failure.

and in contrast Mark Blundell's well-driven Tyrrell-Yamaha was nimble and effective. The Briton, anxious to stem a tide of the misfortune that has struck him all year, was pushing very hard and after moving ahead of the red car when it stopped for fuel and tyres on lap 38, two laps after his own call, Blundell raced home to an excellent result for this revitalised team. It was an endorsement of Harvey Postlethwaite's sensible 022 chassis, and of the continuing improvement Yamaha and Engine Developments have made with their jointly produced V10.

Alesi thus wound up fourth in another disappointing weekend for Ferrari, which showed little sign of advancement as the new rules muddied the issue. The Frenchman was unimpressed with his machinery, while Berger was generally unimpressed, having been turfed off by Barrichello on the first lap, and then struggling with gearbox problems. The Prancing Horse is still going through a difficult phase.

Jordan, by contrast, was back on the up and up after the hiatus caused by Barrichello's Imola accident, and with Eddie Irvine back was up to full regular driver strength. The pair of them seemed destined for some good points, especially after Barrichello had qualified a best-ever fifth, but the Brazilian threw it away with a poor start, and was fighting his way back towards Alesi when his Hart engine unaccustomedly broke on lap 40. Irvine then took up the cudgels on behalf of Ulster, and survived a moment at the chicane and steadily worsening clutch slip to take the final point on his return. But for those problems he could have beaten Martini's well-conducted Minardi for fifth place, but as the track conditions worsened he wisely eased back and the little Italian's two points went without further challenge. Piero had been sixth fastest in Friday qualifying, only to be hurt by engine failure on Saturday, so he was delighted with his result.

The man who should have been third instead watched the remainder of his first Grand Prix from the Williams team garage.

David Coulthard had duly been called up for active service by Frank Williams, and the team's test driver did a terrific job to qualify ninth with a quiet confidence that shouts volumes about his future in F1. He was honest enough to admit that he didn't make best use of his tyres in Saturday's afternoon session, in which case he might have been higher on the grid. And as soon as the race

· REFLECTIONS · IN · THE · RAIN ·

FROM THE ORIGINAL PAINTING BY JEREMY MALLARD



IN RESPONSE TO THE VOLUME OF RECENT REQUESTS WE HAVE RECEIVED, AFTER CAREFUL CONSIDERATION, WE HAVE DECIDED TO PUBLISH THIS PICTURE,WHICH TO DATE ONLY A FEW PEOPLE ARE FAMILIAR WITH.IT IS AN ELOQUENT PORTRAIT AND AN EXPRESSIVE SUMMARY OF ONE OF AYRTON SENNA'S MOST REMARKABLE ACHIEVEMENTS AS A RACING DRIVER. GOING BACK ALMOST FIVE YEARS TO A RACE IN WHICH HE GAVE A VIRTUOSO PERFORMANCE OF DRIVING ABILITY AND INSPIRED THE ORIGINAL PAINTING.
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started he made amends by jumping into sixth place. He always did get straight into the action, in his Formula Ford, VLC, F3 and F3000 days.

For the first 16 laps he sat easily in the wake of Alesi and Lehto, aware that the Finn was trapped, and that he himself could afford to wait. A good pit stop could throw him clear of both when they in turn stopped, and he knew that he would be making an early stop and that there was no reason to throw it away trying to overtake. Unfortunately, he had already been experiencing a hesitation in his Renault engine's pick-up from low revs, and it was dead even as he crept into the pits. He lost a complete lap as they tried to get him going again, and when he finally staggered back on to the track he was down in 20th place. When the electronic problem continued to manifest itself, the team called him in.

Spain thus yielded him little in hard terms, but his was an F1 debut that could so easily have outstripped those of Stewart, Regazzoni, Giunti, Reutemann, Prost, Herbert and Schumacher. Watch out for him; Barcelona showed us where F1's next star talent is coming from.

Footwork and Sauber also left empty-handed. The Arrows FA15s reacted very badly to the new regulations, and qualified poorly as a result, but by Sunday morning Alan Jenkins had his designs working much better and they were strong for the race. Christian Fittipaldi opted for a non-stop strategy which seemed to be working for him a he was embroiled in the battle for sixth place with Alesi, Blundell and the two Jordans when his engine broke on his 36th lap. Team-mate Gianni Morbidelli ran as high as fifth during the early stops, but dropped out when his fuel valve literally fell into the tank on his 25th lap. Frentzen had been dicing with the Italian and also had a brief spell up in fifth place, but when his Sauber began changing down through the gears of its own accord he called it a day.

Reigning F3000 champion Olivier Panis again drove smoothly and unobtrusively for Ligier to claim seventh place ahead of team-mate Eric Bernard, who'd pitted on lap seven for attention to debris damage, while Alessandro Zanardi made it home ninth on his F1 return in a badly oversteering Lotus 107C.

Spain was a bitterly disappointing weekend for Lotus. The previous week Pedro Lamy had been hospitalised with serious leg injuries after his 107C had crashed at Abbey curve at Silverstone following rear wing failure, and after a scare concerning cracks in the mounting structures on both Johnny Herbert's new 109 and Zanardi's older 107C on Friday the camp was thrown into further consternation. The problem was solved by Saturday, but the 109 was very unsorted, having only done a handful of laps prior to the meeting, and it was so twitchy that it got away from Herbert on his 41st lap, when he might have been in a position to challenge Martini's eventual fifth place.

When Damon Hill took the chequered flag, and then did a lap of honour waving the Union Jack, it was 26 years to the race since his father's victory in the Spanish GP had lifted a Lotus team still shattered by the death of Jimmy Clark at Hockenheim. The coincidences were quite uncanny, for though Damon had competed unsuccessfully at Monaco and Graham had actually won the very next GP after that F2 event, Graham had participated in an interim race too, the *Daily Express* Trophy at Silverstone.

Damon was the first to admit that his triumph owed everything to Schumacher's ill fortune, but a win is a win, and this one came precisely the right time to boost Williams' tattered morale and to prove once again that they can still win. It came almost a month to the day since Ayrton Senna's accident, and marked a fantastic 300th GP success for Goodyear, but an even more surprising statistic was that it was eight months since the Didcot team last took a chequered flag before anyone else. So much has changed since Monza last year. . .

D J T

STARTING GRID

5 SCHUMACHER
Benetton B194
1m 21.908s (2)
1m 23.426s (1)

0 HILL
Williams FW16
1m 22.559s (2)
1m 24.716s (1)

7 HAKKINEN
McLaren MP4/9
1m 22.620s (2)
1m 24.580s (1)

6 LEHTO
Benetton B194
1m 22.983s (2)
1m 25.587s (1)

14 BARRICHELLO
Jordan 194
1m 23.594s (2)
1m 25.990s (1)

27 ALESI
Ferrari 412 T1
1m 23.700s (2)
1m 24.957s (1)

28 BERGER
Ferrari 412 T1
1m 23.715s (2)
1m 26.121s (1)

8 BRUNDLE
McLaren MP4/9
1m 23.763s (2)
1m 26.614s (1)

2 COULTHARD
Williams FW16
1m 23.782s (2)
1m 27.482s (1)

3 KATAYAMA
Tyrrell 022
1m 23.969s (2)
1m 27.017s (1)

4 BLUNDELL
Tyrrell 022
1m 23.981s (2)
1m 25.863s (1)

30 FRENTZEN
Sauber C13
1m 24.254s (2)
1m 25.115s (1)

15 IRVINE
Jordan 194
1m 24.930s (2)
1m 26.368s (1)

24 ALBORETO
Minardi M193B
1m 24.996s (2)
1m 26.595s (1)

10 MORBIDELLI
Footwork FA15
1m 25.018s (2)
1m 27.459s (1)

20 COMAS
Larrousse LH94
1m 25.050s (2)
1m 26.097s (1)

19 BERETTA
Larrousse LH94
1m 25.161s (2)
1m 28.011s (1)

23 MARTINI
Minardi M193B
1m 25.247s (2)
1m 25.502s (1)

26 PANIS
Ligier JS39B
1m 25.577s (1)
1m 27.872s (2)

25 BERNARD
Ligier JS39B
1m 25.766s (2)
1m 28.289s (1)

9 FITTIPALDI
Footwork FA15
1m 26.084s (2)
1m 27.631s (1)

12 HERBERT
Lotus 109
1m 27.685s (2)
1m 59.009s (1)

11 ZANARDI
Lotus 107C
1m 26.397s (2)
1m 30.379s (1)

31 BRABHAM
Simtek S941
1m 28.151s (2)
1m 30.797s (1)

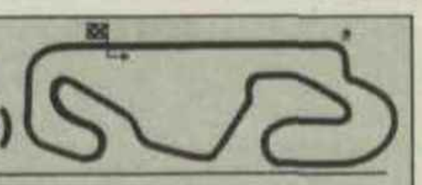
34 GACHOT
Pacific PR01
1m 28.873s (2)
1m 34.318s (1)

33 BELMONDO
Pacific PR01
1m 30.657s (2)
1m 31.750s (1)

Did not qualify:
MONTERMINI (Simtek S941) 1m 31.111s/Did not run

FORMULA 1 WORLD CHAMPIONSHIP

SPANISH GRAND PRIX, Barcelona, May 29
65 laps of 2.949-mile circuit (191.685 miles)



Pos	Driver	Nat	Car/Engine	Time/Stated Retirement	Best Lap	Lap
1	Damon Hill	GB	Williams FW16-Renault V10	1h 36m 14.374s	1m 25.874s	17
2	Michael Schumacher	D	Benetton B194-Ford Zetec-R V8	1h 36m 38.540s	1m 25.155s	18
3	Mark Blundell	GB	Tyrrell 022-Yamaha V10	1h 37m 41.343s	1m 27.486s	14
4	Jean Alesi	F	Ferrari 412 T1-Ferrari V12	64 laps	1m 27.558s	9
5	Pier-Luigi Martini	I	Minardi M193B-Ford HB V8	64 laps	1m 28.610s	58
6	Eddie Irvine	GB	Jordan 194-Hart V10	64 laps	1m 26.580s	40
7	Olivier Panis	F	Ligier JS39B-Renault V10	63 laps	1m 29.118s	39
8	Eric Bernard	F	Ligier JS39B-Renault V10	62 laps	1m 29.233s	34
9	Alessandro Zanardi	I	Lotus 107C-Mugen Honda V10	62 laps	1m 30.493s	9
10	David Brabham	AUS	Simtek S941-Ford HB V8	61 laps	1m 30.558s	13
11	Martin Brundle	GB	McLaren MP4/9-Peugeot V10	59 laps – transmission	1m 26.233s	33
12	JJ Lehto	SF	Benetton B194-Ford HB V8	53 laps – engine	1m 26.346s	38
13	Mika Hakkinen	SF	McLaren MP4/9-Peugeot V10	48 laps – engine	1m 25.872s	29
14	Johnny Herbert	GB	Lotus 109-Mugen Honda V10	42 laps – spin	1m 28.901s	38
15	Rubens Barrichello	BR	Jordan 194-Hart V10	39 laps – engine	1m 26.863s	31
16	Christian Fittipaldi	BR	Footwork FA15-Ford HB V8	35 laps – engine	1m 28.002s	27
17	David Coulthard	GB	Williams FW16-Renault V10	32 laps – electronics	1m 26.983s	10
18	Bertrand Gachot	B	Pacific PR01-Ilmor V10	32 laps – rear wing	1m 31.557s	28
19	Gerhard Berger	A	Ferrari 412 T1-Ferrari V12	27 laps – gearbox	1m 27.614s	11
20	Gianni Morbidelli	I	Footwork FA15-Ford HB V8	24 laps – fuel valve	1m 28.032s	23
21	Heinz-Harald Frentzen	D	Sauber C13-Mercedes V10	21 laps – gearbox	1m 28.279s	17
22	Erik Comas	F	Larrousse LH94-Ford HB V8	19 laps – water leak	1m 27.533s	14
23	Ukyo Katayama	J	Tyrrell 022-Yamaha V10	16 laps – engine	1m 26.658s	15
24	Michele Alboreto	I	Minardi M193B-Ford HB V8	4 laps – engine	1m 29.880s	4
25	Paul Belmondo	F	Pacific PR01-Ilmor V10	2 laps – spin	1m 35.061s	8
NS	Olivier Beretta	MC	Larrousse LH94-Ford HB V8	engine failed on parade lap	no time	–

Winner's Average Speed: 119.730 mph Conditions: warm, sunny
Fastest Lap: Michael Schumacher, 1m 25.155s on lap 18, 124.700 mph

Championship points – drivers: 1 Schumacher 46; 2 Hill 17; 3 Berger 10; 4 Alesi 9; 5 Barrichello 7; 6 Larini and Brundle 6; 8 Hakkinen, Katayama, Blundell and Wendlinger 4; 12 Fittipaldi and de Cesaris 3; 14 Frentzen and Martini 2; 16 Comas, Alboreto and Irvine 1.

Constructors: 1 Benetton Ford 46; 2 Ferrari 25; 3 Williams Renault 17; 4 Jordan Hart 11; 5 McLaren Peugeot 10; 6 Tyrrell Yamaha 8; 7 Sauber Mercedes-Benz 6; 8 Footwork Ford and Minardi Ford 3; 10 Larrousse Ford 1.

No stopping

Schumacher

Williams is a distant second to Benetton, as Ferrari makes some quiet progress

It was, for the better part of a day and a half, quite a feeling. Something, indeed, to be savoured. A Ferrari had been fastest in an official qualifying session for a Grand Prix. Moreover, a Ferrari had actually been fastest in official qualifying for a Grand Prix *and* in each of the free practice sessions either side of it. Barring the odd banzai performance at Monza, you had to go back a bit to recall the last time, and it really made rather a nice change to the all-too-familiar ring of Williams-Renault, Benetton-Ford or McLaren-Ford of recent months.

It couldn't last, of course, and it didn't. When it really mattered – in the second and final qualifying session, Michael Schumacher dug a little deeper into the secrets of the Benetton B194, and came up with a time just over a tenth better than the 1m 26.277s lap that had won Jean Alesi the honours the previous day, and which had seemed set to offer the Frenchman the best possible sort of present as his 30th birthday rolled round on the Saturday.

If it was thus business as usual for Benetton-Ford on the premier rank of the grid, though, Alesi's presence on the front of it was unique. It actually takes a bit of thinking about that, doesn't it? Just as you assume the man has won Grands Prix, you assume he'd been on the front row before, but he hadn't. The Canadian GP marked a first for Jean in that respect.

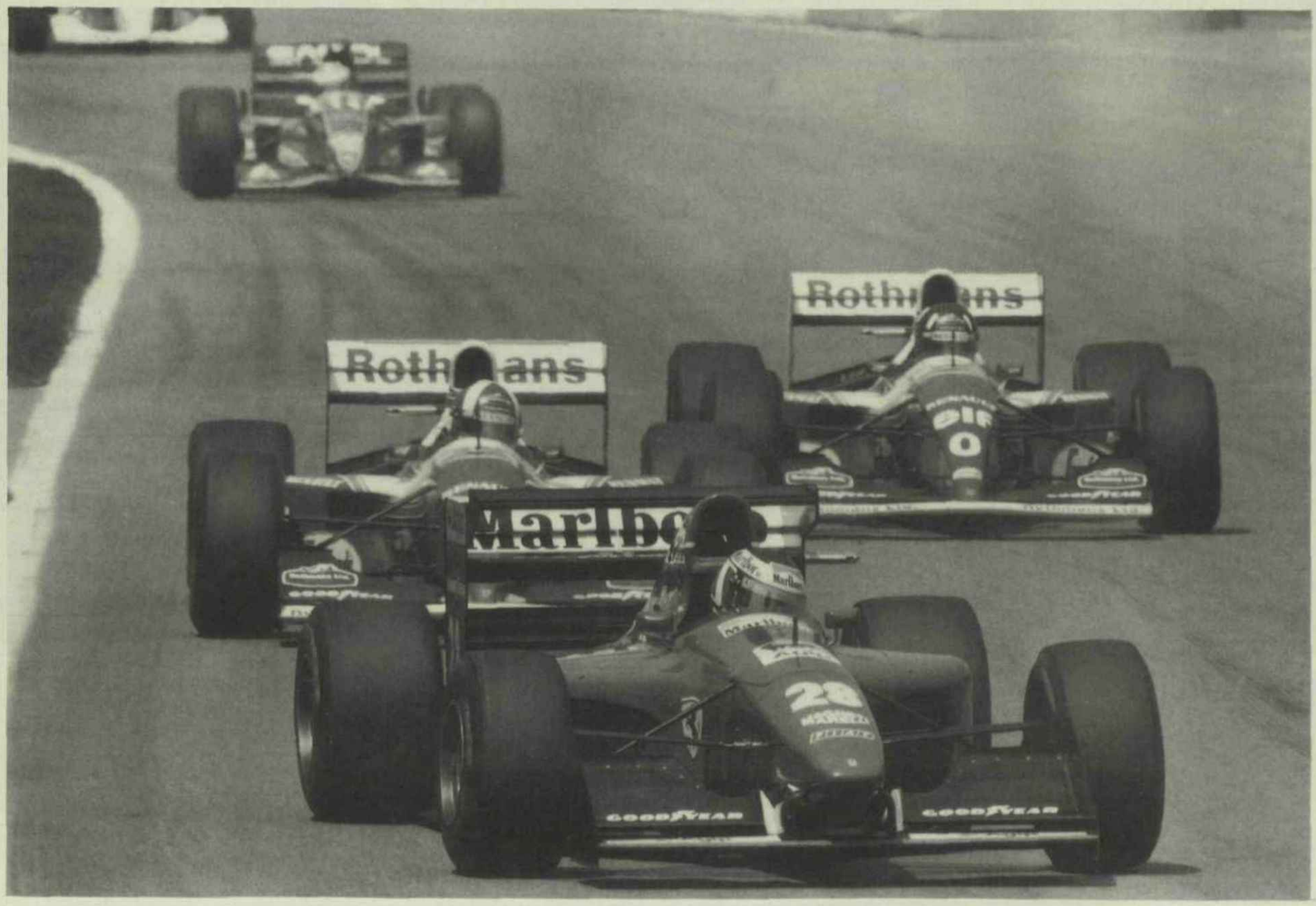
If qualifying had thus shown only Schumacher's Benetton to have the edge on the Ferraris, the race was a different story, for as well as the Mild Seven car, Damon Hill's Williams proved superior to the red machines when it countered. But the indications are there nevertheless that the Prancing Horse is beginning to make progress.

After his fourth place in Spain Alesi had been predictably dissatisfied, cursing the sort of characteristics within his machine that had obliged him to play the blocker's role of high straightline speed and poor cornering performance. Now, in Canada, in practice at any rate, he appeared to have a 412T1 that behaved quite well. This, remember, was the meeting where 'pump' fuel became mandatory, and where the pressure effect of the overhead airboxes was outlawed. And sadly, that's where a chunk of Ferrari's Friday speed seemed to come from, for where most others elected to cut away the rear sections of their airboxes so that no pressure could develop across the engine's inlet trumpets, Ferrari had merely cut slots in the sides of its engine covers. By the Saturday it had been obliged to do rather more than that, and though the drivers gallantly tried to convey the impression that nothing had changed, the dramatic reduction in straightline speeds told the story. As Schumacher rediscovered his edge to take the pole with 1m 26.178s, Alesi was unable to improve, and Ferrari's only consolation was that Berger was able to vault up the grid to third place ahead of Hill, who himself was only just ahead of his increasingly impressive new team-mate David Coulthard.

Grand Prix starts are interesting these days, and Canada was no exception. Schumacher went off the line with barely a wisp of tyre smoke, and the Ferraris followed suit, never looking remotely like emulating Berger's dragster start of Imola. The Williams, by contrast, spun their wheels. Coulthard, as is his style, got a cracking start to beat Hill, who momentarily sat with far too much wheelspin and just made it to the first corner fifth ahead of the battling Jordan-Harts of Irvine and Barrichello which were sandwiching Hakkinen's McLaren-Peugeot.

By the end of the lap Irvine had dropped back to eighth as Barrichello stole sixth in front of Hakkinen, and in their wake came Morbidelli, Katayama and Frentzen, Blundell, Brundle, Fittipaldi, Herbert, de Cesaris, Beretta, Martini, Alboreto, Zanardi, Lehto, Comas, Brabham, Panis, Bernard and Gachot.

Brundle lasted only until the fourth lap, when his engine suddenly cut out approaching the last corner. He tried fiddling with the ignition switch, but it remained dead. Peugeot later suspected either the alternator or the fuel pump. Sauber's for-



Berger leads the Williams-Renaults of Coulthard and the frustrated Hill in the opening stages, as Barrichello follows.



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tunes also waned early. Frentzen dropped out of 11th place on his sixth lap as he vaulted over the chicane kerbs and hit the tyre wall, and de Cesaris fell from an unhappy 17th place on lap 25 when his engine lost its oil pressure.

Schumacher quickly established a gap to Alesi, but Jean was looking relatively comfortable as he kept this around five seconds. behind them it was soon clear that Berger was holding up Coulthard, Hill, Barrichello and Hakkinen. For a while they had worked clear of the next group which comprised Irvine, Morbidelli and Katayama, with Blundell gradually dragging himself up on to their tails. But by lap six they were all bunched back together. Coulthard's efforts to pass Berger had come to nothing, and as the young Scot had taken the edge off his Goodyears team-mate Hill was becoming increasingly frustrated by his blocking tactics. Three times he drew alongside, only to have Coulthard refuse to concede the position. All the while Berger was gaining a respite, and moving away again. Eventually Coulthard got the word from the pits to let Hill go, and as he waved him by Damon gesticulated rudely at him. Later they would have a spat in the Williams garage as they vented their respective feelings on the matter.

As soon as he was by Hill sped after Berger, leaving Coulthard to deal with Barrichell, Hakkinen *et al*. Damon caught the Ferrari quite easily but for a while ran into the same problem as Coulthard had until the Austrian made a mistake going into the chicane at the fast right on the back of the circuit on lap 15. Hill dived gratefully down the inside to snatch third place.

After that the Ferrari fell steadily back towards Coulthard, Barrichello and Hakkinen, but then the first pit stops interrupted the flow. Benetton had adopted a strategy of either coming in early or staying out late if it felt it necessary, so had leeway. Ferrari, meanwhile, had opted for a split policy. The Frenchman had a revised rear

"It takes a bit of thinking about that, doesn't it? Just as you assume the man has won Grands Prix you assume he'd been on the front row before"



suspension on his car, with different roll-centre and better tyre wear, so he would only have to stop once, whereas with the older set-up Berger was down for two stops.

By the 25 lap mark Schumacher still led Alesi by a little over 10s, but Hill was closing in to challenge for second. Coulthard was up to fourth with Fittipaldi, Berger (who'd stopped on lap 22), Barrichello (lap 21), Hakkinen (lap 18) and Blundell (lap 15) in line astern. Morbidelli was recovering from his stop (lap 24) in 10th place, ahead of Beretta (who hadn't yet stopped), Lehto (ditto), Martini (ditto) and Irvine (who'd stopped on lap 23).

Three laps later the skies darkened ominously for a few minutes and some rain spots fell, but then the storm that was already raging to the west veered off and everyone could breathe sighs of relief again. Alesi came in for his stop on lap 31, and Hill on lap 33, the Englishman passing the Ferrari during these manoeuvres, while Schumacher continued to nurse his sizeable lead and stayed out until the 40th lap before finally coming in. Though Hill would push hard after him, it was clear that nothing bar misfortune, mistake or unreliability was going to change the outcome of this race. The top three seemed very settled, especially as Alesi was now having trouble with the Ferrari's downchange from fourth to third. Worse was still in store.

Fourth place would not be so cut-and-dried. Coulthard's stop went smoothly enough on lap 34, and when Fittipaldi came in two laps later Berger and Hakkinen resumed their battle. Under braking the McLaren looked very strong, but on power the Ferrari was always able to keep the upper hand. Like Alesi, Barrichello was suffering electronic problems again with his Jordan's transmission and had rather lost touch with them, after hanging on well ahead of the McLaren early on, while Morbidelli and Coulthard were running strongly in seventh and eighth places as Fittipaldi, Irvine, Blundell and Herbert indulged in a great scrap for ninth. Katayama was part of this too for a while, but already his race had been ruined when his first stop on lap 18 cost him more than a minute as the left rear wheel nut locked. Later, on his second stop, the left front would prove problematic. In the end he spun, and had the audacity to drive towards traffic before indulging in a crazy spin-turn right in front of approaching vehicles. Then Irvine dropped out at the end of the 41st lap when he spun in the last corner and tapped the pit wall.

Hakkinen refused to give Berger any peace, while Coulthard and Blundell had begun to make inroads into Barrichello's advantage, but the quiet man in all this was Morbidelli in the Footwork, who had moved smoothly into fourth place ahead of the Berger/Hakkinen battle after the others had made their second stops. He'd driven stylishly all afternoon and was looking a strong bet to finish in that position when an hydraulic pipe fractured in his transmission and he crept in to retire. He deserved a lot better.

As the race moved into its closing stages Schumacher was more than 35s ahead of Hill and Alesi was steadily falling back with his transmission problem. Then came Berger, still hounded by Hakkinen, with Coulthard a lap down in sixth place ahead of Fittipaldi and JJ Lehto. The Finn had been destroyed by Schumacher in qualifying, struggling three seconds off the German's pace for some reason best known to the team, but in the race he was running strongly after starting 20th and was now pushing hard for his first point for Benetton. Barrichello was chasing him as hard as his gearbox problem would allow, while Herbert was a lonely 11th, his Lotus having run strongly in company with Fittipaldi, Irvine and the two Tyrrells around the 38-lap mark until it lost the edge from its brakes.

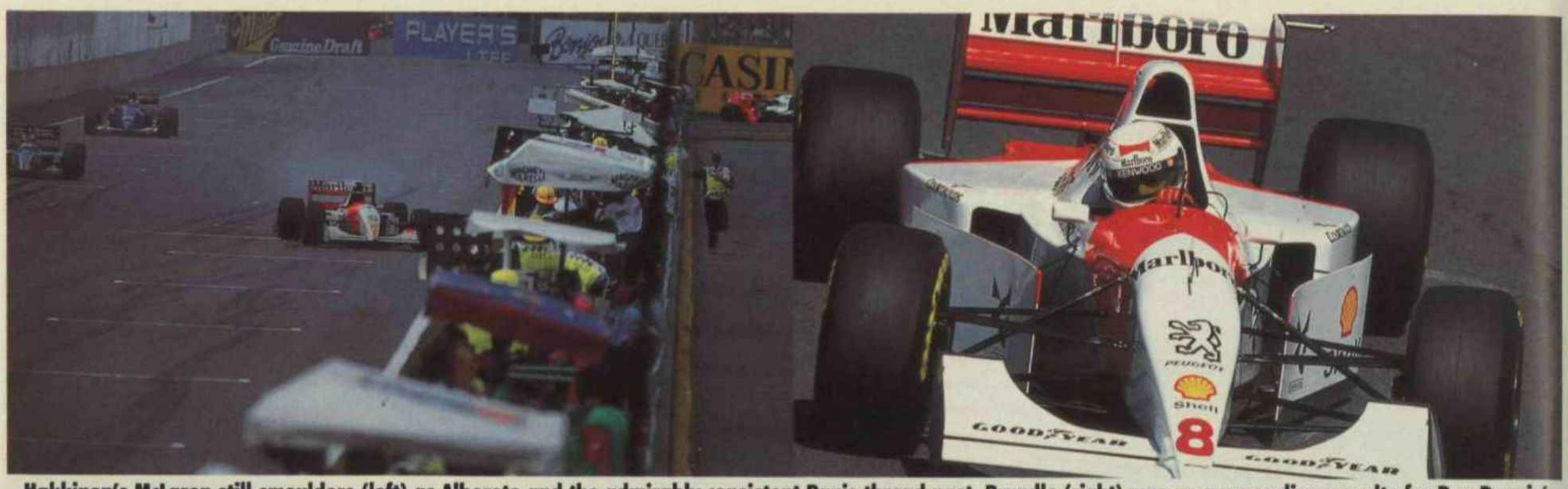
The final drama unfolded on lap 62, when Hakkinen disappeared. Coming out of the last corner his Peugeot engine quit, the French company later diagnosing a leak in the pressurised air system for its valve actuation.

After 69 laps Schumacher swept over the line to clinch his fifth victory in six races, and to extend his championship lead further, and Hill duly followed at a distance. Further back, team-mate Coulthard brought





David Coulthard (main picture) impressed once again, though he incurred his team-mate's displeasure on the road to fifth place. Above left, Hill, Schumacher and Alesi sample Moët & Chandon's latest shampoo. Below left, JJ Lehto raced strongly, after a disappointing practice. Not long after the race, there was word that his place at Benetton was in jeopardy...



Hakkinen's McLaren still smoulders (left) as Alboreto and the admirably consistent Panis thread past. Brundle (right) was an even earlier casualty for Ron Dennis' team; fastest time in the warm-up was scant consolation.



Left: Fittipaldi (centre) had less cause to celebrate with Barrichello (right) and Lehto, after his Footwork was excluded for being underweight. Right: Andrea de Cesaris started his first GP for Sauber, and his 200th overall.

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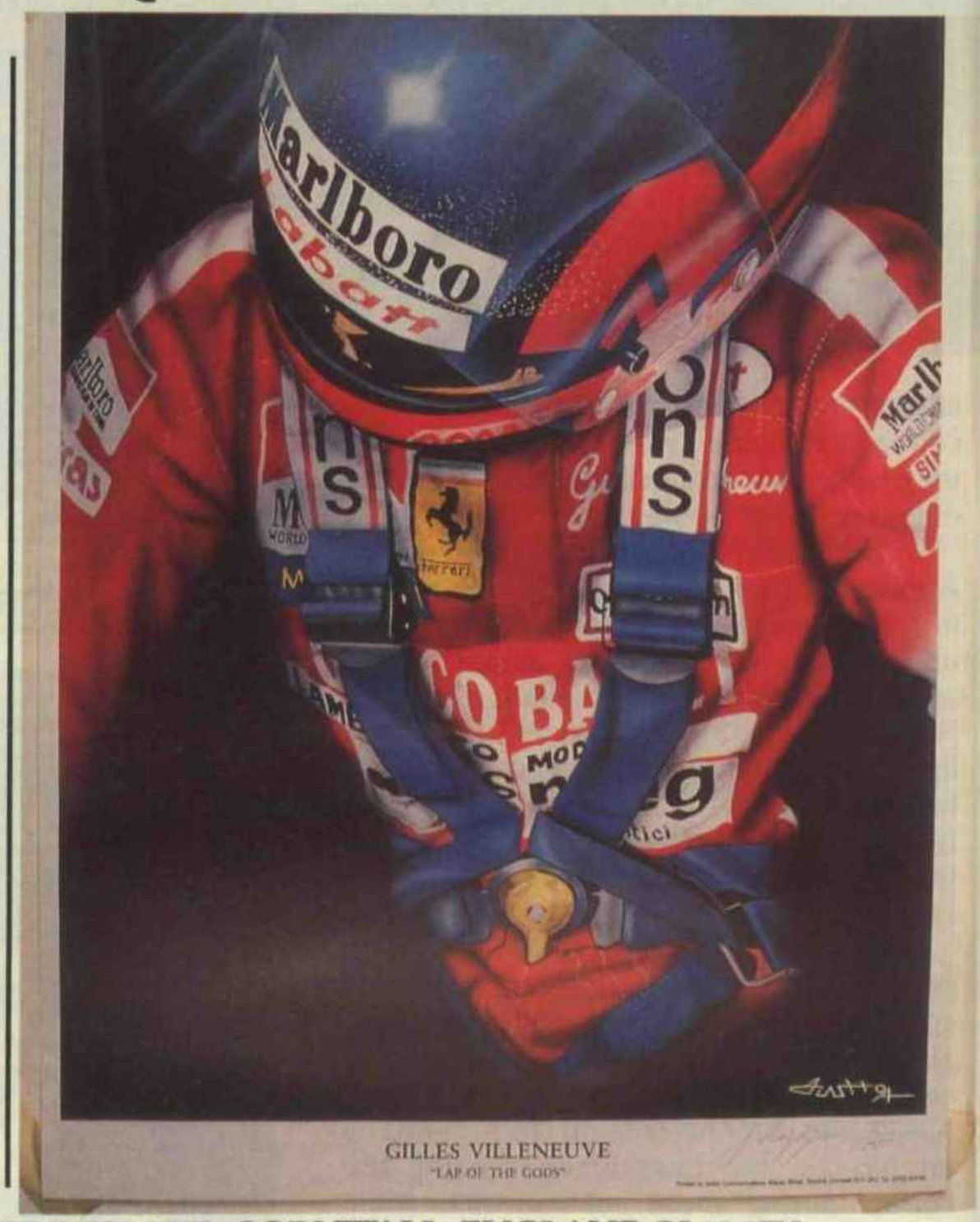
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his Williams home fifth behind the two Ferraris, to win championship points at only the second attempt in a race in which he will have learned much, and the final point went to a relieved Lehto after Fittipaldi's Footwork was thrown out for being 2.5kg under weight.

There were moments of great anxiety for Alesi on his last lap, as he had appeared the lap before at a crawl with the Ferrari singing its head off. He was just able to hang on to that hard-won third, for he finally crossed the line mere feet ahead of Berger. The transmission had jammed in second gear on that final lap, and he had just made it home. If there was thus great relief in the Ferrari camp, there was also a quiet satisfaction. True, they had been little match for the leading Benetton, nor Hill's Williams, and with more experience Coulthard would probably have beaten them too, but the cars were reliable and the engines probably had more power than any others. With a totally revised evolution 412T1 due at Magny-Cours they had cause for some quiet optimism at last. Had the Ferrari engineers heard Hill's comments at Williams after the race, they might have allowed that optimism to be a little noisier, too.

"The car is okay, yes?" asked one of Renault's engineers. "Yeah, it's better," said Hill cheerfully. "And the engine, not so bad, eh?" "No, not so bad. But not as good as the Ferrari. . ."

The writing, perhaps, is on the wall for the second half of the season. **DJT**

STARTING GRID

5 SCHUMACHER
Benetton B194
1m 26.178s (2)
1m 26.820s (1)

28 BERGER
Ferrari 412 T1
1m 27.059s (2)
1m 27.652s (1)

2 COULTHARD
Williams FW16
1m 27.211s (2)
1m 28.636s (1)

7 HAKKINEN
McLaren MP4/9
1m 27.616s (1)
1m 27.851s (2)

3 KATAYAMA
Tyrrell 022
1m 27.827s (1)
1m 27.953s (2)

10 MORBIDELLI
Footwork FA15
1m 27.989s (2)
1m 28.730s (1)

4 BLUNDELL
Tyrrell 022
1m 28.579s (2)
1m 29.108s (1)

23 MARTINI
Minardi M193B
1m 28.847s (2)
1m 29.691s (1)

12 HERBERT
Lotus 109
1m 28.889s (2)
1m 30.063s (1)

26 PANIS
Ligier JS39B
1m 28.950s (2)
1m 29.530s (1)

20 COMAS
Larrousse LH94
1m 29.039s (2)
1m 29.653s (1)

11 ZAKARDI
Lotus 107C
1m 30.160s (2)
1m 31.698s (1)

31 BRABHAM
Simtek S941
1m 31.632s (2)
1m 32.376s (1)

27 ALESI
Ferrari 412 T1
1m 26.277s (1)
1m 26.319s (2)

0 HILL
Williams FW16
1m 27.094s (2)
1m 28.011s (1)

14 BARRICHELLO
Jordan 194
1m 27.554s (2)
1m 28.612s (1)

15 IRVINE
Jordan 194
1m 27.780s (2)
1m 28.843s (1)

30 FRENTZEN
Sauber C13
1m 27.977s (2)
1m 28.048s (1)

8 BRUNDLE
McLaren MP4/9
1m 28.197s (2)
1m 28.451s (1)

29 DE CESARIS
Sauber C13
1m 28.694s (2)
1m 29.793s (1)

9 FITTIPALDI
Footwork FA15
1m 28.882s (2)
1m 29.493s (1)

24 ALBORETO
Minardi M193B
1m 28.903s (2)
1m 29.957s (1)

6 LEHTO
Benetton B194
1m 28.993s (2)
1m 29.580s (1)

19 BERETTA
Larrousse LH94
1m 29.403s (2)
1m 31.167s (1)

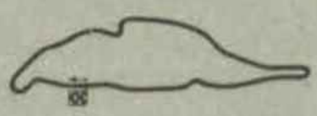
25 BERNARD
Ligier JS39B
1m 30.493s (2)
1m 30.806s (1)

34 GACHOT
Pacific PR01
1m 32.838s (1)
1m 32.877s (2)

Did not qualify:
BELMONDO (Pacific PR01) 1m 33.291s/1m 33.006s

FORMULA 1 WORLD CHAMPIONSHIP

CANADIAN GRAND PRIX, Montreal, June 11
69 laps of 2.766-mile circuit (190.797 miles)



Pos	Driver	Nat	Car/Engine	Time/Stated Retirement	Best Lap	Lap
1	Michael Schumacher	D	Benetton B194-Ford Zetec-R V8	1h 44m 31.887s	1m 28.927s	31
2	Damon Hill	GB	Williams FW16-Renault V10	1h 45m 11.547s	1m 28.962s	56
3	Jean Alesi	F	Ferrari 412 T1-Ferrari V12	1h 45m 45.275s	1m 29.260s	58
4	Gerhard Berger	A	Ferrari 412 T1-Ferrari V12	1h 45m 47.496s	1m 29.142s	58
5	David Coulthard	GB	Williams FW16-Renault V10	68 laps	1m 29.966s	55
DQ	Christian Fittipaldi	BR	Footwork FA15-Ford HB V8	68 laps – underweight	1m 30.700s	58
6	JJ Lehto	SF	Benetton B194-Ford HB V8	68 laps	1m 30.374s	33
7	Rubens Barrichello	BR	Jordan 194-Hart V10	68 laps	1m 29.757s	65
8	Johnny Herbert	GB	Lotus 109-Mugen Honda V10	68 laps	1m 30.865s	14
9	Pier-Luigi Martini	I	Minardi M193B-Ford HB V8	68 laps	1m 31.587s	66
10	Mark Blundell	GB	Tyrrell 022-Yamaha V10	67 laps – spin	1m 29.369s	54
11	Michele Alboreto	I	Minardi M193B-Ford HB V8	67 laps	1m 31.221s	66
12	Olivier Panis	F	Ligier JS39B-Renault V10	67 laps	1m 31.109s	65
13	Eric Bernard	F	Ligier JS39B-Renault V10	66 laps	1m 31.703s	6
14	David Brabham	AUS	Simtek S941-Ford HB V8	65 laps	1m 31.840s	6
15	Alessandro Zanardi	I	Lotus 107C-Mugen Honda V10	62 laps – engine	1m 31.588s	6
16	Mika Hakkinen	SF	McLaren MP4/9-Peugeot V10	61 laps – engine	1m 29.512s	34
17	Olivier Beretta	MC	Larrousse LH94-Ford HB V8	57 laps – engine	1m 31.451s	21
18	Gianni Morbidelli	I	Footwork FA15-Ford HB V8	50 laps – gearbox	1m 29.658s	39
19	Bertrand Gachot	B	Pacific PR01-Ilmor V10	47 laps – oil pressure	1m 32.041s	6
20	Erik Comas	F	Larrousse LH94-Ford HB V8	45 laps – clutch	1m 30.194s	11
21	Ukyo Katayama	J	Tyrrell 022-Yamaha V10	44 laps – spin	1m 30.079s	31
22	Eddie Irvine	GB	Jordan 194-Hart V10	40 laps – accident	1m 30.626s	21
23	Andrea de Cesaris	I	Sauber C13-Mercedes V10	24 laps – oil leak	1m 31.187s	19
24	Heinz-Harald Frentzen	D	Sauber C13-Mercedes V10	5 laps – accident	1m 28.279s	4
25	Martin Brundle	GB	McLaren MP4/9-Peugeot V10	3 laps – electrics	1m 26.233s	3

Winner's Average Speed: 116.825 mph **Conditions: humid, brief light drizzle**
Fastest Lap: Michael Schumacher, 1m 28.927s on lap 31, 119.413 mph

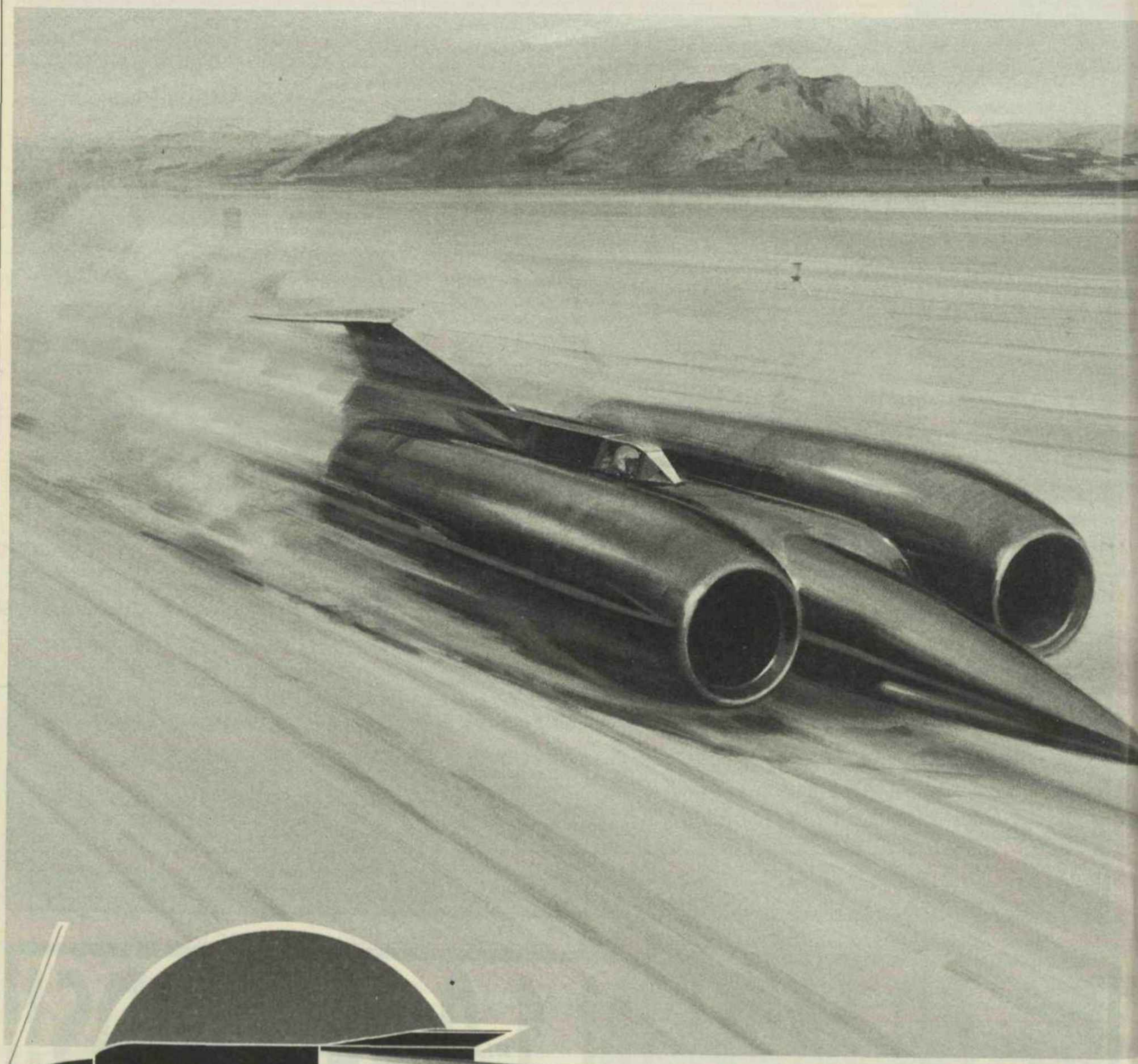
Championship points – Drivers: 1 Schumacher 56; 2 Hill 23; 3 Berger and Alesi 13; 5 Barrichello 7; 6 Larini and Brundle 6; 8 Hakkinen, Katayama, Blundell and Wendlinger 4; 12 Fittipaldi and de Cesaris 3; 14 Frentzen, Coulthard and Martini 2; 17 Comas, Alboreto, Lehto and Irvine 1.

Constructors: 1 Benetton Ford 57; 2 Ferrari 32; 3 Williams Renault 25; 4 Jordan Hart 11; 5 McLaren Peugeot 10; 6 Tyrrell Yamaha 8; 7 Sauber Mercedes-Benz 6; 8 Footwork Ford and Minardi Ford 3; 10 Larrousse Ford 1.

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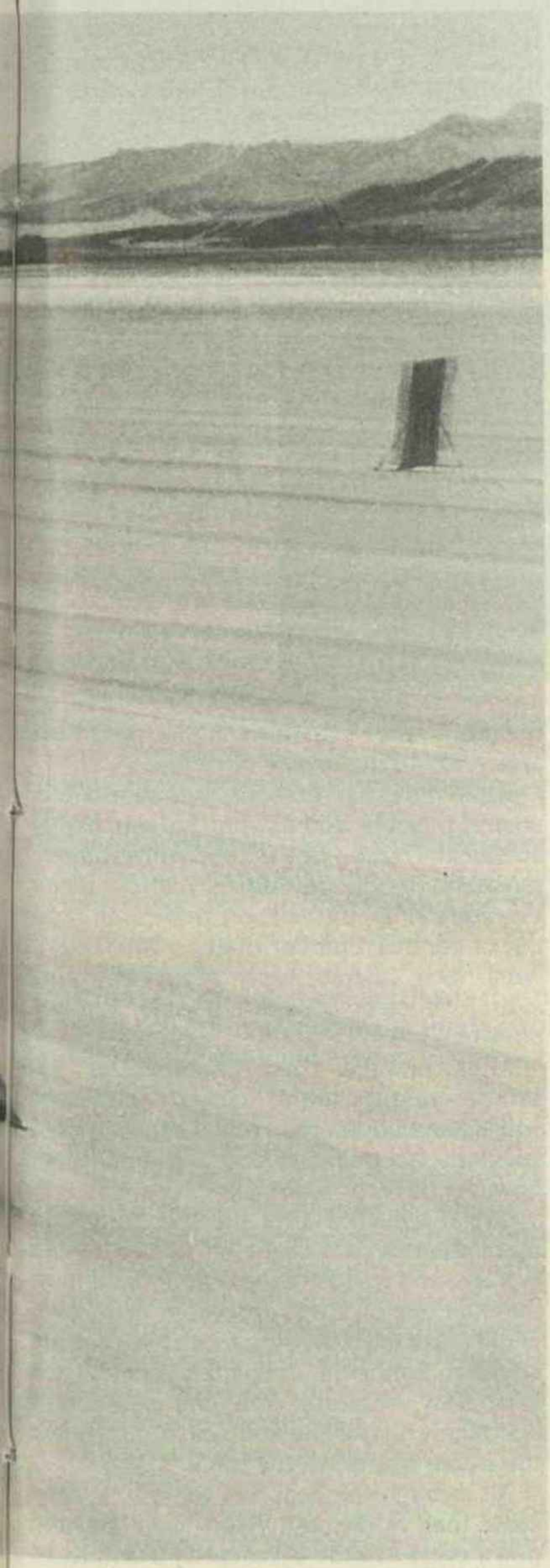
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Outrunning



Why land speed record holder Richard Noble is building Thrust SSC to challenge McLaren in a race to the Sound Barrier on land – and why he won't be at the wheel himself this time

sound



Richard Noble has some new bedtime reading. Not for him something by Salman Rushdie, Gilly Cooper or Alan Clark. Just before he turns in each night, he prefers a line or two from the Lockheed SR-71 flight manual. Yes, that's the famed Blackbird . . .

We are in his sitting room. Laid casually on the floor is £30,000 worth of strain gauge balance, with what looks not unlike the Blackbird attached to one end. Closer inspection reveals a lack of wings, bar a vestigial tailplane. Whatever it is, it *looks* quick. Noble *knows* it is, for this very creation has already travelled at Mach 1.1.

This is a gorgeous aluminium model of Thrust SSC, the car he believes will break the Sound Barrier. A video plays footage of the model on test on a rocket sled in Pendine, south Wales, upon whose sands the record used to fall in the mid-1920s and where Parry Thomas perished back in 1927 trying to beat 180mph. Noble is, as usual, in full spate. It hasn't struck me before, but now I see a resemblance to the Labour MP, Jack Cunningham, as he speaks.

Perhaps I watch the performance with more than my usual amount of cynical detachment. But you don't listen long before you are impressed in spite of yourself. And your mind's eye is full of laughter at various points as he unravels a tale that could only be. . .well, which could only be Richard Noble and Thrust.

We've been here before, I keep reminding myself. With Thrust 2, and with the battle against the world's scepticism about a public school-educated bloke with a jet engine in his garage and a dream to smash the land speed record.

This time around a lot of things are different, though. The speed, for a start. It's not 622.407mph to beat. Noble erased Gary Gabelich's 1970 mark with his own record at Nevada's Black Rock Desert on October 4 1983. But he's not interested remotely in his own 633.468 figure, either. Last time out the aim was 650, which Thrust 2 peaked at on its record run. This time it's 850, well past the speed of sound.

This time, too, there is real competition. With Thrust 2 there were always spectres in the background, but this time there really is McLaren. There really is Craig Breedlove. Both, like Thrust SSC, are near to build.

And this time there is less angst about finance. True, it may not be in McLaren's perceived league, and there may have to be shortcuts, but being the holder of the title of Fastest Man on Earth has to count for something, and Noble exudes the confident air of one who knows that there are companies waiting on the sidelines to throw their cash into a kitty already boosted by Castrol and TI Group.

Oh, and this time there isn't a jet engine in the garage. No, not one. There are four, two racers and two spares...

We always knew that Thrust 3 existed in designer John Ackroyd's head, and that he and Noble had tossed some ideas around a long while ago, because Thrust 2 was initially only ever intended as a show car until its wind tunnel tests at Weybridge proved so positive that it became the record attempt vehicle. But Noble and Ackers had grown apart when Noble began to sense what McLaren was planning with its Maverick project.

It was a sensitive time for him. He was no longer involved with the ARV light aircraft project which he had founded the year after breaking the land speed record, and he was just realising that his Atlantic Sprinter transatlantic crossing venture would have to go into liquidation. As he said, an '80s project had dragged into the '90s.

He needed something exciting to do, and another crack at the lsr could not have come at a better time. The major problem, however, was his awareness of just how close Thrust 2 had been to the edge on its record run.

"You remember the graph of the loading on the front suspension . . . Frankly that was horrendous! It scared the hell out of me and it scared the hell out of Ackers! We think Thrust 2 could have gone about point one Mach, about seven miles an hour, faster before the front end started lifting . . ."

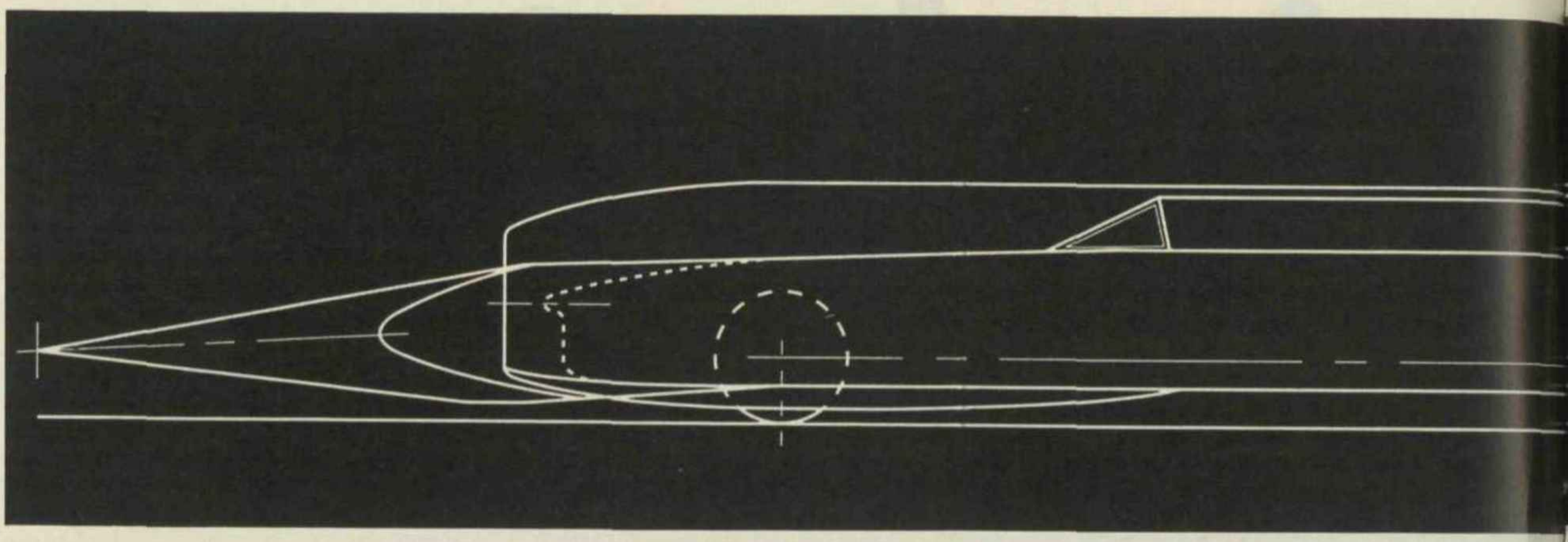
Noble acknowledges that a sizeable reason for that was that Thrust 2 was deliberately run with positive pitch on its final outing, to take some of the weight off the front end in order to reduce rolling resistance on a surface that was neither as dry nor as hard as ideally it might have been.

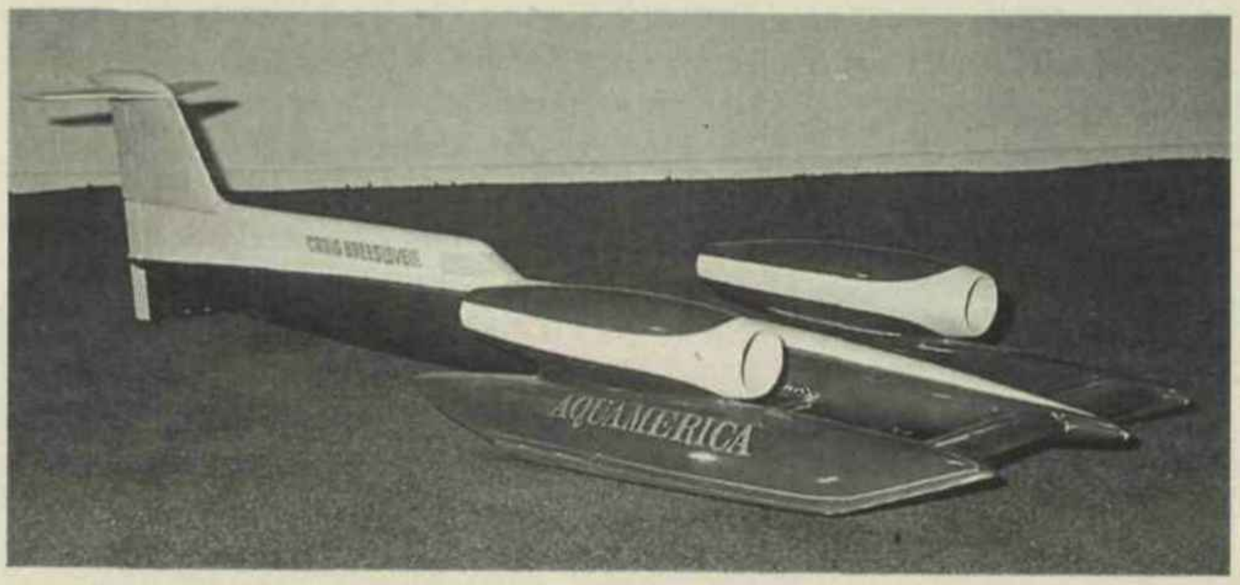
But therein nevertheless lay one of the problems. Thrust 2 was never intended to be a research vehicle, so neither he nor Ackroyd could be absolutely sure just what the rolling resistance was. Worse, from the point of view of chasing a supersonic record, nobody knew what happened beneath such a projectile. Without solving these twin problems, there was no way forward.

In the end Ackers headed to Reno to continue his balloon projects, but Noble had a chance meeting with Ron Ayers, the chief aerodynamicist at BAC on the Bloodhound missile and a keen technical student of lsr cars. His pet theory was that all of them had in some way underperformed, and he and Noble set out on separate paths to find out why.

"Ron was very interested, and so was I, that there was always a 4000lb thrust difference in what might have been the power of the Avon engine in Thrust 2 and what effectively might have been the aerodynamic drag. Was all that power absorbed by the rolling resistance of the Black Rock Desert?

"It took us two and a half months. It's terribly difficult to do, and we both decided to approach it using different methods. You could only do this sort of thing empirically. We took the data that we had and tried to reconstitute it mathematically and also to apply some sort of sensible logic to the thing. Eventually we got there and we ended up with a situation where we believe that we knew what happened to Thrust 2, we came





Thrust SSC (above) coincidentally shares a few styling clues with Craig Breedlove's stillborn Aquamerica project, from 1966, left.

up with a considered opinion what the thrust was, we came up with a considered opinion what the actual roll drag was, and from that we calculated the rolling resistance, and from each stage therefore we were able to calculate the rolling resistance and also the relationship between the rolling resistance and the speed, which of course is crucial."

With that done, they started reconsidering the early conceptual ideas for the third Thrust, but both soon concluded that they'd got to look at something completely different. Thus was born Thrust SSC, but not until they realised the true facts behind cross-sectional area.

Conventional wisdom, since the days of Gabelich's Blue Flame in the very late '60s, had suggested that a Vee-bottom, pencil-slim hull was best for aspiring supersonic cars, to help bounce away any harmful shockwaves. Ever since, that sort of dogma has held true, even though to date the Budweiser Rocket is the only car to claim to have gone supersonic (and it is extremely doubtful that it did).

In a nutshell, the cross-sectional area rule favours twin-engined designs, because you don't have to count the filament of air that runs through the exposed jet. According to Noble, "When you actually do your sums what you see therefore is that the thrust per unit area is a hell of a sight greater. It's a factor of about 30 percent."

They also realised that they'd got to have a really enormous amount of power, and that an ordinary turbojet, whose thrust drops or at least levels off the faster the vehicle goes, would not be enough. They needed something with an element of bypass, half turbojet, half ram-jet.

At this stage in the rather one-sided conversation, Noble gestures towards the drawings for Thrust SSC. His speech is rapid-fire, the arms move a lot, he shifts around in his seat all the time. It's all purely unconscious, but it's as if he's back doing a presentation to a potential sponsor. You remind yourself for the umpteenth time why he has been so successful raising backing in the past.

SSC is effectively Thrust 2 turned inside out. Instead of a cockpit either side of a jet engine, it is two jet engines either side of a cockpit. The whole thing is held together by a reverse tricycle backbone spaceframe chassis on which the front wheels are widely spaced and the rears are mounted in tandem like the Summers' Brothers old Pollywog streamliner. It's all clothed in a mix of carbon fibre (for the engine nacelles), aluminium and stainless steel. At 54 feet in length and weighing seven tons, it's the biggest lsr car ever, and arguably the most dramatic looking.

Listen to Noble and the sheer logic of the design process becomes fascinating. Ever since I've know him he's always been a proponent of having the centre of gravity of a record vehicle as far forward as possible, and the centre of aerodynamic pressure as far back. The Rolls-Royce Spey engines he will use are heavy, massively powerful and long, but they enable him and Ayers to do exactly what they want. Mounted either side of the cockpit, they get the cg way up front, while the extended tail brings the cp back accordingly. Their criteria for aerodynamic and dynamic stability are satisfied.

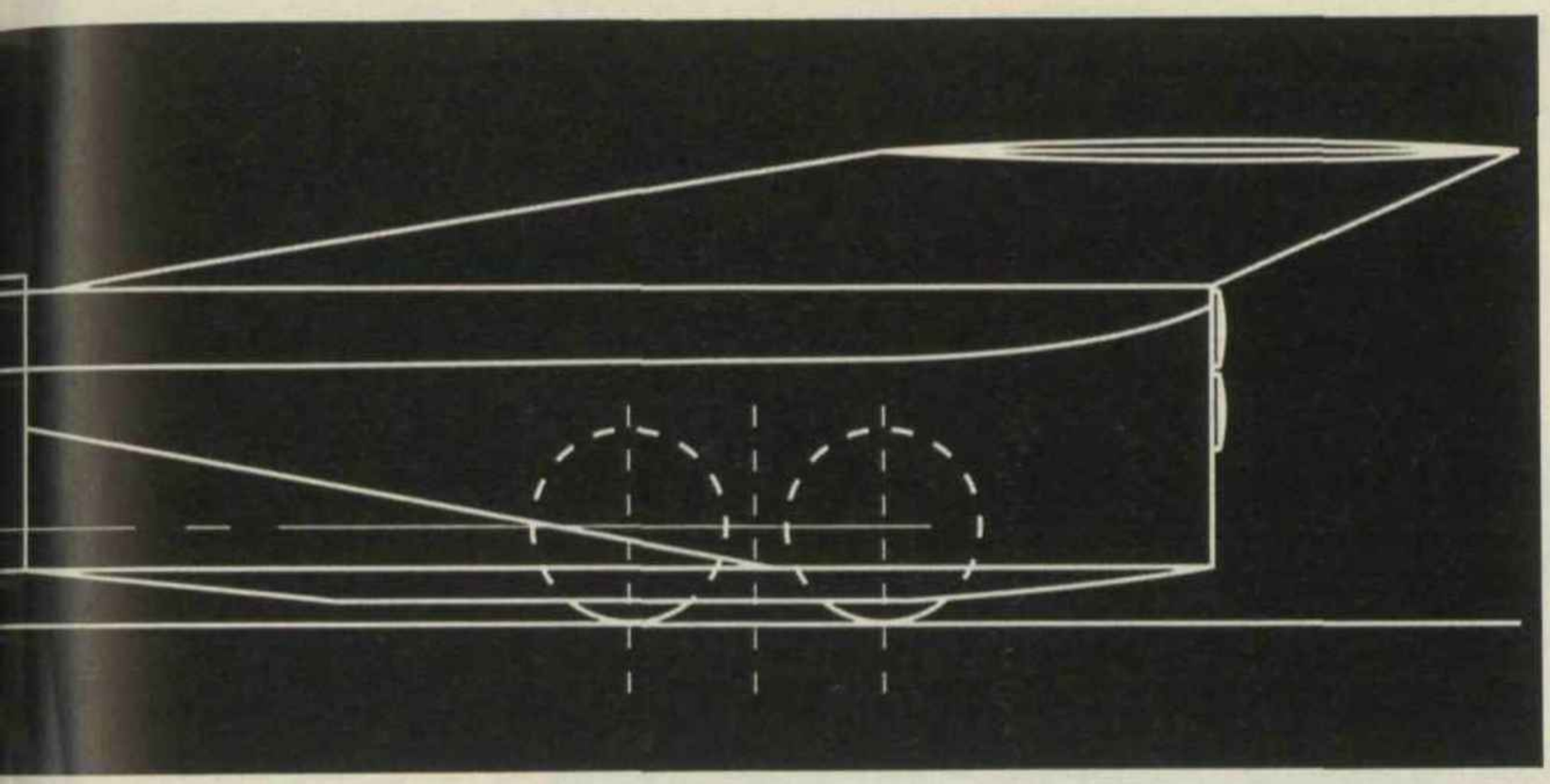
The roll resistance is good too, because the front wheels are tucked away in the nacelles. But isn't there a problem steering them in that position? You already know the answer, but it's interesting to see the effect the question has. I'd swear Noble rubs his hands as he launches into another speech about rear-wheel steering, the brainchild of Glynne Bowsher. The latter is a quiet, self-effacing Welshman who was part of the old Thrust team when he looked after Thrust 2's brakes. Now he's been drawn from his shell, and as well as designing all-new L77 aluminium alloy wheels which are bigger and stronger than 2's, he's done the spaceframe chassis and suggested the solution to obviate the problem of getting the front wheels to turn in the restricted space within the engine nacelles.

When Bowsher first mooted rear-wheel steering, Noble admits that he was highly sceptical. "I said, 'Glynne, we'll never, *never* persuade people that this is viable! I mean everyone is used to airport trolleys that go out of control, dumper trucks... And I said, 'Well, look Glynne, we're going way outside... We can't convince people. *I'm* not convinced

After Bowsher had cannibalised his brother-in-law's Mini, locked the front wheels and added rear-wheel steering via a special spaceframe welded to the rear end, however, tests at MIRA convinced him.

"We discovered after the first runs that there there was a slight bit of slip in the linkage, and we tightened that up, and from that moment on it was absolutely magic! We could hare down the straights at 90, and we could go hands off, absolutely straight. It's very, very accurate. You can position it absolutely on the line and hold it on the line the whole way down the track."

All through the past two years it is quite clear that Noble and Ayers have pushed down every avenue of research possible, to ensure the credibility and feasibility of their vehicle, and he admits that there were several hiatuses at which the project appeared set to stumble. "We took the firm decision that you cannot go ahead – really *you must not go ahead – with any project* where there is real doubt about the vehicle's effective ability to do it," he says trenchantly. Each time, however, they came up with some form of solution. Nothing epitomises that better than the tests at Pendine, at the MoD's Proof and Experimental Establishment rocket sled facility.



where they actually conducted their aerodynamic testing at real speeds. Noble, quite rightly, is very pleased with this bit of lateral thinking, and seems even more like an excited schoolboy as he relates the tale.

With what seed capital they had – not a huge amount but significantly more than the £175 with which they started the Thrust 2 project back in 1977 – they liaised with Imperial College and University College of Swansea and used their computational fluid dynamics to come up with behavioural predictions for the car, but the problem with cfd is precisely that it is computer figures. "You get very nice pictures, but then you say, 'Hang on, can we really believe this? How can we prove this? This is what it *says*, but is it believable?'"

As you might imagine, wind tunnels suitable for supersonic cars are rarer than credible politicians, no doubt because there have not yet been any supersonic cars to make use of them. It's not a market one can envisage booming. There are plenty that run up to 100mph with moving ground boards, and their figures can be extrapolated with a high degree of accuracy for speeds up to around 250mph. It's different when you start talking about 850.

Hence Noble's stroke of pure genius in approaching Colonel Lowry at Pendine.

"You know, that rocket railway is absolutely amazing. It comprises two sections of British Rail track, 1.6 kilometres long. The accuracy of this is point six of a millimetre in 1.6 kilometres. It's absolutely *staggering*. The sled there has 18 rockets to accelerate it and four to decelerate it. It goes nought to 880mph in one second and pulls 50G off the line!

"What they use it for, largely, is zapping bombs down the track and into great lumps of concrete. And they come off the end at basically three times the speed of sound. So we thought that if we built a sledge, which basically gripped the outside edge of the rail, then we could fill the inside of the rail up with a road, instrument our model and mount it on a strain gauge balance, use the telemetry off the sled, and then get our readings . . ."

It worked. An extremely sophisticated model was built by G-Force Precision Engineering in Fontwell (formerly Ganassi Racing's UK offshoot) and with it strapped to the strain gauge balance they were able to obtain readings at the critical speeds over 800mph (the model has so far run to Mach 1.1), but also get all the speeds either side, up and down. They then ran the film they shot on a clear wall and were able to calculate precisely what pitch deviations were experienced by the model.

This led to another crunch point, when the rocket sled findings had to be compared with the cfd figures. "The problem was, if they didn't match up, we couldn't believe either of them . . ." But they did. "So then we knew exactly what happens underneath the car."

Thus were the elements of Thrust SSC finally coming together. Like McLaren's rival Maverick, Noble's new machine will rely totally on active suspension, and a system is already well advanced at the Flight Systems and Measurements Laboratories at the College of Aeronautics at Cranfield. "You're looking at enormous forces. You're dealing with a lift slope of the order of 5G per degree. So in other words, one degree up in incidence leads to a 5G vertical load, or 5G the other way," reminds Noble, "and you've got to control the pitch absolutely accurately. Certainly, our system is considerably simpler than a Grand Prix installation. It simply *has* to be active, you've *got* to control that pitch and you've got to control the loading on the car."

The last big hurdle has been the power units, but just like Thrust 1 and Thrust 2, the story of Thrust SSC is already littered with examples of supreme opportunism. Rolls-Royce's relationship with McLaren precluded any dialogue, but then by the sort of convoluted but undoubtedly fated process one historically associates with Thrust, they came across a brace of Rolls-Royce Speys.

"Originally we looked at the RB199, it seemed to be the sensible engine. Obviously that's why McLaren went down the same route. It's a very nice little engine, three spool, very light, good power to weight ratio. All that's extremely good. The downside is that 1) it needs a separate gearbox so you've got quite a lot of installation problems, and 2) it's a computer-driven engine, so you've got that side of it. You can control your engine absolutely, and make it do exactly what you want, but the downside is that there's a lot of software that's got to be written, and you've got to experiment with it. And we wanted really a fit and forget engine."

He was also worried about the effect of a dusty desert atmosphere on the finely engineered cooling holes in the turbine blades.

"And the other thing too is that it's a very short engine. What you want with these supersonic vehicles, long, thin Concorde-like vehicles, you've got to get a really long, long shape to it. And this becomes difficult when you're faced with an engine which is actually very short, because while it's great to stick in the back of a Tornado, if you try putting it in a nacelle like ours here, it just doesn't work. Our nacelles are 20-odd feet long. The car is over 50 feet long. Two Thrust 2s.

"So that made us think. As far as Rolls-Royce is concerned, I don't even talk to them because they're involved with Ron. They're plastered all over his car. This is the published fact that we've heard.

"Ask who will drive Thrust SSC, and for the first time Noble becomes noticeably edgy"

"So in the middle of all this I was talking to my various friends in the Air Force about what the hell we were going to do, and they said: 'Well, there's always the Spey.' We said, 'Oh *God*, not a Spey!' You know, a 1960s engine, a huge great heavy thing. Bloody massive. They claimed 20,000 lbs of thrust, but it was probably closer to 19,000 on the test bed. So, no.

"And then somebody said, 'Well, there is the Spey 205.' I only knew of the 202, what was the 205? This was a very expensive project undertaken by the Ministry of Defence, to extend the hot-end life, of the Spey 202. Basically the engine could be uprated for a longer life or increase in performance. So, one thing led to another, and somewhere along the line we managed to acquire two of the 205s, still in their Rolls-Royce wrappings." That is typical Thrust luck! "I understand there were only 12 built. Those engines never actually flew, it was part of the programme which was coming to fruition when basically the Phantom was scrapped, and that was it. We were lucky enough to get those two, plus two 202s, and we then managed to get talking to the various people involved in the 205 programme, to find out just how much they could be uprated to. They reckon 25,000 lbs of thrust apiece..."

Ask who will drive Thrust SSC, and for the first time Noble becomes noticeably edgy.



The fully instrumented model of SSC is primed for launch on the rocket sled at Pendine.

Again, you already know the answer, but are interested to see how he frames it. The voice becomes more clipped, the sentences sharper. The bonhomie is missing from his tone. This is the manner Noble reserves for dealing with Bad Things, and for once, he does not come across very convincingly. He glances at his wife.

"We're in a difficult situation. There are a number of problems. Obviously, Sally is not very enthusiastic, point one. Point two is that we're into a situation where, in order to get the car operational by next year, we've got to go for one hell of a build operation. Basically, to fund that and to manage that is going to be a hell of an undertaking. We're going to be right back where we were with Thrust 2. Do you remember when we arrived at Bonneville in 1981 we were all absolutely shattered and in no condition. No element of driver training whatsoever. We were just very thankful that we'd managed to get our half completed car to the desert. We've got to get on with it, we can't afford that sort of situation.

"My situation is that I've made a very, very painful decision. The reality is that we've got to find somebody who has got to live with the team, who has got to actually train up with the team, and who will then become the car's driver. This is the role of a minor test pilot. I mean, in Thrust 2 what were we doing? What it requires is somebody who is quite happy at dealing with high speeds. The ability, basically, to process an enormous amount of information under stress and under pressure, extreme pressure . . ."

The voice trails off a little as Noble relives the past. "I can still remember those runs as if they were yesterday. You remember the mark the timekeepers made across the measured mile? I can still remember going over that at 650. Seeing all those polygons going underneath. You could see every single detail. And principally that's because effectively what had happened is like an accident, where your mental processes have speeded up to such a point that the whole thing is a very relaxed, slow motion effort. That's what you've got to get.

"The other side of it is the disciplines. I mean, the car is a low-flying aeroplane, effectively. You've got to therefore have people with aeroplane experience and aeroplane skill. Yeah, it's a minor test pilot's role. I think that's right."

Without Dr Brian Ridgewell, International Marketing and Technology Director at Castrol, it's doubtful that Thrust SSC would ever have gone beyond the paper stage. Noble was invited to address the conference of managing directors in Palm Springs that Castrol promotes every five years, and his theme was the land speed record. He took personnel at their word when they advised him that they would come aboard if he ever considered having another go, and ultimately, Ridgewell released £40,000 to fund the research programme.

> ***"We can't sort of hang around at Mach 1; we've got to go a lot faster"***

If there is one thing Noble understands more than anything else, it is the value of money. "You know, Brian's decision was extraordinarily courageous. It takes real guts to take a corporate gamble like that..."

Following completion of the research Castrol has advanced a *lot* more money, while TI Group, which built the spaceframe and supplied its materials for Thrust 2, has also pledged further support. Others seem imminent.

"We've started going out and talking to people, and the response is fantastic!" Noble smirks happily. "I mean, you think back to the Thrust 2 days and think how difficult it was, how everyone was very negative and how long it took, now it seems what's happened is people are looking for something a) exciting and b) something that's very different."

Building commenced in mid-June, and he is aiming to be on the Black Rock Desert next September, which means a very tight schedule. Ever a realist, he says, "Everything is controlled by cash, as we all know. But I think that's what we've got to do. Breedlove's on the way, so is McLaren. We've got to get out to Black Rock next year, and we've got to be in the Mach 0.9s."

He is also open about the speed he's looking for: like McLaren he talks not of 750, but 850 by 1996. "We can't sort of hang around at Mach 1; we've got to go a lot faster than that. Because at these speeds, around Mach 1, what you've got is a nasty sort of mix of airflows which are subsonic and supersonic, so what's actually happening is that you've got this nasty mix but a very small increment pushes that subsonic airflow supersonic and everything sort of settles down and smoothes out. It a very nice thing to handle."

He pauses briefly as he thinks of another point. For anyone taking written notes it must be the equivalent of momentary cessation of machine gun fire. "I think the sensible thing for everybody, basically, to do would be to run on both of the available venues," he says. "Black Rock and Lake Gairdner in Australia. What it means is that you could develop the car in two different seasons, at two different times in the same financial year. Now that is terrific, instead of the awful problem we had with Thrust 2, which was slog away for a year and get the car out for 40 days running, and then hit the weather . . ."

As Rosco McGlashan prepares to push after Noble's 633.468mph mark with his transonic Aussie Invader II, he knows that there are three serious supersonic contenders starting to construct their designs – Breedlove, McLaren and now Noble. The Sound Barrier on land will not just be a fantastic achievement for the first man to breach it – it's become a race as well. **DJT**

If you are interested in joining Thrust, write to The Mach 1 Club, PO Box 77, Twickenham TW12 2XN.



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Ups and downs, ins and outs: Sainz and McRae (inset).



Carlos and carless

While one member of the Subaru team was winning his first WRC event since late 1992, the other found himself excluded . . .

Very few people at the 1994 Acropolis Rally could have remembered the SCDA. It was an organisation beyond the memories of most of rallying's present followers, born of the time when the event was not only scorchingly hot, throat-burningly dry and eye-stingingly dusty, as it is today, but totally demanding of physical stamina, personal endurance and indefatigable grit.

The three latter qualities have now gone by the board, for, in common with other events of the world championship, the rally runs only in the daytime, goes to bed every night and no longer taxes human endurance. Skill is certainly still required, but other once essential elements of tenacity have been swept away by the FIA's so-called reforms, carried out in the cause of progress and safety but nevertheless quietly pandering to the needs of television companies upon whom the FIA's UK-based offshoot, the ISC, suddenly dropped a bombshell by demanding huge and unjustified fees for filming rights.

The initials SCDA stood for the Sleeping Co-Drivers' Association, a tongue-in-cheek group which got together in the early '70s after several of its number admitted that they had nodded off over their pace notes. It was also the time when crews were stopping whenever they could to douse their heads under the taps of village water pumps. In those days, the Acropolis was almost an African event contained within Europe, with road sections so tight that almost the entire route would be pace-noted and pillows were essential items of in-car equipment.

However, geography and climate are things that are beyond the interference of even the FIA and the Acropolis Rally remains as hot, as dusty and (almost) as rough as it ever was, rendering the event the nearest thing to an endurance event that the non-African events of the World Championship have to offer. Road section schedules have slackened over the years, but there is still no time for major work and this year only 11 of the 36 finishers went without road penalties.

There were 88 entries, including no less than five teams with drivers nominated to score points in the World Championship for Makes. Toyota sent three of its Celicas from Cologne, two for regular crews Juha Kankkunen/Nicky Grist and Didier Auriol/Bernard Occelli and one for Japanese driver Yoshio Fujimoto, partnered by the highly experienced Swedish co-driver Arne Hertz.

The Ford entourage was split into groups. From Boreham came two Escort Cosworths for Massimo Biasion/Tiziano Siviero and Malcolm Wilson/Bryan Thomas, the latter crew replacing François Delecour who is still recovering from foot fractures sustained in a road accident. Ari Vatanen/Fabrizia Pons were in a car built by Konrad Schmidt in Germany, which differed from the works examples in several respects – Pirelli tyres rather than Michelins, Ohlin shock absorbers rather than Bilsteins and Bosch electronics rather than Marelli, for instance. It was Vatanen's first time in an Escort Cosworth, his first rally this year and his first time with Pons as co-driver.

Only Biasion's car was fitted with the sequential gearchange system.

Two Group N Escort Cosworths, built by Mike Little Preparations in England, were driven by Carlos Menem/Martin Christie from Argentina and Emirates driver Mohammed Bin Sulayem with his Irish co-driver Ronan Morgan. A second Schmidt car was driven by Austrian Raimund Baumschlager and German Manfred Hiemer.

> **"Once essential elements of tenacity have been swept away by the FIA's so-called reforms"**

Two Subaru Impreza 555s were sent from Prodrive for Carlos Sainz/Luis Moya and Colin McRae/Derek Ringer, whilst a third was entered privately by Japanese pair Hiroshi Nishiyama/Yushi Noda.

Mitsubishi Ralliart sent two Michelin-shod Lancers for Kenneth Eriksson/Staffan Parmander and Armin Schwarz/Klaus Wicha, the latter pair now reunited after they were split during the time that Schwarz drove for Toyota.

The Astra team, now divided between Italy and Belgium, brought a lone and rather old Lancia Delta integrale, backed by Giesse, for Alessandro Fiorio/Vittorio Brambilla, whilst both 'Tchine' from Monaco and Manfred Stohl from Austria drove privately entered Audi Coupé S2s. Co-driving Stohl was the bearded Berliner Peter Diekmann.

Prominent among the two-wheel-drive brigade were Grégoire de Mevius/Willy Lux from Belgium in their Opel Astra, whilst a Didcot-prepared Nissan Sunny GTi was driven by local crew 'Stratissino'/Tonia Pavli, and stayed in Greece after the event so that the driver can use it in Greek Championship events. Veteran driver 'Leonidas', the Athens Renault importer, was in a Clio Williams with Maria Pavli, sister of Tonia.

From the Skoda Motorsport Team came two Favorit 136Ls for Pavel Sibera/Petr Gross and Emil Triner/Jiri Klima, whilst two Russian Lada Samaras, crewed by Sergei Aliasov/Vladlen Ishimov and Alexandre Kikonenko/Sergei Talantsev, were actually entered by the Greek importer.

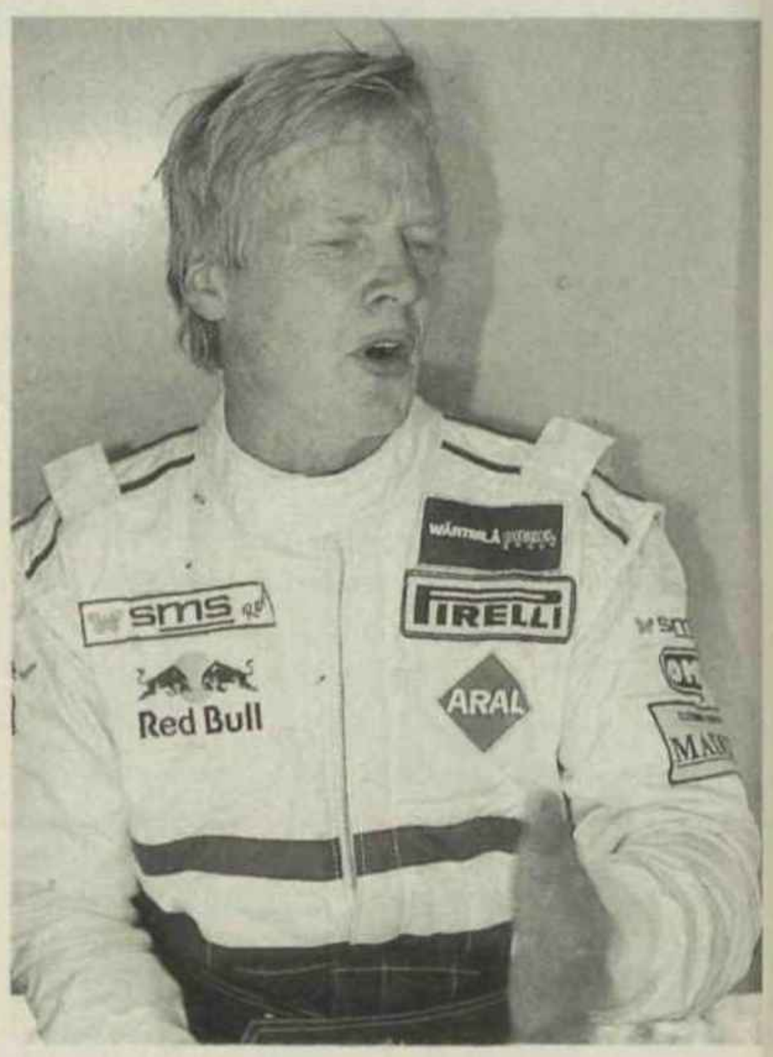
'Iaveris', who once drove rwd Escorts very spiritedly indeed, was at the wheel of an Audi Coupé S2, alongside John Alvanos, whilst up-and-coming Greek driver Aris Vovos was in a Lancia Delta integrale with Constantinos Fertakis.

Last year the rally moved its base from Lagonissi to Vouliagmeni, much nearer the city and its airport. The rally itself went nowhere near Vouliagmeni, for the start was, by tradition, at the foot of the Acropolis hill in Athens, the two night stops at Kamena Vourla, on the southern coast of the Gulf of Maliakos, and the finish at the Peace and Friendship Stadium close to Piraeus. Its 900-mile route, with 33 special stages totalling 312 miles, remained entirely within the main land mass, from Athens in the south to Lamia and Gardiki in the north.

During practice it became evident that the leading cars would be at a disadvan-







Malcolm Wilson (at service, above) did a good job as François Delecour's stand-in, and was the only works Escort driver to finish. Miki Biasion (above, right) dropped out with oil pump failure. Wilson's place in Argentina will be taken by Ari Vatanen (right), who guided a Schmidt Escort to fifth in Greece. Far right, Didier Auriol was thwarted by a holed sump.

tage, clearing the roads of loose dirt and rubble for those who followed. On the other hand, if you were too far back you stood a chance of encountering rocks thrown into the road by the corner-cutting cars ahead. Good positions to be in were from about five to eight, where drivers would benefit from the former and not have too great a risk from the latter.

'Stratissino' was involved in a bizarre accident during practice when, engaged on a photographic session, he met his photo car head on and his Nissan was badly damaged at the front. A hasty overnight rebuilding session finally got it ready for scrutiny the next day.

When cars congregated for the start, they entered a city plagued by fumes and smog. Indeed, in the weeks before there had been city centre restrictions on private vehicles in order to minimise exhaust emission. Athens, with its enormous traffic problem, would certainly not qualify for a clean air certificate.

The first stage confirmed the predictions of the works drivers. The leading group had to cope with chippings and dirt, clearing it all away for those who followed, and fastest was McRae, running at number seven, just one second ahead of Kankkunen, running at six. Biasion, first driver on the road, was eighth fastest, 14s behind McRae.

Fujimoto collected a front left puncture, whilst Schwarz lost his brakes and broke a rear suspension arm, the subsequent repair leading to a one-minute road penalty at the next time control. On the following stage, Wilson spun, Eriksson had a halfshaft joint break, whilst Kankkunen had the misfortune of having his radiator fan blades break off. The car survived the overheating and was fitted with a new fan.

Biasion, whose intercom stopped working due to a loose plug, also had his engine overheat, but this was due to a failed water injection, which was put right soon afterwards.

On the fifth stage it was quite amazing that both Fujimoto and Wilson had their windscreen wipers fail just as they were entering a mudhole – the same mudhole! The Japanese driver escaped without damage, but the Cumbrian damaged a steering arm on a rock. Later, his handbrake stopped working. Eriksson collected a front left puncture but lost little time as he was using foam-filled tyres, but Fiorio lost something approaching four minutes when his right rear tyre went flat. His tyres were not foam-filled.

Stage six was a 14.5-miler at Stiri, and it was here that Stohl went out when his gearbox gave up. After a new one was fitted that car was fine again and, whilst Manfred went home, father Rudi took the car testing for future events. Schwarz came to the end of that sixth stage with his right rear wheel at a misshapen angle, a suspension link having broken.

Before the one hour stop at Livadia in the early afternoon, after seven stages, Bin Sulayem was out due to fuel starvation. Despite being hindered by a gearlever knob which fell off, he had been leading the Group N category, which was then handed over to Menem. Schwarz broke another suspension link and collected a minute of road penalties, whilst Eriksson had another halfshaft failure. On the first stage after the restart, both Schwarz and Eriksson had yet more similar failures, and the team wondered whether they had been supplied with a bad batch. In any event, to avoid running short, the consignment ready for shipment to New Zealand from Piraeus docks was raided so that Acropolis service vans would not run short. At the end of the leg, Eriksson decided to have his springs changed.

Biasion was not finding it easy to get used to the sequential gearchange, especially as it began jumping out of gear at crucial moments – as he was approaching hairpins, for instance. McRae was also having a selector problem, though not quite the same. He was finding the mechanism stiff, but he had to endure it until the whole gearbox could be changed at the end of the leg.

On the last stage of the day, the 10th, de Mevius stopped when his engine blew, leaving the 2wd category to the Skodas. The sinking sun made visibility ever worse in the dust, and many said afterwards that they could hardly see where they were going. Schwarz found himself without rear brakes, whilst Stratissino lost some eight minutes after going off the road, breaking a wishbone and bending a steering arm.

At Kamena Vourla, McRae led by 43s from Sainz, who was nine seconds ahead of Auriol. Kankkunen was another 9s back and Vatanen another two. The gap then to Eriksson was 38s.

On the second day the two Subaru drivers



were first and second on the road and, as expected, their lead was gradually reduced. Indeed Eriksson was fastest on the first three stages, after which he moved up to fifth. Auriol also moved ahead of Sainz into second place.

Vatanen was troubled for a few stages by an engine misfire, whilst Wilson shed a tyre from its rim. Both Biasion and Auriol were distracted by loose objects rolling around in the floorwell, in Biasion's case a stray nut and in Auriol's the centre boss of his steering wheel.

"The FIA decided to check the cars and the procedure led to controversy and dispute"

At midday there was a one-hour stop at Makrakomi, after five of the day's stages. Here the FIA people decided to check the cars and, not for the first time, the procedure led to controversy and dispute. After McRae's car was checked, the bonnet was lowered but the securing pins were not placed properly in position. Soon after the car left, the bonnet flew open, breaking the windscreen.

After removing dangerous glass frag-

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ments, the crew continued and arrived at the start of the next stage on time. But they were not prepared to start the stage without a screen so they asked officials if they could have the screen replaced and this was agreed after the officials on the spot had consulted rally headquarters on the radio. What happened next has been reported somewhat differently elsewhere, but the following is what I *understood* to have happened.

McRae was offered a gap of six minutes between himself and whichever car was in front of him when he was ready to start the stage, but the Scot did not take too readily to this and placed his car so that it effectively blocked the road whilst the screen was changed. Later, all of 29 minutes later, the new screen was in place and the stage was restarted, McRae still first on the road. Mechanical repairs are allowed in closed park areas, including control zones, but time penalties can be imposed and in this case McRae was told that he would be penalised 14½ minutes. Unhappy about this, he continued, later to place the matter before the stewards at Kamena Vourla.

Soon afterwards, on the toughest sector of the rally, the Toyota challenge crumbled when Auriol hit a gigantic rock and smashed the sump, and then Kankkunen suffered a rear suspension failure that cost him five minutes and any chance of victory.

Later that night, discussions between Subaru team management and the stewards continued until the small hours, but eventually the stewards decided, unanimously we understand, to ignore the matter of the penalty but to exclude McRae from the event for the "unsporting" conduct of placing his car so that it blocked the road for other competitors.

In the morning, when the decision became known, various emotions were expressed, from outrage to total detachment. But we can't help feeling that a Ford man best summed up the situation by saying that, even after a scrutineers' check, it was a driver's responsibility to ensure that the bonnet pins were replaced properly so that the car was safe to be driven. Had that been done, the incident would not have arisen.

Meanwhile, Ford lost Biasion before the end of the second leg when his oil pump driveshaft broke, whilst McRae was slowed by a broken wheel bearing, allowing Sainz to finish the leg in the lead, 7s ahead of his Scottish team-mate. Kankkunen survived another radiator fan failure, whilst Wilson lost third place to Schwarz when a turbocharger pipe split. At the end of the leg, both the engine management electronics and the cylinder head gasket were replaced on Wilson's car, both having been adversely affected by overheating. The turbocharger itself was not replaced until the next morning.

On the final day, Sainz started with a healthy 4m 18s lead over Schwarz, with Wilson another 30s behind. There were no heroics by the Spaniard at this stage. Subaru had lost the chance of a one-two and he was not about to put his first place at risk.

Schwarz had a heart-stopping moment on the first stage of the day when a tractor crossed the road in front of him on one of the faster sections. But the most severe blow was that dealt to Wilson when he bent a steering rod and finished the stage with his front wheels splayed.

No service was allowed between that stage and the next, so Wilson applied a good measure of old fashioned rallymanship by getting out the jack and a length of rope and enlisting the services of a convenient tree. He straightened the rod as much as he could and continued, but the whole episode cost him a great deal of time, including a substantial road penalty. Less enterprising drivers would probably have retired on the spot, but the wily Cumbrian was determined to get his car to the end. He eventually finished sixth, but would have been fourth or even third had it not been for this mishap.

Schwarz continued to have trouble with his brakes, despite another change of calipers and discs, whilst Vatanen had to work rather hard when his power steering failed in the third stage of the day. Later, he had a halfshaft break.

As the rally progressed towards Athens, so Sainz began setting fewer best times. But this was not because others had suddenly become faster; the Spanish driver had such a lead over Schwarz that he could afford to ease off to avoid taking risks. When he finished first, his first World Championship win since the RAC Rally of 1992, there was jubilation in the Subaru camp, but this was tempered by the needless loss of McRae.

G P

"The Scot did not take too readily to this and placed his car so that it effectively blocked the road"

Acropolis Rally — May 29-31 1994

1	Carlos Sainz / Luis Moya (E)	Subaru Impreza 555, GpA	6h 36m 38s
2	Armin Schwarz / Klaus Wicha (D)	Mitsubishi Lancer Evolution, GpA	6h 40m 39s
3	Juha Kankkunen (SF) / Nicky Grist (GB)	Toyota Celica 4wd, GpA	6h 42m 31s
4	Alessandro Fiorio / Vittorio Brambilla (I)	Lancia Delta HF integrale, GpA	6h 50m 58s
5	Ari Vatanen (SF) / Fabrizia Pons (I)	Ford Escort RS Cosworth, GpA	6h 52m 03s
6	Malcolm Wilson / Bryan Thomas (GB)	Ford Escort RS Cosworth, GpA	6h 59m 25s
7	Yoshio Fujimoto (J) / Arne Hertz (S)	Toyota Celica Turbo 4wd, GpA	7h 09m 30s
8	Aris Vovos / Kostas Fertakis (GR)	Lancia Delta integrale, GpA	7h 19m 15s
9	Emil Triner / Jiri Klima (CZ)	Skoda Favorit 136L, GpA	7h 37m 02s
10	Pavel Sibera / Petr Gross (CZ)	Skoda Favorit 136L, GpA	7h 37m 46s

World Rally Championship points after five of 10 rounds

Drivers – 1 Juha Kankkunen and Carlos Sainz 57; 3 Didier Auriol 47; 4 Massimo Biasion 30; 5 François Delecour and Ian Duncan 20; 7 Armin Schwarz 19; 8 Kenjiro Shinojuka 15; 9 Bruno Thiry and Andrea Aghini 12.

Manufacturers – 1 Toyota 91; 2 Subaru 78; 3 Ford 54; 4 Mitsubishi 27; 5 Renault and Skoda 4.

Historic Hunsrück

One of Germany's best known events is the Hunsrück Rally and it is not surprising that an event for historic cars takes place in conjunction with the rally. The Historic Hunsrück Rally is not really a rally at all, but an informal get-together of people and cars involved in the sport many years ago. In the words of the organisers, "Life is serious enough. Now we talk about fun; no sport of whatever age."

Owners of any rally car built before 1987 are invited to contact the organisers of what is described as a carnival rather than a speed event. There will be no real competition, although stages can be tackled if drivers wish. Indeed, cars, drivers and co-drivers can all be changed at will during the event. Last year, Björn Waldegård drove five of the 37 cars attending, proclaiming later that, despite his long and distinguished career, he had never driven any of them before.

The event takes place from August 5-7, and the base will be at the town of Baumholder, about 60 miles east of Luxembourg. The whole route will be on tarmac, although those intending to drive with spirit should note that it is rather bumpy in places. Everything is optional. You drive when you want to drive. It's as simple as that. Furthermore, the route leads back after almost every stage to a central area where service vehicles and catering will be laid on by the organisers.

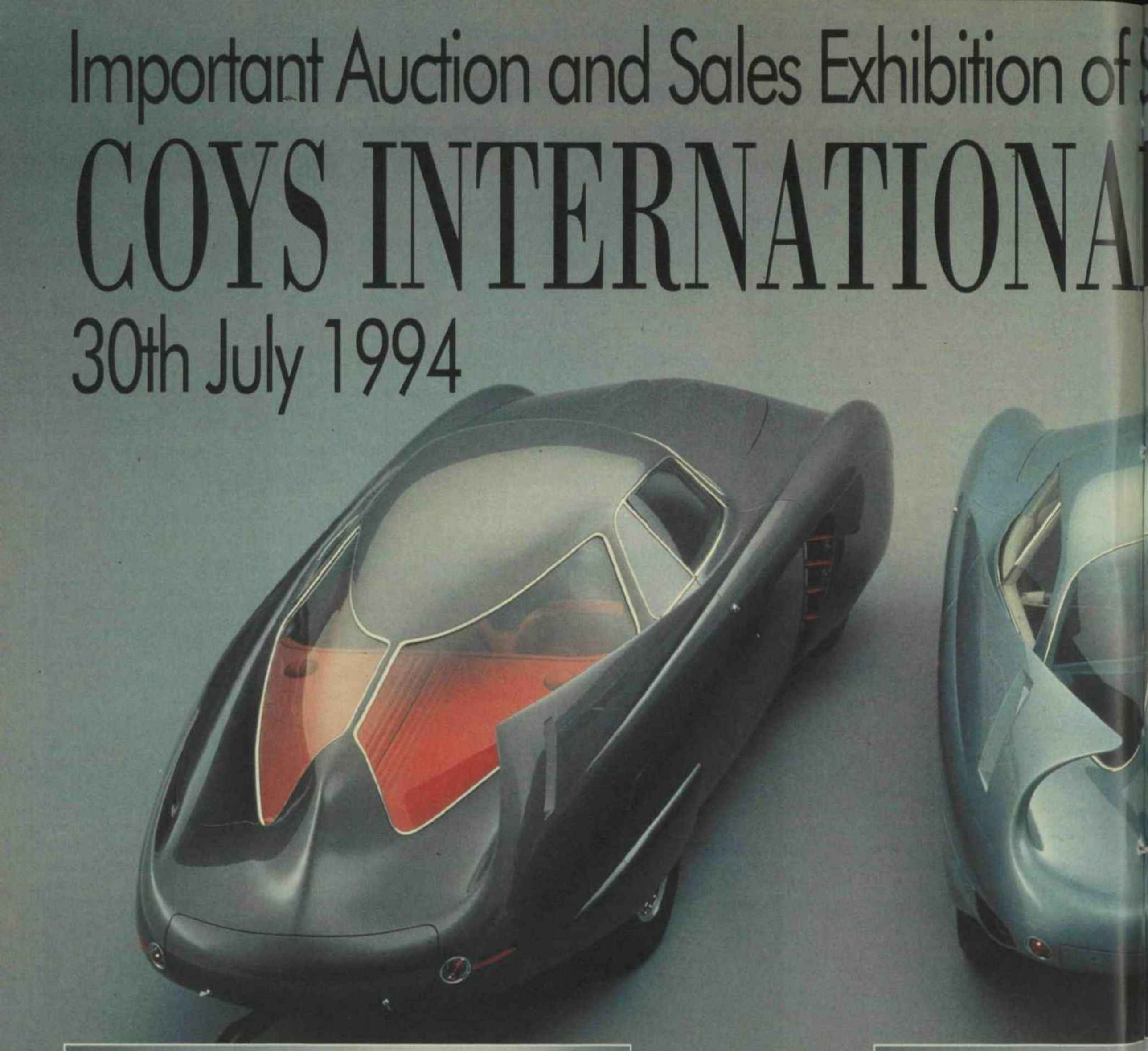
For more information, contact Reinhard Klein, In der Rosenau 19, 51143 Köln, Germany. Telephone & fax: 010 49 2203 82718.

Alessandro Fiorio took his tried and trusted Delta to fourth (above).
Despite brake troubles, Armin Schwarz hung on to take second for Mitsubishi (below).

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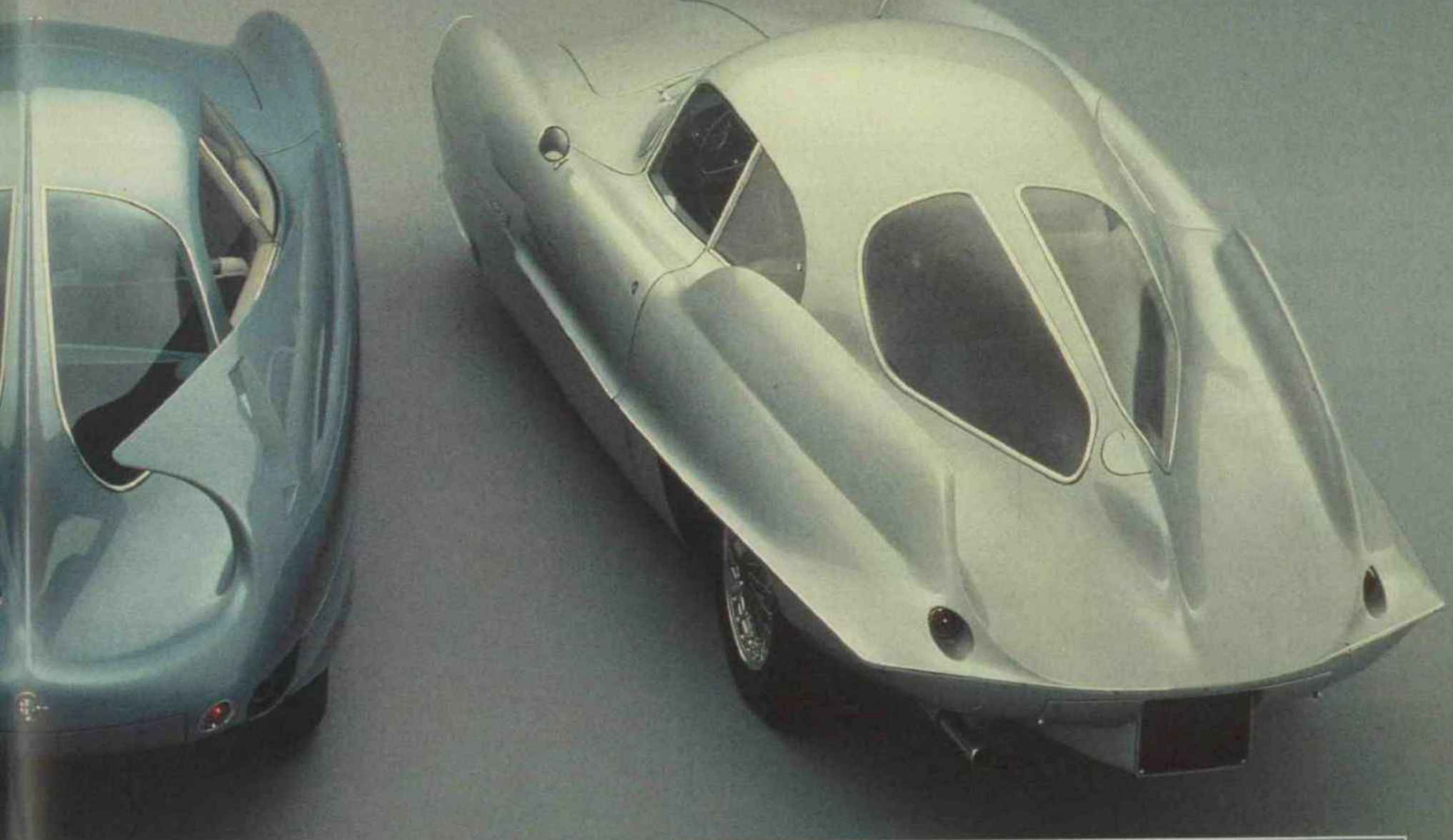
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Treble top

Three races; three different winners; three drivers sharing the championship lead; was Formula 3000 ever anything other than congested?

What has been the best news for Formula 3000 drivers in recent weeks? On a personal level, Gil de Ferran and Massimiliano Papis will have drawn great satisfaction from their victories in Pau and Barcelona, respectively. The most *significant* development, however, was the sight of David Coulthard's Williams running in the top six during the Spanish and Canadian GPs.

Coulthard earned his F1 spurs through desperate circumstances, but if he felt any pressure at being asked to replace the late Ayrton Senna it barely showed. After Barcelona, you could tell that a number of seasoned F1 observers, not many of whom are clued up on matters F3000, were genuinely impressed. "He's good that Coulthard, isn't he? I suppose there are a few more like him in F3000 are there . . . "

Indeed there are.

David's cheery good manners and down-to-earth commonsense will be missed henceforth in the F3000 paddock, but at least his departure subsequently provided the formula with one of its best advertisements.

The effective removal of the Scot from the championship fray doesn't make things any clearer. After what had happened to him at Pau in 1993, who could have imagined that Gil de Ferran would return to conquer the streets of the south-western French town so comprehensively 12 months later?

The Brazilian stuck his PSR Reynard on pole by a copious margin, and not only became the first man ever to have led an F3000 race there from start-to-finish (and this was the 10th time the formula has graced the track), but he did so under continuous, and extreme, pressure from Vincenzo Sospiri, whose terrier-like persistence is matched only by his consistency.

In the first three races, Sospiri has finished fourth, second and third. It is a reminder of the extraordinarily regular form he showed last year, and a tribute to the way that David Sears' new Super Nova team has adapted to F3000. It has also given Sospiri a share of the series lead, with de Ferran and Silverstone winner Franck Lagorce.

While Lagorce has finished fifth in each of the past two races (driving splendidly in Spain to recover from 16th on the grid), de Ferran missed out in Barcelona. Like Lagorce, he had skated off the circuit in second qualifying, which left him a stupefied 18th. His opening burst was extraordinary: by the end of the first lap he was ninth, and not long afterwards eighth. Others' retirements then hoisted him to fifth, but a misfire forced his retirement and deprived him of the opportunity to retain the outright series lead.

De Ferran's win in Pau gave the Zytek-Judd KV engine its first victory since Barcelona 1992; upon F3000's return to the Circuit de Catalunya, it promptly racked up another.

Massimiliano Papis had never previously looked like winning an F3000 race. He'd been a top six runner on numerous occasions, but his form in Spain made you think he'd been winning in F3000 for eons.

There were undoubtedly sound technical reasons for Papis's success. After all, Mythos engineers Roberto Trevisan and Giorgio Breda had prepared the Il Barone Rampante Reynards which finished 1-2 at the same venue two years earlier.

There were deeper, emotional reasons too.

Papis is a thoughtful character, a man with compassion and soul. When he arrived in Barcelona on the Thursday before the race, he had been reduced to tears by the sight of the Williams transporter. Massi had been a close friend of Ayrton Senna's and, indeed, the whole Senna family. The relationship stretches back to karting, when they both raced, at different stages, for the same team.

"Although I was very sad when I saw the truck, I felt as though I drew something from it. I felt like there was someone watching me, looking after me. In the car, I felt very strong, like whatever I did would be OK."

You had to wonder. The only man who could hold a candle to the Italian, Jules Boullion, stalled at the start of the parade lap and was relegated to the back of the grid.

Thereafter, Papis absolutely walked it, leading home team-mate Fabrizio de Simone in a convincing 1-2 for Mythos. Boullion gave a hint of what might have been, scything his way into the top 10 at enormous speed. Sadly for the Frenchman, it was a question of too much haste: he had skated off by lap 10, having already set fastest lap.



Unmistakably Pau (main shot): Guillaume Gomez heads for sixth; the return of Allan McNish (above) was brief, but impressive.

The fact remains, though, that Boullion has just scored three points, in Pau, from three races, which is somewhat below pre-season expectations. Lagorce apart, the government-backed Frenchmen haven't been faring all that well. Didier Cottaz drove a stormer to finish third in Pau, where Guillaume Gomez came sixth after wrestling with a damaged front wing from the first lap, but Emmanuel Clérico has been unlucky (despite running with the leaders in every race to date) and the new Danielson team has found the learning curve steep.

Danielson's Nicholas Leboissetier was fortunate to leave Pau with no more than a bruised thigh after suffering one of the most violent accidents since the European F3000 series was conceived 10 years ago. The Frenchman smacked the wall at the flat-in-

fifth kink past the pits, tearing off two wheels and, with it, a couple of brake lines. No steering; no brakes; around 160 mph . . . Leboissetier's Reynard was transformed into a high-energy pinball, clouting the guardrail with sufficient force to bend it in three separate places before the car was finally launched into a roll from which it emerged, the right way up, in an escape road. The final impact, with the *top* of a barrier, sent a pack of photographers diving for cover. Their escape was every bit as fortunate as the driver's; motor racing might have had a grim time of it thus far in 1994, but don't let anybody kid you that the cars themselves aren't inherently strong.

Of the rest, Lola was encouraged by the improved form, in Spain, of its T94/50. Jordi Gene and Marc Goossens finished in the points with their Nordic entries, while Omegaland's efforts to build up a brand new car for Oliver Gavin (following an accident in Pau that caused him to miss the race) were rewarded when the Englishman hauled his way into an early fourth place. Sadly, an early trip across a kerb tweaked his front suspension and the resultant understeer built up and up. . .until Olly slithered out of the contest. It was a promising augury, all the same.

Forti's two recruits, Hideki Noda and Pedro Diniz, have both revealed hitherto unseen speed. What they need most of all is to combine that with the art of finishing races. Noda ran as high as second in Spain, but had spun away his chances by lap six. . .

And spare a thought for Vortex. Having lost Coulthard to Williams, the team has subsequently been thrown into turmoil. Paolo delle Piane had a massive testing accident at Pembrey (he escaped with a shaking), and Tarso Marques crashed during on his first formation lap in Spain, necessitating a night in hospital for observation.

The one bright spot was one-race recruit Allan McNish's form in Pau. He ran a strong sixth in his first race since September 1992, before a post-kerbing suspension breakage pitched him into the wall. On lap eight. . .

Away from the track, the formula remains its fluid, unpredictable self.

When the Vallelunga race, originally scheduled for June 5, was postponed, teams breathed a sigh of relief, for it averted the threat of having races on three successive weekends. And now . . . Vallelunga is shifted to September, six days before a new race in Estoril, which replaces the cancelled Nogaro event, which . . .

The upshot is that the series concludes with three races in successive weekends, and the teams must wrestle with the logistics of hauling their material goods from Vallelunga to Estoril in three days: not a lot, given the distances involved, possible damage repairs and the time required to set up the cars once they get to Portugal. Rome wasn't built in a day, nor was the journey from there to Cascais ever completed within such a time framework. Leastways, not in a 38-ton truck full of racing cars.

The good news, of course, is the confirmation of a fourth F1 support race, the first time that there have been so many such fixtures since 1985. It's a shame that these things can't be decided during the winter break, rather than halfway through the season, but better that it should happen late than never at all.

The loss of Nogaro will be rued by gastronomists, but probably not by those who regard motor racing as a professional activity. The environs of the Circuit Paul Armagnac are a culinary delight, but assessed objectively the fact remains that its facilities fall way below the standards with which F3000 wishes to be associated. And besides, the return of the formula to Portugal adds a touch of balance to the schedule: the nine rounds will now take place in seven different countries.

All of this was announced at a meeting of the FIA General Assembly in Geneva on June 3, when it also became apparent that F3000's technical regulations will not be tampered with to the same degree as F1's. The two-year chassis stability rule, thrashed out last winter by teams and constructors, remains intact, though engines are likely to be subject to detuning at some point.

"It is," said one team manager, "about the only time I can recall being pleased that the FIA has ignored us . . ." SA



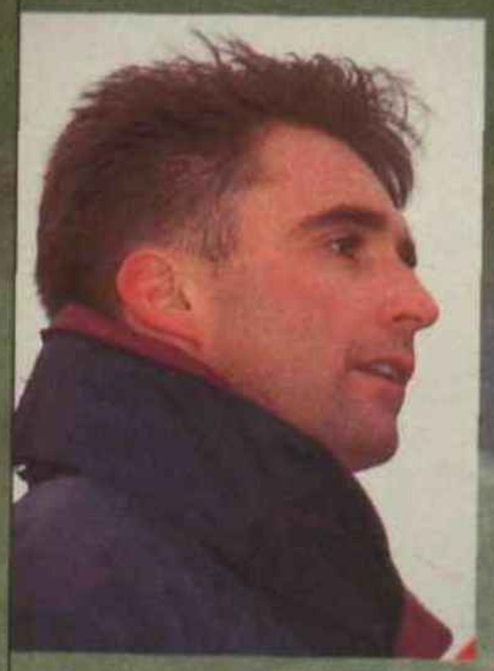
Gil de Ferran (left) and Vincenzo Sospiri charge for the first corner in Pau. They were never much more than this far apart all afternoon . . .



Happiness is . . . Massimiliano Papis's joy was absolute in Barcelona, after his first F3000 win.



Omegaland built a new Lola in two days, and Oliver Gavin hauled it into fourth place in Spain. Sadly, the Engishman was an early retirement.







Winners all: Radisich (top), Cleland (above left) and Menu (left).

Fair share

The dust is settling in the BTCC. As it does so, our columnist finds himself holding a share of the championship lead

Sorry if this column sounds a bit snuffly – I've got hayfever! It gets to me sometimes – rather like Vauxhall Cavaliers!

I got a bit of a shock at Donington; I finally beat the Alfas in a straight fight, I build up a three-second lead . . . and then John Cleland comes right by me. It was a big disappointment; if you build up a lead like that you normally have to do something stupid to lose it, but he just hauled me in as if he had a line on me, and there was nothing I could do about it.

Practice had gone well and it finished with my first pole position of the year. We've struggled so far this season to get the best out of the Ford Mondeo in qualifying, but eventually it all clicked.

I made the most of this by making a good start and it was all looking good for my second win of the year. Then I hit an invisible barrier at around lap seven or eight. It was a very hot day, and although I had been trying to drive smoothly to save my Michelins and the brakes, I suddenly lost front-end grip and John was able to get by.

He carried a lot more speed than me into Coppice and was able to push me wide. We touched very slightly and he lost his wing mirror, but it wasn't too bad. I'd have never been able to hold him off anyway. I think maybe Dunlop had come up with a better tyre for the hot conditions, which, apparently, is all linked in with this shiny, yellow thing in the sky. Thankfully, you don't see it too often over here! I just wish it would go away and take the pollen with it!

John got the drop me at the start of the second race, but I was surprised how slowly he went on the first lap. In fact, I passed him on this lap when I went round the outside of him at Coppice. He was going so slowly that I was able to get by and still claim my normal line for the corner. But I think he knew the score in the grip stakes.

Once again I was able to pull out a sizeable lead. . .but here comes lap eight again, and there goes John's line attaching itself to my rear bumper once more. As in the first race, I was powerless to stop him.

Still, two second places is not too bad, and I'm now tied with Alfa Romeo's Gabriele Tarquini at the head of the series. Consistency is always important, but it is absolutely vital in this season with every race counting for maximum points. The double-headers are particularly difficult. You've got to think it out. You've got to be fast because the points are biased heavily towards the first three places, but you can't afford to make a mistake in the first race; one stupid manoeuvre can bugger up your whole weekend.

Consequently, the wholesale points changes over the last couple of weeks caused by the row over Alfa's wings have played havoc with my state of mind. One minute I had a 30-point advantage and I'm thinking that I can take it easy, and the next I'm 24 points behind and thinking that I've got to win. I don't feel sorry for Gabriele. That's not malicious, it's just honest. Motor racing is full of ups and downs, and we've all experienced them. We're all out there to win the championship and you have to take what's coming. I know exactly what's he's gone through in the last few weeks, but I've had to just get on with it, and so has he.

I'm just glad the wrangling has all be sorted out now, whatever the outcome; it would've been awful if it had been allowed to rumble on right through the season. At least we all now know where we stand, and I feel that it has been given back to me, that my destiny is my own hands.

I'm quite happy to be in this position at this stage of the season. At the start of the year, when the Alfas were rushing off into the distance, we were all really worried that we might not catch them. But we have now shown ourselves to be on their pace, and when they have to push their splitters back on July 1 I expect them to lose maybe two tenths a lap. Despite this, I still anticipate Tarquini as being the man to beat. But you can't discount anybody in this series; I was concentrating on Gabriele at the start of the first Donington race, and it was John's Cavalier that came rushing by! He's been a bit up and down at the start of the season, but I expect him to the other big threat to my title ambitions.

Perhaps Renault's Alain Menu is also in with a chance of the championship. We had a very close look at each other at Oulton Park, where he took the lead away from me with a very optimistic move. Basically, he gave me a couple of taps from behind and was thus able to get by. I don't think he did it on purpose, and he showed that he had the quicker car once he got by me – but it was still an optimistic move!

The BMWs, with their new wings and reduced weight, will also come more to the fore in the second half of the season, although their chance of the championship looks to have gone.

Alfa and Ford at Silverstone, Renault at Oulton Park and Vauxhall at Donington Park – it's all very close, very fraught and very high pressure. To get away from it all I like to relax with the odd oval race and by racing a 300 bhp sportscar on slicks in the rain!

I was invited to do a couple of Eurocar (Europe's planned answer to NASCAR) races at Mallory Park recently. This was a really good day out because I won both! These cars have Mondeo bodyshells which are bolted onto specially-made spaceframes and powered by a three-litre V6s. They have a lot of built-in stagger that makes them want to turn left all the time. They were good fun to drive, and in terms of speed didn't feel far short of the BTCC Mondeo, although it was a case of building up the speed and keeping it on rather than accelerating from corner to corner.

The sportscar I drove was a ProSport 3000, which was intended as a form of single-seater practice. But I had very little testing in it and got caught out, because, for once in this country, it rained! I decided it wasn't worth risking the car and called it a day. I'm just going to have to get into a F3000 car to get up to speed.

Get up to speed for what? A Benetton test next month, that's what!

Keep reading. . .

P R

The price



Penske's successful exploitation of the Indy 500 rules could spark a costly new wave of engine development

The 78th Indianapolis 500 was a strange race in most ways that matter, a fitting conclusion to a month of May which bordered on the bizarre.

In contrast to expectations, the cauldron of rumour, innuendo and speculation that annually serves as the backdrop to the "Greatest Spectacle in Racing" was quiet; eerily so, given Indianapolis Motor Speedway president Tony George's March 10 announcement that IMS and the United States Auto Club would soon be revealing plans for their own IndyCar series.

Ironically, instead of stock blocks, oval tracks and grassroots drivers, the hot topic of conversation was. . .food.

In a move that irritated team owners, led to rampant indigestion and left many observers pondering the sincerity of the entreaties for reduced costs emanating from Georgetown and 16th, the Speedway decreed all hot food served by the teams at the Brickyard had to be prepared by an officially licensed caterer. Not only did teams face food bills four and five times more than in the past, but the fare itself was generally suited to a mess hall.

But it wasn't *just* the food that had people up in arms. The United States Auto Club introduced a new pop-off valve designed to eliminate the inconsistencies associated with the old valves. But the valves were no discernible improvement over their predecessors and, in the case of the 55 in settings for the Mercedes-Benz engines, proved intractable at times. What's more, the teams were forced to lease one valve per entry for $1500 – non-refundable of course – for the month. Small change perhaps, but enough to raise more questions about reduced costs.

Then there was the deafening silence from George and USAC regarding their new series. Was it because Tony and USAC have become Penske-like in their abilities to keep a secret? Or was it, as many are beginning to suspect, there was little planning done before that fateful announcement in March.

Meanwhile, Andrew Craig and CART were hard at work on long-term sanctioning agreements with the tracks on the current schedule. Indeed, the week before the Detroit Grand Prix 11 of the 16 tracks on the 1995 schedule (all but Indianapolis, Phoenix, Long Beach, New Hampshire and Laguna Seca) plus new venues at Miami and California – reached agreements with CART lasting up to the year 2000. With Laguna Seca expected to join ranks shortly and New Hampshire leaning in that direction, these agreements – particularly with the Penske Speedways – have, at the very least, put CART in a powerful bargaining position with

# of success

Tony, and quite possibly pre-empted his series altogether.

Back to the Brickyard, where practice and qualifying went off with less than the usual sense of urgency. Perhaps this was because most observers conceded the front row – if not the race itself – to the Mercedes-Benz powered Penskes. The only question seemed to be whether or not the Penskes were "sandbagging" in order to avoid the possibility of draconian measures slapped on them by USAC at the 11th hour. Certainly their straightline trap speeds of 245 mph – six to 10 mph faster then the quickest Fords (coupled with overall lap speeds little better than the rest) supported that speculation. On the other hand, the fact that Paul Tracy deposited his Penske-Merc in the wall suggested the Marlboro cars were on the ragged edge – like everyone else.

Besides renewing speculation that his days with Penske are limited, Tracy's shunt opened the door to a spot on the front row which Raul Boesel was only too happy to walk through, thanks in part to a favourable draw that saw him qualify in the cool of Saturday morning. As has been the case in recent years, the rest of the grid was something of a lottery based on the weather. Given the contemporary Indy chassis's fantastic sensitivity to minute mechanical and aerodynamic adjustments at 225 mph, it should come as no surprise that a 10 or 15 (Fahrenheit) degree shift in temperature can make a tremendous difference in speeds.

In the end, Al Unser Jnr qualified under relatively favourable conditions, as did Lyn St James and Hideshi Matsuda, while Emerson Fittipaldi, Mario Andretti, Nigel Mansell and Jimmy Vasser didn't – as reflected by their speeds.

A couple of entertaining sideshows developed in the form of the lacklustre performance of the Honda-powered Rahal/Hogan machines and the terrible showing of the Budweiser/King team. For more than a year the Rahal/Hogan people have been telling Honda that its engines are short on power, and for more than a year Honda has promised gradual gains. The stopwatch and trap speeds at Indianapolis told the true tale. While Fittipaldi and Boesel each topped 230 mph in *lap* speeds, neither Bobby Rahal or Mike Groff broke 227 – in *top* speed. And so after struggling at 220 (Rahal) and 218 (Groff), Rahal/Hogan had little choice but to switch to an alternative plan, in this case, '93 Penske-Ilmors which they duly qualified comfortably.

The performance of Budweiser/King was embarrassing, both to Lola (Bud/King is, after all, the official "development team") and team owner Kenny Bernstein. After turning a 222 in pre-May testing, Scott Goodyear spent the first week struggling to top 220, waved off a high 221 on Saturday, then crashed while trying to get back to 220 that afternoon. The following week saw a steady regression to 214 before Davy Jones was brought in for a fresh perspective and duly lapped at 214. The team then began working on getting not one but two cars in the show with Goodyear eventually taking a 220 and getting bumped, while Davy turned a sizzling 224 in the cool of the day and then had to yield his seat to Scott. By Detroit, a new management structure was in place with veteran team manager/engineer John Dick replacing sportsman John Dengler at the helm.

So the second weekend of qualifying was all but over on Saturday when Bud/King and Rahal/Hogan qualified, leaving a long day on Sunday that resulted in a single successful qualifying run.

The race wasn't a whole lot more exciting. The Penske-Mercs of Fittipaldi and Unser were simply the class of the field and those that might have at least kept them honest – Michael and Mario Andretti, Nigel Mansell, Eddie Cheever, Gordon and Boesel – all ran (or were run into by) problems.

After Unser and Fittipaldi left Boesel in the dust of the most ragged start since 1982, Michael Andretti gave chase until a stop to replace a punctured tyre cost him a lap. Mario's final stab at a second Indy 500 win ended appropriately, if not successfully, when he retired with a broken fuel relief valve. Boesel was slowed by an overheated engine, Gordon lost time early with handling problems and Mansell and Cheever were both penalised for real – or imagined – infractions of the pit lane blend line.

Mansell recovered to third place but was taken out in semi-comic fashion when, during a caution period, his Lola-Ford was assaulted from behind on the warm-up lane by Dennis Vitolo. Thinking he was about to be consumed by a methanol fire, Nigel bailed out and was subsequently taken to the infield hospital where an ugly scene ensued. After some terse interviews, Mansell stormed back to his home in Clearwater, Florida.

Subsequently, Mansell launched into a tirade about the absurdity of having a driver like Vitolo – who had not driven an IndyCar in a year – competing in the Indy 500. It's a valid point. But it's also true that Vitolo played by the rules and made the race and hardly by the skin of his teeth. Nor was he alone in not having raced an IndyCar in some time; the same could be said about Matsuda, St James, Geoff Brabham, Stan Fox and Gary Bettenhausen.

The second half of the race thus boiled down to a battle between Fittipaldi and Unser with Jacques Villeneuve hanging on to the lead lap for dear life. As measured and brilliant a drive as Villeneuve's was, there was never much doubt that either Fittipaldi or Unser would win.

And for more most of the race, it was all Fittipaldi.

After Unser stalled on the first pit stop, Emerson led 145 of the next 163 laps and put Al a lap down at the 450 mile mark. But a few laps later Al regained the lead lap after Emerson got bogged down in traffic. On lap 184 Emerson was poised to go up a lap again when he clipped the inside kerb in Turn Four, wiggled once in a valiant effort to save it and slid into the wall.

In defeat, he was utterly gracious.

From there it was just a case of driving it home for Unser, and with Stan Fox crashing to bring out another yellow on lap 197, he didn't even have to race to the finish. Unquestionably, Penske Racing's seventh Indy 500 win in the last 10 years – and 10th overall – was one of its most impressive. Not only did it dominate the race, it dominated the month. What's more, the manner in which it achieved such domination – by embarking on a parallel programme to the 'standard' IndyCar effort – proved beyond the shadow of a doubt that this is the most powerful team in the discipline.

But the 1994 Indy 500 was also Penske's most controversial win. Nobody with any racing sense can fault Penske for exploiting USAC's engine rules; they have been there for all to see for three years and, as Roger Penske himself noted, the physical changes to the Indianapolis Motor Speedway last year placed a greater emphasis on torque – which the Merc had in abundance.

The question is the wisdom – or lack thereof – of the rule that gave 209 push rod engines 10 in more boost than the "conventional" 2.8-litre overhead cam engines. Despite the results, despite cries from nearly every corner ridiculing "equivalency formulas," there is no reason to believe the 209 won't be eligible again in 1995, albeit in slightly less potent form.

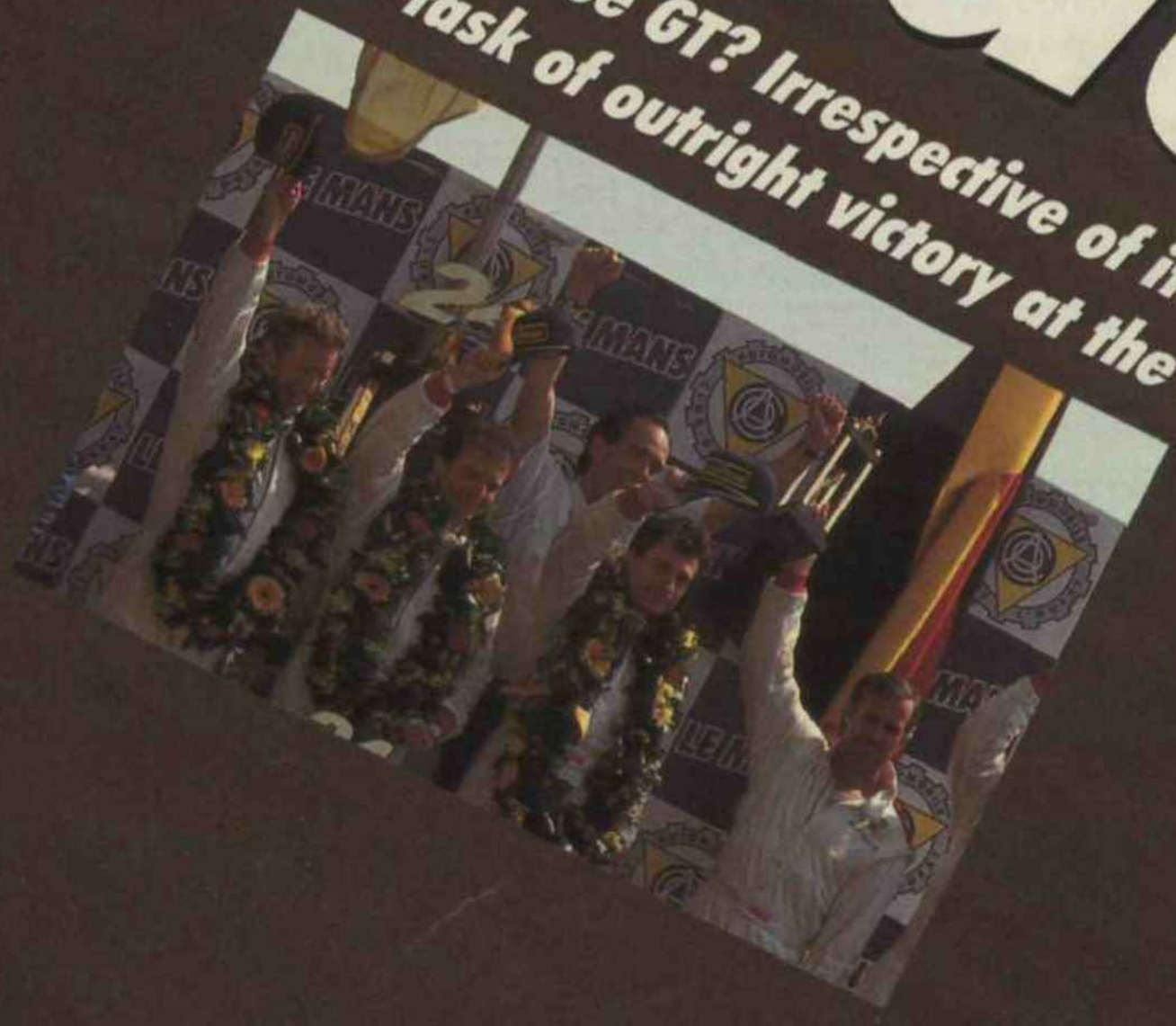
"We'll have to review the whole month, not just the race," said USAC technical director Mike Devin. "That thing (the Mercedes) had periods of dominance in practice but we also have to go back and review the race itself. Emerson (Fittipaldi) was on a roll; he was going for it. But Al was just another lead pack car. . .I'm not sure just how domineering they were. I'm not so sure if the same team had their usual Ilmor D engines the outcome wouldn't have been the same. That wasn't exactly Andy Gump out there. It's the same guys who lapped the field at Phoenix.

"If anything, we'll take a look at adjusting the boost but how much it'll be I wouldn't want to guess."

If the rule holds – even in the form of a minor reduction in the boost advantage, Ford, Honda and Toyota will have little choice but to embark on their own 209 engine projects. And that's hardly an eventuality likely to reduce costs. . . **D P**

FATuring Dauer

Is the 962 LM really a true GT? Irrespective of its pedigree, it was up to the task of outright victory at the Sarthe



Power

The Porsche factory was successful at Le Mans every year between 1981 and 1987, a run finally ended by Jaguar, and it has taken the Zuffenhausen company seven years to return to the ACO's podium.

Porsche's 13th Le Mans victory was achieved on June 19 by Yannick Dalmas, Hurley Haywood and Mauro Baldi in a Dauer 962LM Porsche running in the Grand Touring category, and they were a single lap ahead of their team-mates Hans Stuck, Danny Sullivan and Thierry Boutsen, claiming third place in an identical 'works' Porsche.

Third?

Between the two Porsches, in fact just a tenth of a second ahead of Boutsen at the finish, was the gallant SARD Toyota 94CV (basically a 1990-spec Group C car, despite its type designation) with Eddie Irvine at the wheel.

Irvine and his Jordan GP predecessor Boutsen duelled for the final 80 minutes of the race, and the Ulsterman claimed the runner-up spot 10 minutes from the finish when the Porsche slowed, jinked between three backmarkers lining up for a photo finish, and lost momentum.

The excitement was not over even then. Boutsen, in a heavier car on narrower wheels, used the Porsche's superior straightline speed to threaten Irvine throughout the final two laps.

The flag marshals traditionally line the edge of the track whirling all the bunting in their armoury. It's a nice routine, but they seemed not to realise that Irvine and Boutsen were racing for a result.

The Toyota driver was forced to slow at the Ford chicane just before the finishing line and Boutsen made a half-hearted attempt to pass, sending the flag men running in all directions. The Belgian driver had no intention of putting anyone at risk, but he and Irvine had provided the most excitement at the finish line since 1969. If only it had been for victory!

The ACO needed a good event to continue the march back after the débâcle of 1992. The club itself is virtually insolvent and has handed over the promotional and financial aspects to the Syndicat Mixte, which will soon bring in new blood to revive the organisation.

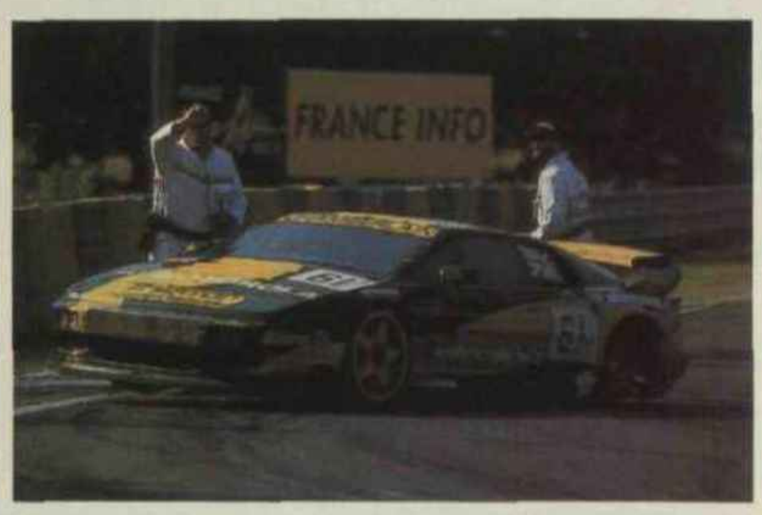
More than 80 entries were received for the race and these were whittled down to 50 invited to qualify – the process was difficult and controversial, and initially ruled out some very good teams in favour of lesser outfits.

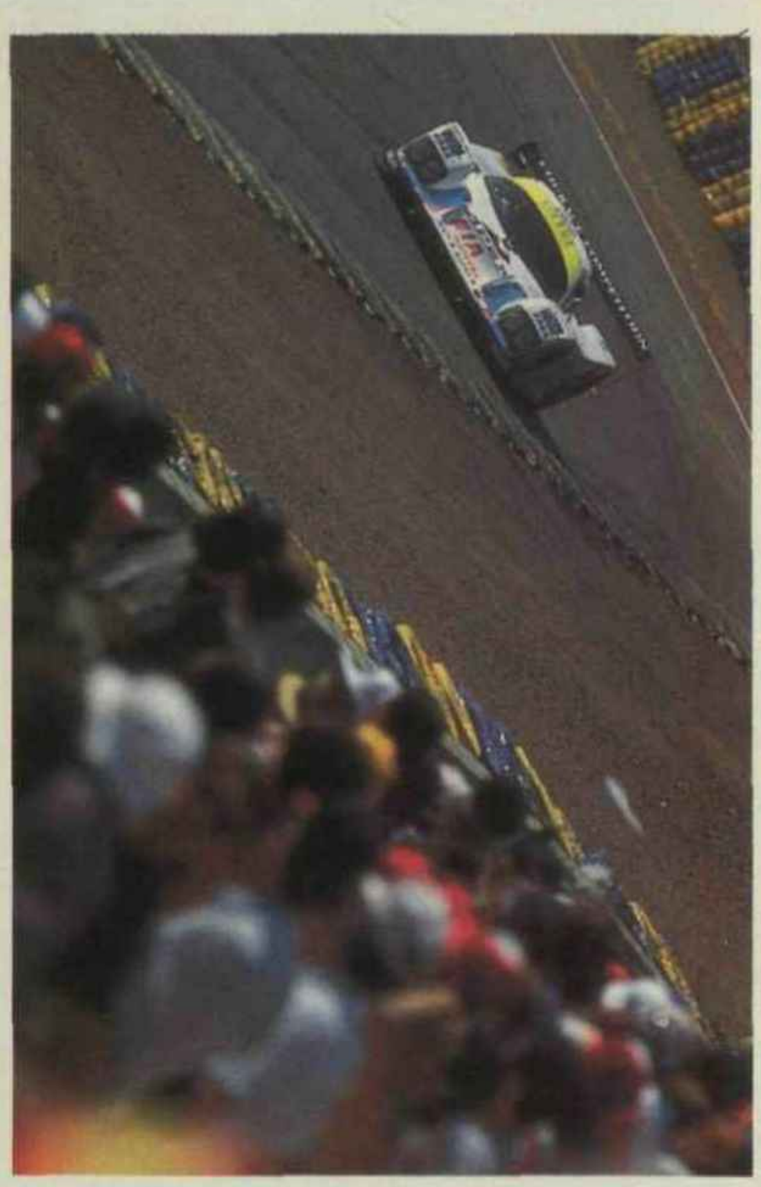
Just 48 took the start and eight manufacturers were represented: Porsche, of course, was the strongest numerically, making or powering 17 cars including the Dauer 962LM GT and Yves Courage's three Group C cars.

Toyota had two Group C cars from Japan, Nissan brought two 300 ZXs from Clayton Cunningham's workshop in El Segundo, California, and the entry included three Ferraris, six Venturis, three Kremer prepared Honda NSXs, three Lotus Esprits, two colourful Dodge Vipers, the Callaway Corvette, an Alpine Renault A610, ADA Engineering's de Tomaso Pantera and, perhaps the crowd's favourite, Michel Hommel's Bugatti EB110S.

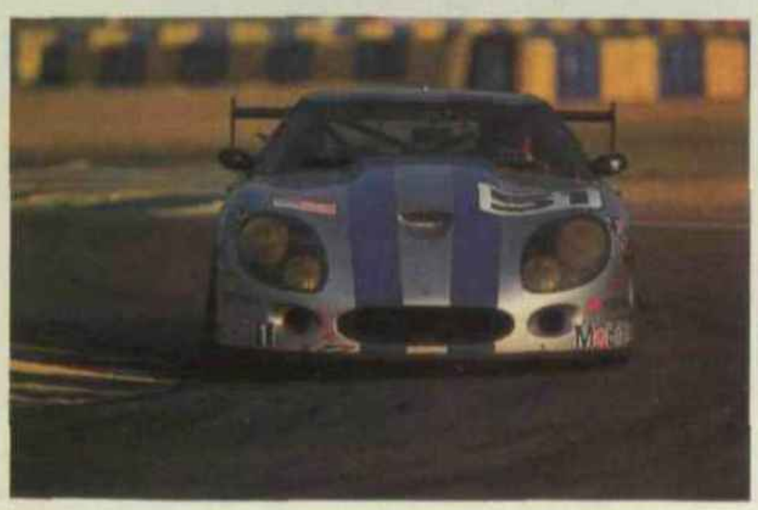
Bugatti won the race outright in 1937 and again in 1939 but the marque has been absent ever since. The second coming of the French blue car might have been a big disappointment, but it was nothing of the sort.

It qualified 17th in the hands of last year's winner Eric Hélary with Alain Cudini and Jean-Christophe Bouillon and ran second in the GT class for a while, in sixth place overall, though it was eventually handicapped by turbocharger









Neither works Lotus finished. The 61 car lost a wheel at Arnage (top). The two quickest Courages suffered engine failure (above). Fond farewell: Derek Bell pursues the GT2-winning Porsche 911 (below). The latter class was headed for a long time by the impressive Callaway Corvette (bottom).

problems.

The Bugatti's 3.5-litre V12 engine is boosted by four little IHI turbos and, on a rough reckoning, it needed six replacements in the space of 20 hours, though its demise 45 minutes before the end came when the four-wheel drive car spun spectacularly into the barrier while braking for the first chicane on the Mulsanne Straight; it was suspected that oil was breathing onto the rear tyres.

Reeves Callaway's five-litre, moose-like Chevrolet Corvette was a GT2 entry that astonished rivals by leading the class handsomely, seeing off a mighty squadron of Porsche 911 Carrera RSRs until the brakes went spongy in the night. The Corvette resumed the chase but ran out of fuel at the Porsche Curves, and was disqualified when more fuel was taken to it.

Spoiled for choice, some said that there were too many GT cars in the entry but others said that Le Mans should be reserved exclusively for GTs. This is a question that the ACO will have to answer, and they have given themselves until the end of July to publish regulations for next year's event.

Race director Alain Bertaut is adamant that the Dauer 962LM does not belong in GT1 (a view shared by many), but it was *his* wording of regulations that allowed Porsche to make a successful bid for their 13th victory with the old 962.

The meter has expired on the Group C machines, and this was the last opportunity for Toyota and Courage to challenge with their turbocharged models. Next year the Le Mans Prototype class will be promoted – even though it did not feature at all on this year's starting grid – and an accord has been reached between the ACO and IMSA to unify the LMP and World Sports Car regulations in 1995 for the Daytona, Sebring and Le Mans races. There may even be an event at Suzuka, and a trophy series could emerge.

Toyota went to Le Mans with two ostensibly private teams, Nisso Trust and SARD, though there were enough senior managers present to turn that to advantage if the dream result was produced.

TRD had helped both teams to develop new bodywork with more top side downforce to compensate for the abolition of venturi, and the cars were close to their target weights of 950 kg, pushed along by 3.6-litre twin-turbo V8 engines rated at 550 horsepower with air restrictors.

The Toyotas had duelled ferociously for fifth and sixth places last year, in the wake of the V10-powered, 3.5-litre 'prototypes', and did so once again.

Bob Wollek, still looking for his elusive Le Mans victory, accepted an invitation from Nisso Trust to join George Fouche and Steven Andskar in their Toyota, and the SARD entry had four names on the door, that of the late Roland Ratzenberger above Eddie Irvine, Mauro Martini and Jeff Krosnoff.

There was not even one token Japanese driver among them. As Martini eloquently explained: "It's the last time Roland's name will appear on a racing car, and we are doing this for him. He will help us to win."

Porsche's two entries in the GT1 category were weighed at slightly above the 1000 kg minimum and were powered by 650 bhp versions of the three-litre, twin turbo flat-six. They were some 50 kg heavier than the Nissans and were obliged to run with 12-inch wide rear wheels (the Goodyear tyres at the rear were almost identical to those at the front in recent years).

An advantage of the GT category spotted early on by Porsche's management was the regulation concerning fuel capacities. The Group C Toyotas and Courages were limited to 80 litres but the Grand Tourers and IMSA GTS Nissans could run with 120 litre tanks, giving them a definite advantage.

The Porsches' street legal bodywork, developed by Jochen Dauer's company and made by Lola Composites in Huntingdon, resembled the 962's 'long tail' configuration and Stuck's car was the fastest of all, timed at 328 km/h (203.8 mph) at Hunaudières during qualifying.

"Bertaut is adamant that the 962LM does not belong in GT1, but it was* his *wording of regulations that allowed Porsche to make a successful bid"

The days of lapping in 3m 20s and hitting top speeds in the high 300s have gone, for the time being, and the show was none the worse for it. Now, with heavier weights, narrower rims, air restrictors and flat bottoms the cars are some 30s per lap slower, where like can be compared with like, and 3m 50s was the marker for qualifying.

Alain Ferté took pole position in his Courage Porsche C32 shared with Henri Pescarolo and Franck Lagorce with a time of 3m 51.05s, and for a while it seemed that he might be joined on the front row by Patrick Gonin in the Peugeot (two-litre turbo) powered We!ter WR LM93 single seater, which weighs merely 651 kg.

Derek Bell ousted the little monoposto on Thursday evening, to the relief of purists, driving the Gulf Kremer Porsche CK8. Racing at Le Mans for the last time, he says, Bell was loudly cheered when he stepped into the open-top Porsche for the final stint, and even more loudly when he climbed out after crossing the line in sixth place after a drive shared with Robin Donovan and Jürgen Lässig.

The Englishman first competed at Le Mans in 1970 driving a Ferrari 512S. Since then he has won the event five times, won

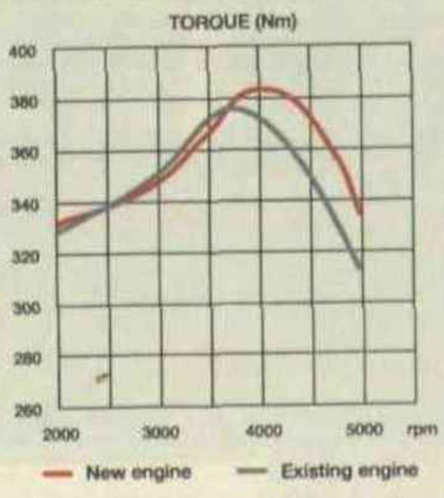


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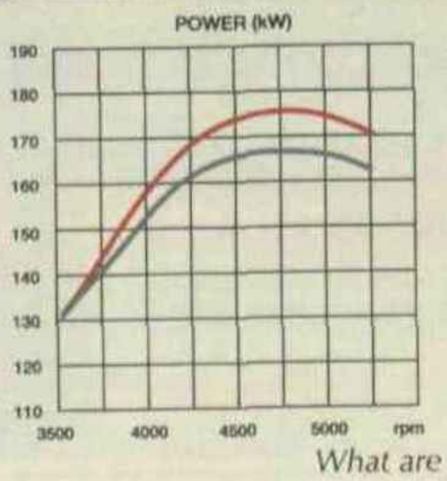
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JAGUAR

What are dreams for, if not to come true?

two World Championships, and failed to appear only once, when the works Porsches were withdrawn in 1984. It will be a while before another Briton comes along to rival this record.

Serious aerodynamic problems with the Kremer CK8 blighted the May test session and these were largely cured in time for the race, though the rear wing went curiously soft during Saturday evening and caused a worrying vibration which wasn't traced for a long time.

Bell usually left it to his co-drivers, men like Jacky Ickx, Stefan Bellof and Hans Stuck, to do the qualifying in the past decade, and he looked as thrilled as a winner when he qualified third on Wednesday evening, improving to the front row at dusk on Thursday. He led the race, too, as far as Mulsanne on the opening lap, then yielded to Ferté and went into a paced routine that he knows so well.

The pattern of the race was quite clear after an hour of racing. The Group C Toyotas and Courages were in the pits for fuel after 40 minutes but the Dauer Porsches went almost to the hour. Since their lap times were comparable, a 'works' Porsche victory looked to be a real possibility.

The front-engined Nissan 300 ZXs were not as challenging as they had been at Daytona and Sebring, and there were no midnight surprises for their rivals. One Nissan shared by Eric van de Poele, Paul Gentilozzi and Shunji Kasuya lasted less than two hours before a suspected turbo problem turned out to be something more serious.

The other, driven by Steve Millen, Johnny O'Connell and John Morton, was gradually outpaced by the Toyotas and Dauer Porsches. The Nissans had the advantages of the 120 litre tankage and wide tyres, but had got nowhere near their 1000 kg minimum. . .the 200 kg of excess weight carried by Millen's car was too much of a burden, and the eventual fifth place almost *felt* like a victory to the popular, hard-working team.

The two Dauer Porsches were leading the field at the two-hour mark, pursued by the Nisso Trust and SARD Toyotas, but it was not a runaway success for the German team. Although they would make 35 stops, 12 more than the Porsches, the Japanese managed teams had a strategy of double-shifting to cut the downtime.

This year's regulations prohibit any work being done on the cars while refuelling, so each time the Dauer Porsches stopped they needed approximately 45s for the fill and another 30s for wheel changing. It was Eddie Irvine's suggestion to run two shifts in the SARD Toyota, amounting to 80m in total.

The wide Dunlops were good for that mileage so the alternate stops took only 30s at rest, or a minute when the wheels were changed. It didn't take Porsche's engineers very long to twig that, but there was nothing they could do.

Against expectations, the Toyotas began to establish an advantage. Danny Sullivan dropped two laps when the left rear tyre burst on his Dauer 962LM, just as he was passing the pit entry lane as luck would have it. The American spun impotently through the Ford chicane, finishing up facing the wrong way in front of the pit wall, and had to drive a slow eight-mile lap.

Balancing the scales, the Dalmas/Haywood/Baldi Dauer 962LM needed a new driveshaft in the seventh hour, the grease having escaped the inner and outer gaiters, so it went back four laps.

At midnight the Toyotas looked strong, SARD almost two minutes ahead of Nisso Trust, with Stuck's Porsche a lap behind, Pescarolo's Courage-Porsche two laps down, the Dalmas Porsche three laps behind and Millen's Nissan 300 ZX six laps behind. Sadly for Yves Courage, the popular Le Mans *garagiste*, the engines failed on the Pescarolo and Ferté cars in the small hours of the morning.

The Nisso Trust Toyota was leading at half distance, but was struck down by a transmission problem within three hours. A vibration became too severe to ignore, and the Japanese team spent 54 minutes installing a new gearbox. Dropping to fifth place, they were effectively out of the lead battle.

Soon the works Porsche team evened the contest again when Boutsen hooked a kerb and broke the left-rear lower wishbone at the second Mulsanne chicane, losing 13 minutes in the pits.

The SARD Toyota held the lead safely from 07.30 Sunday morning to 14.22, and looked the winner until the hapless Jeff Krosnoff rolled to a stop by the pit exit. A weld had given way on the gear linkage, so the American hopped out, went to the back of the car and selected third by hand, thereafter com-



The SARD Toyota was driven heroically by Irvine in the closing stages. The finish was a tad chaotic (inset); while most cars were cruising to the flag, Irvine and Boutsen were still hard at it.

pleting a slow lap.

The pit stop seemed to last an eternity. Stuck's 962 went into the lead and five minutes later Dalmas' 962 claimed second place, but Irvine was already moving off the stand and preparing to give chase.

The gap was down to 11s after the final stops, with Irvine continuing to chase Boutsen. This was a highlight of the race, and the cheering from the grandstand suggested that the SARD Toyota was the crowd's favourite as it dramatically snatched second place 10 minutes from the flag.

While the Porsche team notched up its 13th victory, giving Hurley Haywood his third, Toyota continue to be frustrated in its quest for a first-time 24-hour success. Bob Wollek, competing for the 24th time, had chosen wrong again, and asked in frustration: "What do I have to do to win this damned race?"

Nissan's competitions manager Frank Honsowetz promised "We'll be back next year, with new cars," as soon as the race was over. Toyota will be back with 'Super Supras' already in the pipeline, and Honda will return at a higher level, too.

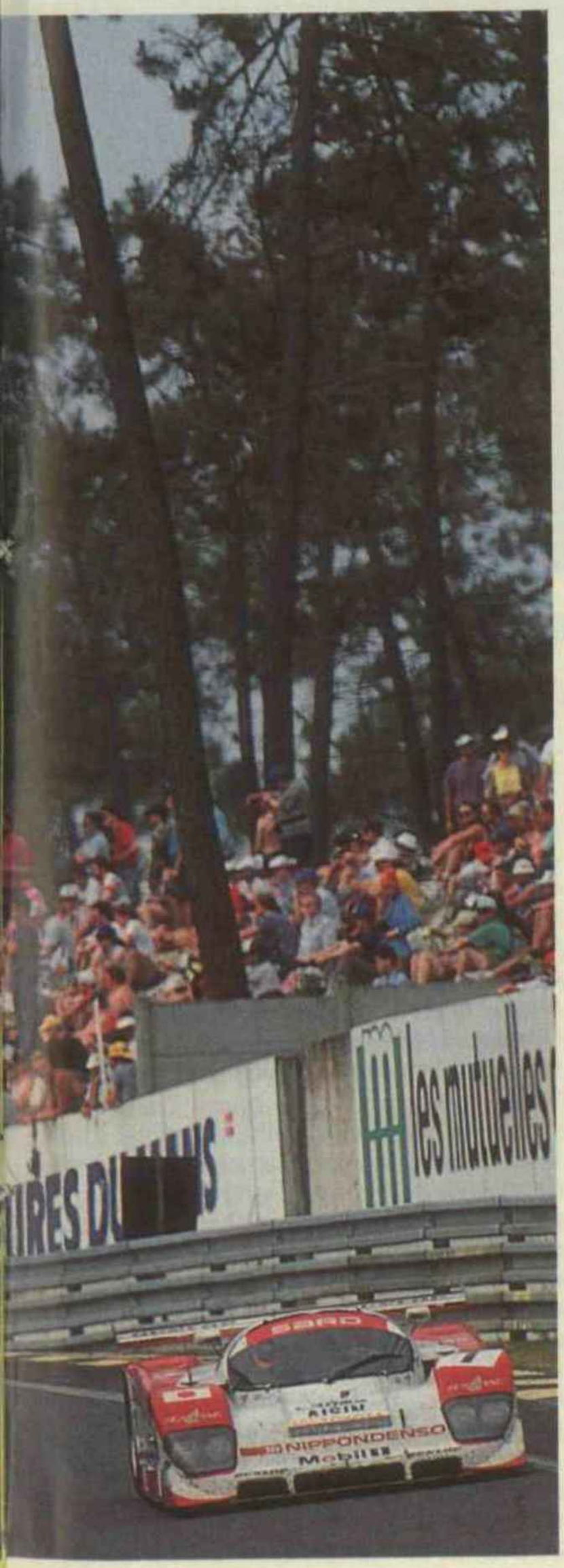
The three NSXs conjured up a 'photo finish' in the GT2 category, though delayed by problems with their sequential gearboxes, leaving the GT2 class victory safely to the Larbre Competition Porsche 911 RSR driven by Dominique Dupuy, Jesus Pareja and Carlos Palau in eighth place overall.

Ray Bellm, Harry Nuttall and Charlie Rickett failed to maintain their brilliant record in the BPRO's GT series as their Porsche 911 RSR's engine broke little more than two hours into the race. It was a thankless outing, too, for other British teams.

Andreas Fuchs' Lotus Esprit lost a wheel at the two-hour mark, and four hours into the race Richard Piper was taken out of the race when his Lotus was savaged by a spinning 911.

ADA Engineering's de Tomaso was an early visitor to a gravel bed and later needed a new gearbox, and the West London team's Japanese driven Porsche 962 was stricken by a water leak. Both were running at the end, though neither was classified.

Not one of the 22 finishers originated in Britain, and the first Britons to take honours were Derek Bell and Robin Donovan in sixth place. But Bell had chosen to drive the private entry, always preferring an open car, and had no regrets: "It was brilliant," was his beaming summary of his swansong. **MLC**



1	Baldi/Dalmas/Haywood (Dauer Porsche 962GT LM)	344 laps
2	Martini/Irvine/Krosnoff (SARD Toyota CV94)	343 laps
3	Stuck/Sullivan/Boutsen (Dauer Porsche 962GT LM)	343 laps
4	Wollek/Andskar/Fouche (Trust Toyota CV94)	328 laps
5	Millen/O'Connell/Morton (Cunningham Nissan 300ZX)	317 laps
6	Bell/Donovan/Lässig (Kremer Porsche CK8)	316 laps
7	Ricci/Evans/Olczyk (Courage C32 LM)	310 laps
8	Dupuy/Pareja/Palau (Larbre Porsche 911RSR)	307 laps
9	Calderari/Bryner/Mastropietro (Biennoise Porsche 911RSR)	299 laps
10	Euser/Huisman/Tomlje (KonradPorsche 911RSR)	295 laps
11	Saldana/d'Orleans Borbon/Vilarino (Repsol Ferrari 348LM)	276 laps
12	Arnoux/Bell/Balas (Dodge Viper)	273 laps
13	Roy/Police/Galmard (Legeay Alpine A610)	272 laps
14	Hahne/Gachot/Bouchut (Kremer Honda NSX)	257 laps
15	Terada/de Thoisy/Fréon (Artnature Mazda RX-7)	250 laps
16	Favre/Shimizu/Okada (Kremer Honda NSX)	240 laps
17	Sirera/Camp/Puig (Agusta Venturi 400LM)	225 laps
NC	Migault/Morin/Gache (Dodge Viper)	225 laps
18	Takahashi/Tsuchiya/Iida (Kremer Honda NSX)	222 laps
NC	Maury-Larybière/Poulain/Chauvin (BBA Venturi 500LM)	221 laps
NC	Chappell/Baker/Andrews (ADA De Tomaso Pantera)	210 laps
NC	Harada/Yoshikawa/Kondo (ADA Porsche 962)	189 laps
NC	Ratel/Chaufour/Hunkeler (Agusta Venturi 400LM)	137 laps



RETIREMENTS

Cudini/Hélary/Boullion (Bugatti EB110S)	227 laps (24th hour)
Said III/Maisonneuve/Jelinski (Callaway Corvette)	142 laps (14th hour, disq)
Otha/Smith/'Stingbrace' (Simpson Ferrari 348LM)	57 laps (12th hour)
Agusta/Coppelli/Krine (Agusta Venturi 600LM)	115 laps (12th hour)
Bourdais/Couvreur/Minassian (Alpa LM)	64 laps (12th hour)
M Ferté/Neugarten/Grouillard (Jacadi Venturi 500LM)	107 laps (12th hour)
Boulay/Robin/Lacaud (ALD 90)	96 laps (12th hour)
Regout/Yvon/Libert (WR LM93)	86 laps (11th hour)
Gonin/Petit (WR LM93)	104 laps (11th hour)
Konrad/Sommer/Azevedo (Konrad Porsche 911RSR)	100 laps (11th hour)
A Ferté/Pescarolo/Lagorce (Courage C32 LM)	142 laps (11th hour)
Santal/Tessier/Dro (Debora LMP294)	79 laps (11th hour)
Wilson/Hewland/Brodie (Harrier LR9)	45 laps (11th hour)
Laffite/Alméras/Alméras (Porsche 911RSR)	94 laps (10th hour)
Raphanel/Fabre/Robert (Courage C32 LM)	107 laps (9th hour)
Bscher/Nielsen/Owen-Jones (Seikel Porsche 968)	84 laps (9th hour)
Olofsson/della Noce/Angelastri (Obermaier Ferrari F40)	51 laps (9th hour)
Haberthur/Gouselard/Vuillaume (Chicco D'Oro Porsche 911RSR)	56 laps (8th hour)
Thyrring/Zwart/Fuchs (Lotus Sport Esprit 300)	28 laps (7th hour)
Piper/Hardman/Iacobelli (Lotus Sport Esprit 300)	59 laps (6th hour)
Yver/Leconte/Chereau (Larbre Porsche 911RSR)	62 laps (6th hour)
Richter/Ebeling/Wlazik (Heico Porsche 911RSR)	57 laps (6th hour)
Larrauri/Mancini/Gouhier (Repsol Ferrari 348 LM)	23 laps (5th hour)
Bellm/Nuttall/Rickett (Henriksen Porsche 911)	34 laps (4th hour)
van de Poele/Kasuya/Gentilozzi (Cunningham Nissan 300ZX)	25 laps (4th hour)

DID NOT START

de Lesseps/Tropenat/Belmondo (Venturi 600LM) – only one driver qualified
Hugenholtz/Heinkel/Kuster (Magnani Lotus Sport Esprit 300 – did not qualify

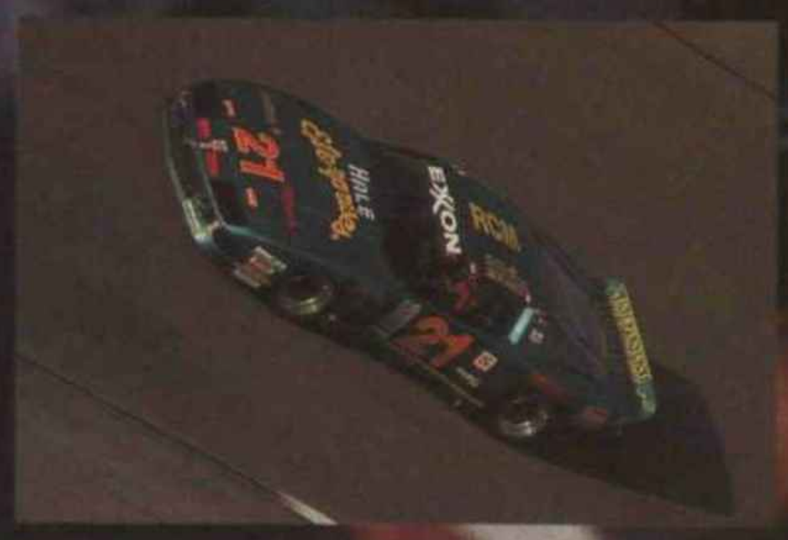
Fastest lap: Boutsen (Dauer Porsche 962GT LM) 3m 52.54s (130.832 mph)

Time of race: 23hr 57m 33.41s

Class winners: LMP1/C90: Irvine/Martini/Krosnoff; LMP2: no finishers; LM GT1: Dalmas/Haywood/Baldi; LM GT2: Dupuy/Pareja/Palau; IMSA GTS: Millen/O'Connell/Morton

First named driver started the race

High



The premise? It is still possible for an amateur racing driver to take part in major league events, and for a reasonable sum. The conclusion? Yes. . .

The format of endurance racing is always changing. For 1994 IMSA's World Sports Cars (WSC) have replaced GTP machines in the States, and at Le Mans the ACO has phased out Group C with an eye on cheaper, open top racers. A minimum of $1 million was required to put a GTP car on the track; IMSA's WSC class is aimed at making racing cheaper and more competitive, the Ferrari 333SP notwithstanding. But are we *really* entering an era where the club racing privateer can get back into world class international events at realistic expense?

All things are relative. Budgets at the top of the sport are always going to be high; however, the further the organisers go to allow less and less expensive cars to compete, the greater chance a driver has of getting to contest some of the world's major endurance events such as Le Mans, Daytona and Sebring.

In 1993 I finished my third season in the Caterham Vauxhall Challenge. In my opinion this is one of the best value championships in the UK: full grids, international events, good TV coverage and cars that are a genuine thrill to drive every time you get in. A Caterham Vauxhall costs £18,000 new (around £14,000 secondhand) and can be run on anything from £5,000-£15,000.

The dilemma at the end of a successful season was what to do next. Unable to find the balance of price, performance and exposure that I had enjoyed in the UK last season, I looked to the States.

During a wet afternoon at Goodwood, experienced racer Rob Wilson (author of the article on the Bogota Six Hours, MOTOR SPORT, April 1992, and a man with a wealth of experience in the States) gave me contacts for some teams who run in IMSA's GTS and GTU classes. Their first race of the season was the Daytona 24 Hours, back in February.

GTS and GTU cars are essentially production-based, and run in various states of tune, weight and modification: Nissan 300ZXs, myriad Porsches, Chevrolet Camaros and Corvettes are typical. Weight limits are calculated in relation to an engine's size and horsepower. For example, a GTU Camaro weighs 2000 lb and yields 350 bhp. The GTS equivalent rates 2550 lb/600 bhp. The two classes form the backbone of IMSA racing and have had full grids for many years.

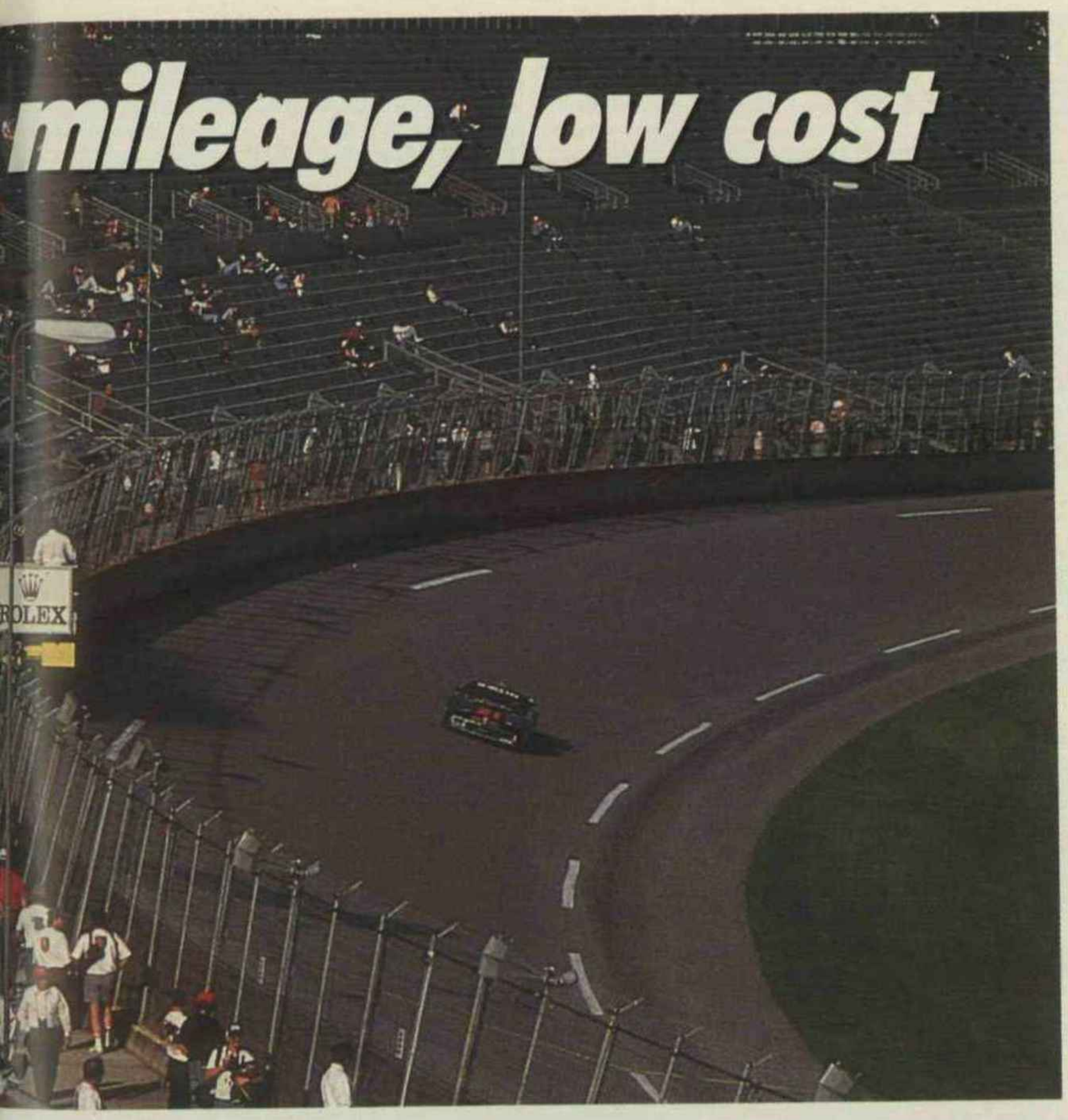
The cost of hiring a seat in one of these cars seemed to range from £4000-£25,000. The expensive rides were mostly in RSR Porsches, 911 Turbos and the works Corvettes and Lotus Esprits.

Although they were all undoubtedly fast, my main priority was to find something *reliable*. Many 'phone calls later, a budget limited to $10,000 pointed me to a good privateer team with a well prepared, tube-framed Camaro and a good finishing record at the event – Kent Racing. Team owner Kent Painter was about to enter his 10th Daytona 24 Hours; in each of the previous three, he'd enjoyed a trouble-free run to the finish.

The car was newly built, with a 6.1-litre, 585 bhp engine. For this particular event Kent Racing opts for a long-stroke engine and a four-speed gearbox, the theory being that the massive torque allows you to only use third and fourth, thus preserving the transmission. There is a live axle at the back and the tube chassis is clad in a 1992 fibreglass Camaro shell. Apparently the only item in common with the road car was the windscreen.

The Camaro was able to attain its top speed of 180 mph on the Daytona banking, and was a potential top 20 finisher in what is, after all, the world's second most famous round-the clock race. You get national TV coverage, a crowd of around 80,000 and an opportunity to race against some of the

mileage, low cost



world's most respected drivers. Not to mention a fair amount of time at the wheel. It all appeared to be excellent value. The next, and final, step was to approach my existing sponsors . . . and within three weeks of having the initial idea, I was on the plane to Orlando.

I met up with the team on the Wednesday night in a Hooters bar (famed for its bikini-clad waitresses) and ran through the schedule of testing and the details of the car. Thursday would mark my first acquaintance with car and circuit. Night practice, at 18.00-20.00 that evening, would be the total track time allocated before the race on Saturday.

It didn't sound like enough to me, but I was assured that it would be sufficient to learn all that was required prior to the race. The size of the car is the first thing that hits you (particularly if you're used to Caterhams); the mechanics actually climb *inside* the engine bay to work on the motor.

As they hook the protective net back over the windows and check the radio, you follow the same procedure every time you get in: cut-off switch on, ignition A on, fuel pump A on (there are two of everything), lights on if necessary and then press the big rubber start button to your right. There erupts a cacophonous noise and the whole car twists to one side. During the race, Kent informs us, most of the wear to the triple plate clutch occurs in the pits. You move away in first at around 3000 rpm and then grasp second asap.

The pit exit road is the first obstacle. It's incredibly narrow, and twisty, and the tyres touch the grass in some places. The first corner is a third gear hairpin. The amazing torque pulls the car round from 2000 rpm to the 6500 maximum in what feels like a long time. It seems strange for a car of such power, but you realise that as you exit turn six onto the banking that this machine is *massively* geared. The car took the hairpin at 30 mph; now, in the same ratio, 4500 rpm on, it is approaching 150 before you grab fourth up on the 36 deg banking.

The first few laps on the banking require intense concentration. It takes some getting used to, though positioning was apparently made easier this year without the menace of GTP cars coming by at 240 mph. There are three lanes and the slower cars keep low; however, you must avoid running too low and drifting on to the apron, where the banking ends rather abruptly.

Major retardation is first required for the chicane on the back straight. Although the huge AP brakes work well, it takes a few laps to get used to the large pedal effort. This may have had something to do with the fact that my previous experience comprised stopping a mere half ton of Caterham with brakes of similar size. During my first few laps it occurred to me that the reason the pedal itself was so big was to allow you to use both feet . . . After 10-15 minutes you get used to it.

The chicane is taken, predictably, in third gear. The main problem is definition of the apices — they put out cones for the race to accentuate the flat bends, but these are soon stuck beneath cars (usually Porsches) and deposited a mile down the road. Grip and turn-in were excellent for a car of this size, and US racer Scott Gaylord did a great job setting it up. Only through the infield section and the chicane did the Camaro feel as though it could have done with a faster ratio steering rack. You had to place your hands at half past six, rather than 10 to two, to be able to crank on enough lock.

There were four drivers in our car: Vic Rice, Mauro Borella, Dave Gooding and myself, Robert Nearn. None of us had raced here before. The practice time was divided into quarters, but we only managed seven laps each during the afternoon session and another five apiece that evening. The plan for the race was to do 40-minute stints at the beginning, instead of 75, in order to gain a little more experience before nightfall.

At Daytona in February there are 14 hours of darkness.

Our strategy worked well, and soon we all felt more at ease in the car, working down to 2m 12s laps whilst preserving the car as much as possible; you couldn't say that about the Porsches, which were still banging doors through the chicane and lapping in the 1m 50s bracket.

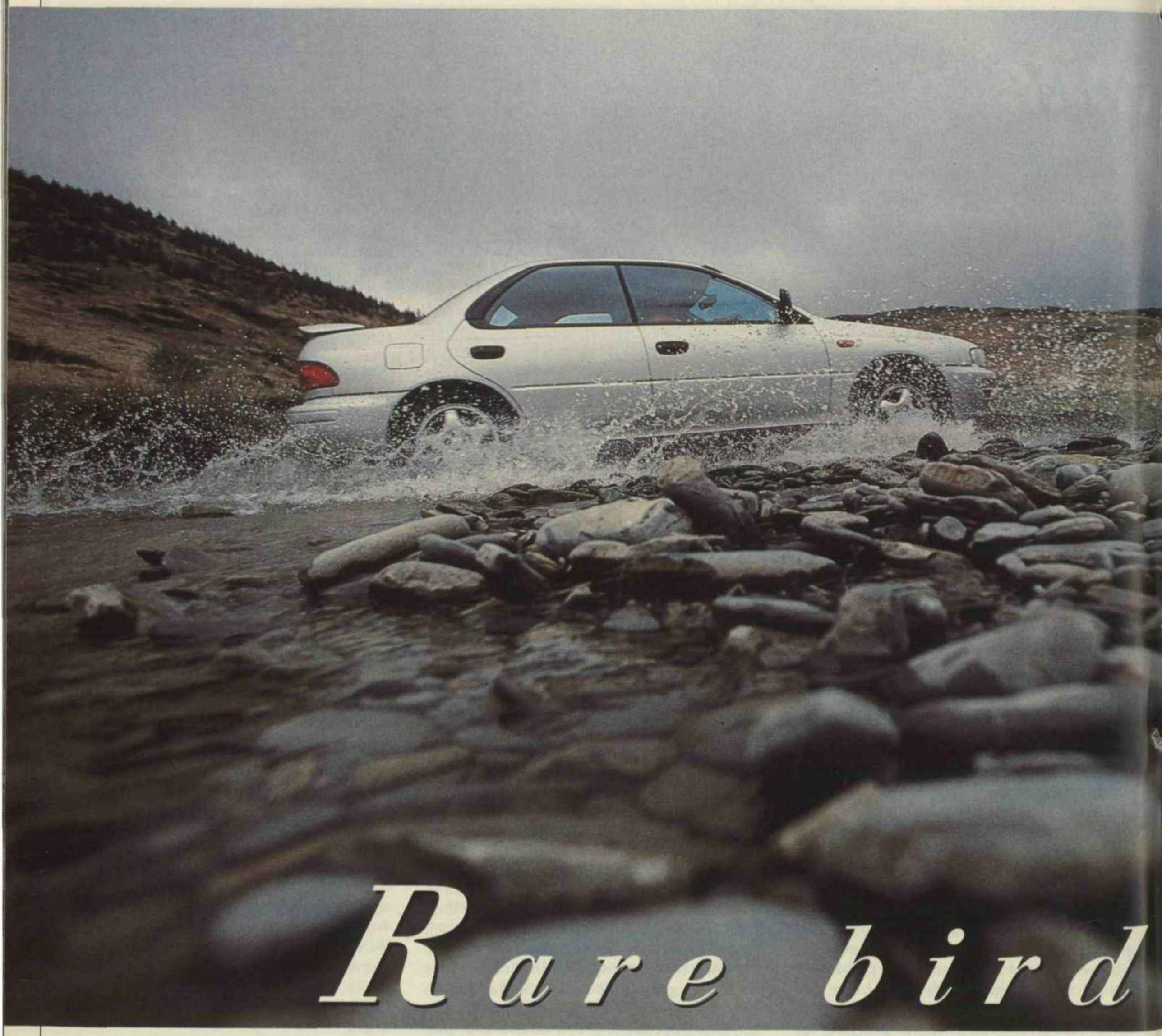
After 12 hours we had worked our way from 42nd to 28th overall but were about to lose our only major piece of time: a long brake pedal had been traced to a faulty master cylinder, and with me in the car the very efficient crew started to change it. The process required the windscreen to be unbolted and kicked out from the inside; the whole thing cost 50 minutes, but we returned to the track with a near perfect car – something of a rarity this far into the race.

As the sun came up at 7.30 you could look at the mist covering all the camp fires from the top of the banking: the hardcore enthusiasts were still having a good time drinking from their pick-ups full of beer, whilst seated comfortably on the three-piece suite sofas they had brought with them.

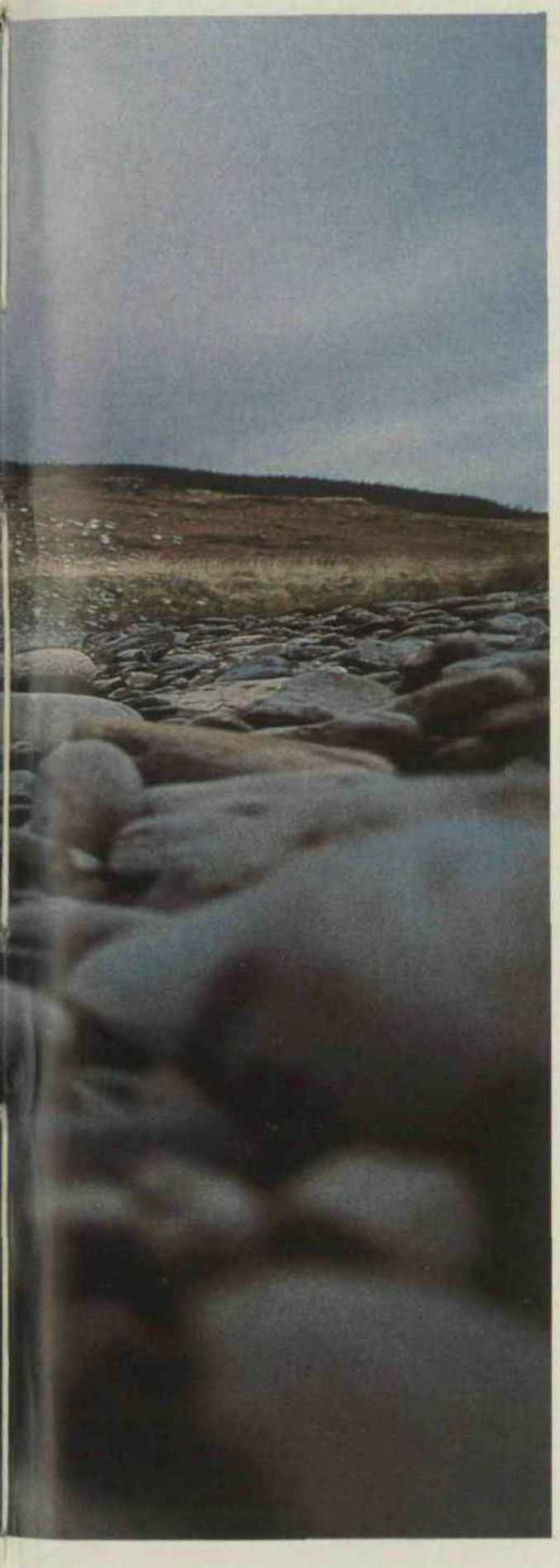
With four hours to go cars started to drop out at an alarming rate: although we now had fairly warped front discs we had our eyes on a place in the top 20. On new tyres the car felt OK under braking, but as the tyres became worn (they could last for four hours) the vibration through the steering wheel was painful. You were actually afraid to take two hands off the wheel for fear you wouldn't be able to get hold of it again. So we slowed our pace, were easy on the brakes and by 15.00 Sunday the four Daytona rookies had managed seventh in GTS and 18th overall. We were also the first privately entered GTS car to finish.

I asked Kent Painter whether finishing the Daytona 24 Hours had lost any of its appeal, even after 10 years. "It will never lose its magic," he replied, "simply because it took me seven years to finish this damned race!"

And all for the price of about five Caterham Vauxhall races . . . **R N**



Rare bird



The Japanese have long been masters of state-of-the-art cars. But they haven't always been able to blend technology with character. There are, however, some honourable exceptions . . .



Despite its current prominence in international rallying (and let's face it, Colin McRae, in particular, has sometimes aroused the habitually disinterested national press), Subaru's road cars never have had a particularly high profile in the UK.

The last example of the breed we tested (in February 1993) was the 2.0, turbocharged, four-wheel drive Legacy, since usurped on Forestry Commission land by the more compact (and already successful) Impreza Turbo 2000 4WD, though the Legacy range continues to be available for road users.

Simply *looking* at the road version of the Impreza is enough to make you think that it is already Subaru's most desirable model. Available as a roomy four-door saloon (tested here) and five-door hatch/estate, it is prettier than the Legacy, but it retains the latter's Q-car charm. Only the aggressive front end treatment (bonnet louvres and giant fog lamps) offer any clues to the car's true purpose.

But. . .

With permanent four-wheel drive and a top speed of 140 mph, its obvious rivals, on road and stage, are the Ford Escort Cosworth, the departed, but still magnificent, Lancia integrale and the Toyota Celica GT4. The last three are all similarly potent, yet all are far more expensive.

Why?

To some extent, you get what you pay for. Although the Impreza's cabin isn't exactly basic, neither is it remotely inviting. Equipment levels are adequate, save for the absence of Recaro-standard seats, which is most noticeable when the Gs are loaded up. While the standard items are comfortable – and a good driving position is attainable, even for tall drivers, via the height-adjustable steering column – the absence of side bolsters and inadequate support under the knees is all too apparent. Accommodation is generous in all areas and five adults can comfortably be located. You can't say that for some of the Impreza's rivals.

The workmanlike interior, dominated by the ugly, air-bag retentive steering wheel is typical of old-school Japanese design, with rather dull tones of grey cloth offset against cheap plastic. Although the controls are ergonomically sound and the instruments perfectly legible, there are even fewer internal clues to the Impreza's pace than there are external. As an aside, don't leave valuables in this car – there is no security alarm, though an immobiliser is standard.

If you want hard evidence of performance, look beneath the lightweight bonnet: you'll find a longitudinally-mounted, aluminium, flat four, quad-cam, 16-valve engine which has been tweaked considerably since it first saw service in the Legacy. The upgrade includes an air-cooled intercooler, which has whipped power up from 197 bhp to a more competitive 208/6300 rpm. Likewise, torque is up from 193 lb ft to 201/4800 rpm. With these mods and the Impreza's lighter, more rigid bodyshell, Subaru claims 0-62 mph acceleration in 6.6s (significantly quicker than the Legacy), but our test car actually *felt* even faster. Sadly, time constraints prevented our being able to conduct a fully calibrated check.

The five-speed gearbox is similar to the Legacy's, but the four-wheel-drive system has been much revised. Torque is continually varied, laterally and longitudinally, according to available grip in the prevailing conditions.

The chassis is barely different to that on lesser Imprezas, featuring little more than uprated dampers and springs. MacPherson struts all round, combined with trailing arms at the rear, form the basis of the suspension set-up. Needless to say, for a car with this performance, the front brake discs are ventilated and assisted by a four-channel ABS system. Engine-speed related power-assisted steering is standard.

If the Legacy was not as inspiring as a Sapphire Cosworth to drive, the Impreza's smaller dimensions certainly promise more.

However, when you examine the prerequisites of 'driveability' (responsiveness, a flat torque curve and wide power band), the Impreza's flat four doesn't exactly appear tailor-made, leastways on paper.

It is rare for even the most advanced turbocharged engine to provide razor-sharp responses or pull from low revs, but at least

ENGINE

Location	longitudinally front-mounted
Cylinders	four, horizontally opposed
Bore × stroke	92 × 75 mm
Capacity	1994 cc
Compression ratio	8:1
Valve gear	dohc, four valves per cylinder
Power	208 bhp/6000 rpm
Torque	201 lb ft/4800 rpm
Fuel	unleaded, 95 RON

TRANSMISSION

Type	five-speed manual, permanent 4wd

GEARBOX

Gear	ratio	mph/ 1000 rpm
First	3.454:1	n/a
Second	1.947:1	n/a
Third	1.366:1	n/a
Fourth	0.972:1	n/a
Fifth	0.738:1	n/a
Final drive	3.545:1	

SUSPENSION

Front	MacPherson struts, coil springs, L-shaped transverse link
Rear	MacPherson struts, coil springs, transverse dual links, trailing arms
Wheels	alloy, 6JJ × 15
Tyres	205/55 R15

BRAKES

Front/Rear	ventilated discs all round, ABS

STEERING

Type	rack and pinion, power assisted
Turning circle	10.4 metres

DIMENSIONS

Wheelbase	2520 mm
Front/Rear track	1465/1450 mm
Overall length	4340 mm
Overall width	1690 mm
Overall height	1400 mm
Kerb weight	1235 kg
Fuel tank	13.2 gallons

PERFORMANCE

0-62 mph	6.6s
Maximum speed	142 mph

Figures supplied by Subaru UK

FUEL CONSUMPTION

Average for test	28.3 mpg
Government figures:	
Urban	24.8
56 mph	39.8
75 mph	30.1

LIST PRICE £17,499











Cabin is typical of modern Japanese thinking, but the overall package is endowed with rare character. Unusual flat four engine revs freely.

the Impreza's delivery is pretty smooth and it becomes ever more willing as the revs rise.

That said, there are noticeable phases in the unit's progress. Floor the accelerator and initial lag is superseded by a sudden kick when the turbo whirrs in at around 2500 rpm. Then, at about 5000 rpm, when you'd expect the power to be tailing off, it gets its second wind, pulling strongly to the red line. If you're caught off-guard in a high gear at low revs, then no amount of throttle stamping will bring anything other than a tardy response. This is an engine which thrives on being revved and is unwilling to idle at the behest of a lazy driver. However, if you wish to make less frantic progress, the four-pot is flexible enough to hold its own.

The chassis dynamics *will* bring a smile to your face. The Impreza is as easy to drive as it is on the eye, a sharpish clutch being the only noticeable concession to power. The brakes can grab a little if used without sensitivity at low speeds, but otherwise the short nose and ample vision, assisted steering, excellent driving position and amazingly light gearchange make urban driving a doddle. Refinement cannot be faulted. There's little wind noise, but enough sound from the engine to keep you awake on motorways, and everything bar obvious pot holes are adequately absorbed. Surely something that rides this well cannot be sporting enough to be entertaining?

Wrong!

Show the Impreza some interesting roads and the sweet flat four's novel bark implores you to remain closer to the rev limit (7000 rpm) for much longer than would be to tolerable in, for example, a Cosworth (redlined at 6000). This is no roller skate – as the body roll consistently reminds you – but if you take the Impreza by the horns it will obey your commands in rewarding fashion. Forget about sloppy understeer (though it does so, mildly); only well-sorted tiddlers such as Renault's Clio Williams can offer significantly better turn-in.

The short wheelbase makes the chassis very throttle-sensitive, and one feels that the car would perform better on gravel, which requires a more flowing driving style than tarmac. When confidence is up and vision is ideal, great fun can be had setting the car up for a series of tight corners – even with its high level of grip.

If you're quick with the light steering, you can have oodles of fun without undue drama. Subaru has retained (just) enough steering communication and kept extremes of lock to a compact minimum. The nose will tuck-in if you lift-off when cornering at speed, and the tail returns to the chosen line with a little more throttle application and, possibly, a whiff of opposite lock if you've gone way over the top.

Its poise and grip isn't limited to the tight stuff. The Impreza's mile-eating capability over super-fast terrain is almost awesome. There aren't many cars the sane side of 50 grand that could leave an Impreza far behind; most of those that could would be hard-pushed to keep up on tighter, narrower roads.

Stopping this formidable machine also inspires confidence, though it is no match for an Escort Cosworth in the braking department.

The transmission is the main dynamic flaw: the gearchange is not the smoothest we have encountered, and there is often a trace of clutch judder. Also, there was an intermittent tendency for the engine to behave as though it was being starved of fuel if ever you backed off the throttle abruptly.

Verdict

The Subaru Impreza Turbo 2000 4WD is a no-nonsense performance saloon, utterly devoid of frills and gimmicks. Yes, the interior is dull, but at least it is comfortable. If you're looking for something a little more extrovert, the aforementioned rivals will further demolish your bank balance to the tune of anything between £7000 and, in the case of the Celica GT4, £12,000 . . .

Add Subaru's three-year unlimited mileage warranty and acceptable fuel consumption (we achieved 28.3 mpg overall, and that involved almost exclusive hard use), and you have probably the best performance bargain around right now.

More than that, the Subaru Impreza is also a modern Japanese automobile in an extreme minority.

It has *character*. **RRB**



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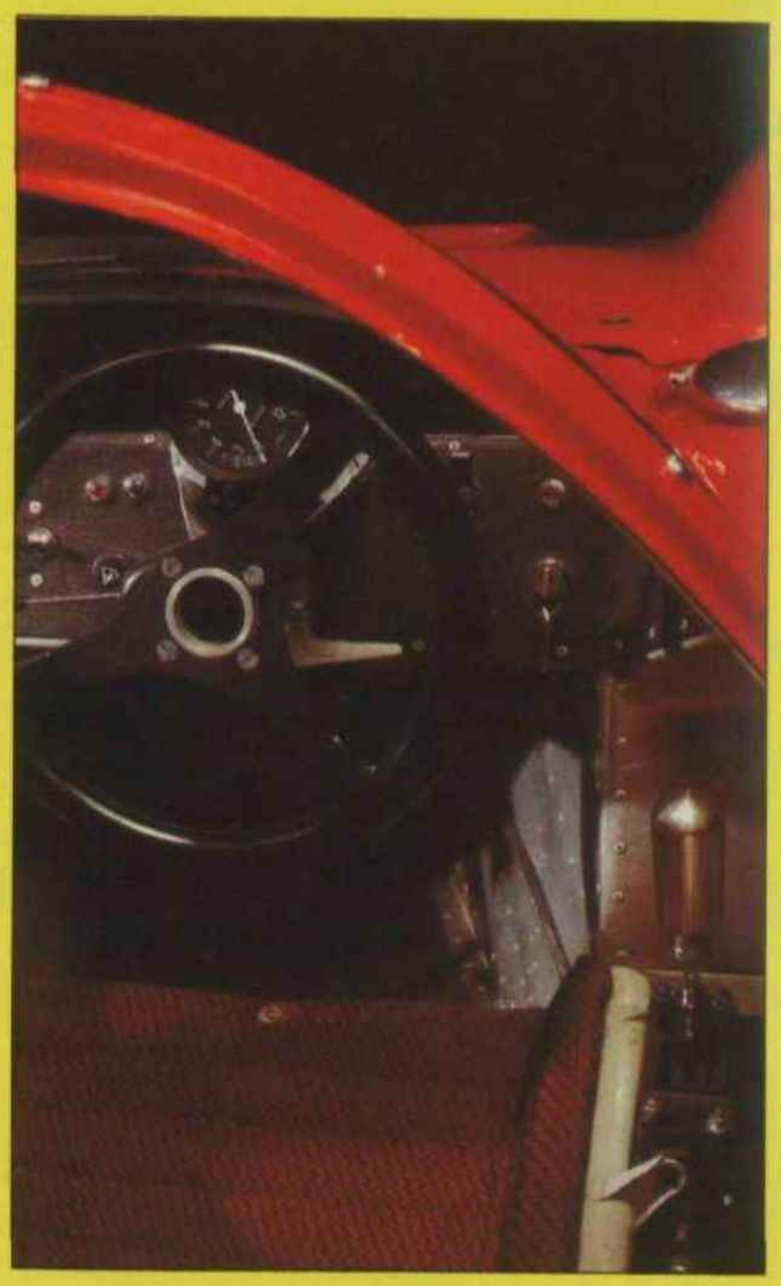
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The numbers game



Ferrari's 348 replacement arrives soon. Dig into the recesses of your imagination, consider how fast a Ferrari should be . . . Then speed up your dreams

This is a busy and important year for Ferrari. Most important in terms of image will inevitably be the autumn launch of the F130 Barchetta at the Paris Motor Show – the successor to the F40 and the model that will show exactly where Ferrari is at now that it faces greater competition from the likes of Bugatti, Honda and even McLaren.

But even more important for the long-term future of Ferrari is the successor to the 348, the F355. Why F355? Well, it's F for Ferrari – all future models will start with the letter – and the engine is a 3.5-litre, five-valve-per-cylinder unit. Hence F355.

And why is it so important?

Simply because this is Ferrari's volume seller, and so its success is absolutely vital for the company's finances. But more significantly, it's important because it represents a complete revolution in Ferrari thinking and attitudes.

Chairman Luca di Montezemolo knows full well that the company needs a sales boost. Struck by the worldwide recession, sales have slumped, with just 2350 cars delivered during 1993, down from 3400 in 1992 and a record 4400 in 1991.

Last year Ferrari had to close down the lines for 40 days as stock levels and inventories built up around the Maranello factory. It's all a far cry from the heady days at the end of the 1980s, when there were so many forward orders from all round the world that the British distributor Maranello Concessionaires had a five-year waiting list and was forced to close the order books completely.

"Today marks a turning point," says di Montezemolo. "We have weathered a crisis but last year ended with a positive financial result so it wasn't too bad. We have got rid of the speculators who were affecting the image of the marque and we are now seeing the true Ferrari enthusiasts coming back.

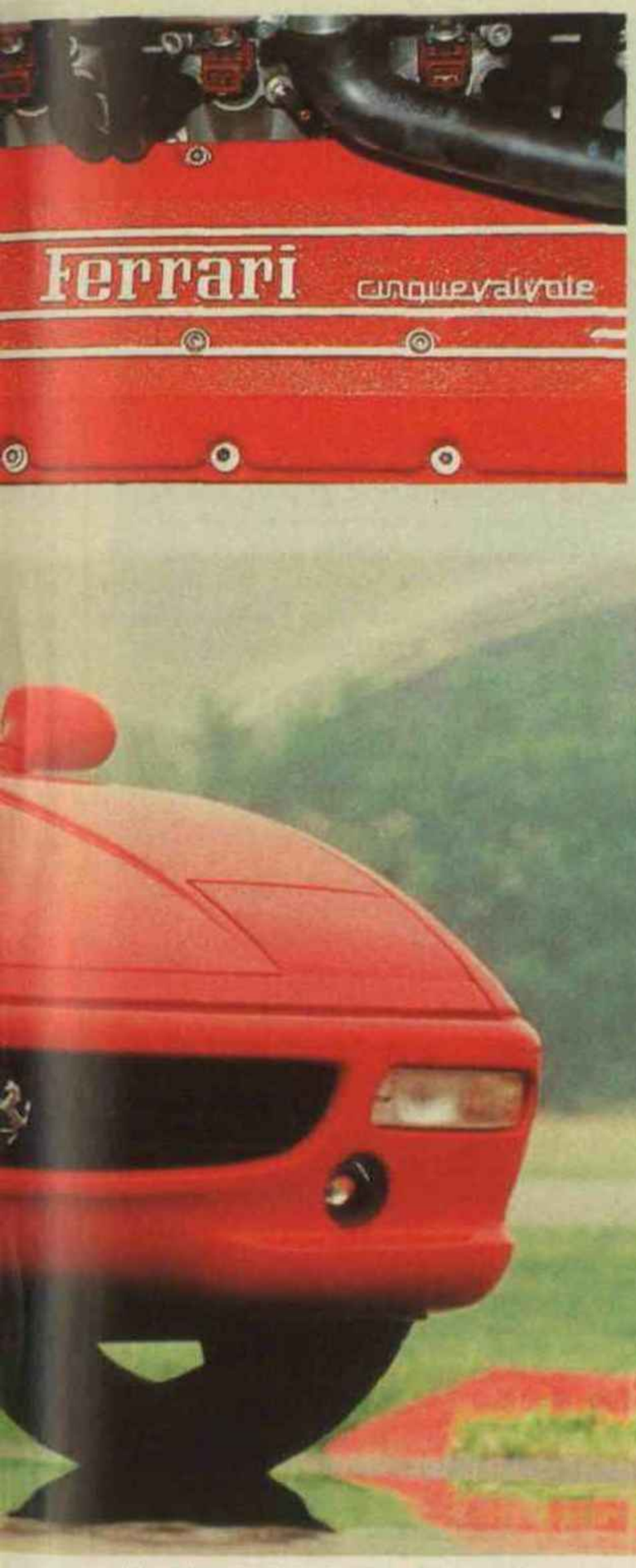
"At Maranello, we are doing our bit by reorganising the company into teams in both the design and production departments. We are bringing in new technologies and new production techniques because we have to respond to the market as we find it, not as we may like it. We have to be able to produce the products our customers want and ensure the right quality levels too.

"Our firm strategy is that we will build a maximum of 3000 cars a year and we have moulded the company to suit that volume." What Ferrari has also done under di Montezemolo is to find out – for the first time – what its customers really want. It has actually gone out and researched their views, and incorporated what they heard in the F355.

Most important, according to those customers, was to ensure that the car should be usable at all times, in all road conditions. Out and out performance is still critically important to the image, but Honda's NS-X has shown all too clearly that pure performance doesn't preclude a modicum of comfort, safe and predictable handling, and ergonomics that haven't derived from the Ark.

Though the basic structure has been carried over from the 348, so the wheelbase and general proportions remain the same, this is far more than a mid-term facelift – in every important respect the F355 is an all-new car.

Most significantly, it gets an all-new engine, an all-new transmission and totally



revised bodywork and aerodynamics.

The engine, of course, is the heart of any Ferrari. For the F355, a new 90 deg, V8, 3496cc unit with an 87x77mm bore and stroke provides the motive power – all 380bhp of it at 8250rpm, with maximum torque of 268 lb ft at 6000rpm.

It's exceptional, not just because it revs to an astonishing 8500rpm, but also because it produces 109bhp per litre, and this makes it the world's most powerful naturally aspirated production engine, with greater specific power even than the mighty McLaren F1. Astonishingly, there could well be more to come from this new V8 because, according to Ferrari engineers, the whole has been designed to rev at up to 10,000rpm.

Needless to say, F1 experience came to the fore in the design and manufacture of the engine. Pistons are constructed from forged aluminium alloy, while con-rods are titanium alloy, finite element designed units. Three radial intake and two exhaust valves heads also derive directly from F1 engineering (though, ironically, the F1 team has now reverted to four valves per cylinder), as does the design of the cylinder head which creates an extremely compact high-swirl combustion chamber with an 11:1 compression ratio.

Other interesting features include an intake system which feeds to individual intake ducts on each cylinder with single throttles to optimise engine performance at all temperatures, and improve response; and an exhaust system featuring two branches – one main branch to a ceramic matrix catalyst and a bypass branch to a steel matrix catalyst that comes into play at high speeds to reduce back-pressure.

From the V8, the drive is transmitted through a new transverse gearbox now offering six forward speeds, all with synchromesh, and with shorter engagement travel. Not only has the synchromesh been improved, but the transmission is also fitted with a water/oil heat exchanger to bring the gearbox oil more rapidly up to the correct operating temperature and thus obviate baulking while the unit is cold. From all of this, it can safely be assumed that the F355 is going to be fast – and indeed, Ferrari's own figures show that, compared with the 348, top speed is up from 170 mph to 183. Even more impressively, acceleration from 0-62mph is down a full second, from 5.7 to 4.7s.

Thanks in no small part to the aerodynamics, the F355 is as steady as a rock at high speed – and this is due to the work of Sergio Pininfarina who was responsible for the design: "We had to achieve a technical aesthetic ideal but we also had to consider the high performance potential of the car and so the aerodynamics became critical to ensure both good handling and safety," he said. Pininfarina, together with Ferrari's engineers, used the wind tunnel at Maranello to refine above all what he calls "the *neglected sixth face of the car*" – the underbody. The aerodynamic effect starts at the front spoiler which is split in the middle to direct most of the airflow under the body. Once there, a completely flat underbody ensures free and rapid passage of the air which is speeded up as it flows under the car, thus producing low pressure and downforce.



Although its family line is apparent, the F355 is said to represent a completely new way of thinking for Ferrari.

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Targa (left) will be available from launch. 348 Spider (below) continues in production for the moment. An F355 equivalent will follow.



Part of Ferrari's new philosophy is increased awareness of the need for better cabin ergonomics.



"All high performance cars generate lift at high speeds and so most have to incorporate large spoilers to counteract this," says Pininfarina. "But because the whole design of the F355 generates negative lift, we don't have to use spoilers to make corrections. This is pure technology driving the design and the styling of the car."

The F355's negative lift ensures predictable stability and straightline handling. To improve cornering and stability under braking and hard acceleration, the aerodynamics are aided by new electronically controlled dampers.

Sensors pick up both lateral and vertical chassis movements and these signals, together with information on road speed, acceleration and throttle pedal position, are fed to a central ECU which in turns instantly hardens the damper settings to minimise roll, pitch and yaw. Then, of course, if the car remains on a relatively even keel, the aerodynamics can continue to do their job, the wheels can be kept on the straight and narrow by the suspension system and the result should be fine handling and reliable stability.

Help in developing the chassis of the F355 came from ex-F1 champion Niki Lauda and just what a good job he did can be seen from the performance figures achieved at Ferrari's own test track at Fiorano. An F1 car gets round in just over a minute. The fastest V12 production cars get round in the right hands in around one minute thirty seconds – and interestingly, the four-seat 456GT is actually marginally faster than the 512TR. The F355 is not only marginally quicker than either the 456GT or the 512TR here, but crucially, it is a full seven seconds a lap faster than the 348 model that it replaces.

On the track, the F355 is not just fast, but it sounds it with the new V8 howling behind the passenger compartment all the way up to the 8250rpm red line. But what is more impressive than the sheer acceleration is the stability and fluidity of the car through the bends. It turns in sharply – the standard power steering is no handicap – and thanks no doubt to the enormous amount of positive downforce created by the underbody aerodynamics, its grip and traction are stupendous. A little power brings round the rear but it takes no more than a flick of the leather-bound steering wheel to correct the oversteer, by which time the next bend is already approaching fast. Through the six gears, the F355 keeps accelerating, keeps pulling like a train – with the high torque ensuring there's massive grunt whatever the gear.

"Help in developing the chassis of the F355 came from ex-F1 champion Niki Lauda"

There are some die-hard traditionalists for whom a true Ferrari has to have a V12 under the bonnet. The F355 doesn't, but it's still a magnificent machine – and it looks the part too.

As far as exterior appearance is concerned the front is cleaned up and the split front spoiler is a distinctive feature, but at the sides the familiar slats are replaced by double air intakes and shaped aerodynamic sills. At the rear, it's back to familiar red Ferrari round lights in a broad body colour strip. Inside the F355, greater emphasis has been placed on ergonomics and the positioning of the minor controls, but of course the central feature remains the traditional open gear gate – though with six forward slots rather than five. Also new is an aluminium alloy gear knob to replace the plastic one of old. Customers can choose standard sports seats or lightweight racing units, and can choose between 17 exterior and 12 interior trim colours. Ferrari buyers have never had it so good.

Initially, two versions are offered – F355 Berlinetta coupé and a GTS targa version with UK sales starting in September. Prices will start around the £80,000 mark. The current 348 Spider remains in production for the time being, but no doubt this too will be dropped once a F355 Spider has been developed. **M D**

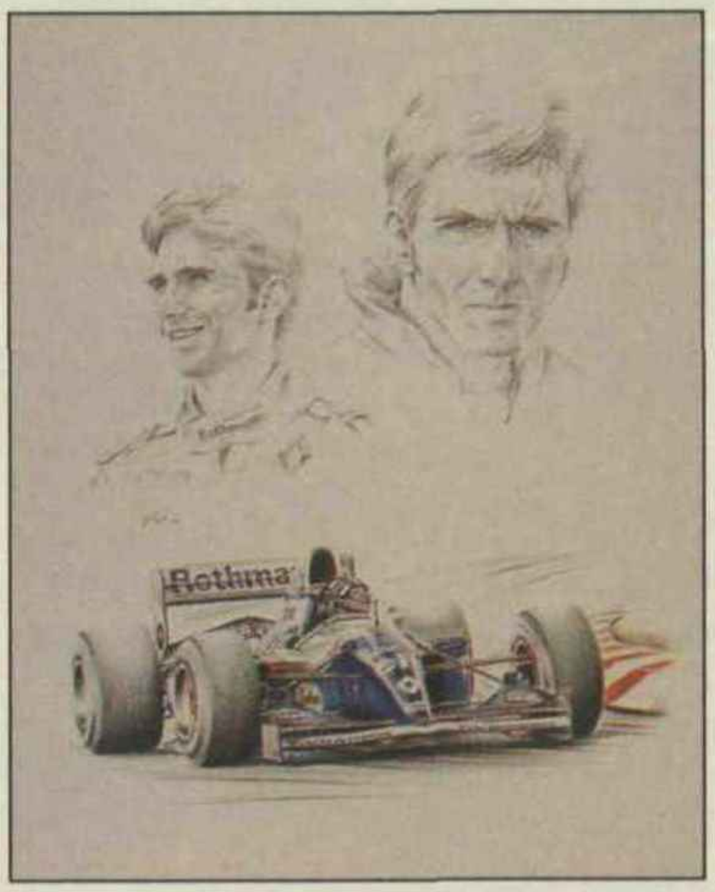
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TRADE ENQUIRIES WELCOME



Mud in the Midlands

The sort of trial in which competitors are required to put up good performances on steep or very steep gradients, usually mud-surfaced, were, and to some extent still are, a very popular part of the motor sporting scene. They were hardly part of pre-1914 happenings but after the Armistice, when more people had cars and a fair proportion of them wanted to enjoy some competitive driving, but could often not afford to race, trials began to multiply. Having recalled the famous MCC long-distance reliability trials of the vintage period, it seems logical to write about the shorter and certainly more frequently-held "mud trials". The problem is, which?

I have chosen the Colmore Cup Trials, organised by the well-known Sutton Coldfield and N Birmingham AC, popularly known as SUNBAC. Not necessarily because they were better-known than the many other similar events but because, being centred largely in the Midlands, the trade could keep an eye on them and enter cars if so inclined, the hills used were (perhaps still are) better known to more followers than if they had been widely scattered, because I have to confine myself to a particular trial, anyway, and because this annual event was representative of its kind.

The first Colmore Cup Trial was held in 1911; the Cup was to be won outright if anyone was awarded it for two successive years. SUNBAC was organising several trials by 1920, but the last, a half-day affair in November, was for the Shell Cup, won by the now-immortal HFS Morgan in one of his three-wheelers. (Cars of all sizes competed with motorcycles; an AC and a Hillman took high honours.)

But in 1922 the Colmore Cup Trial was definitely on again, starting on a March morning at 8 am from the Stonebridge Hotel and encompassing Saintbury, Sudeley, Rising Sun and Willersey as the principal hills. (*The Autocar* endorsed my choice, calling it "One of the most sporting events of the year" — not to be confused with the Birmingham MCC's Victory Cup Trial which was confined to bikes, and cyclecars of under 1100cc and 8 cwt.)

It was dominated by Morgans, which took the Phospher Bronze Team Prize, but HR Godfrey's GN was well up with them. But *the* Cup, was won by a motorcyclist. Indeed, the 'bikes beat cars for years, but Allards took the top Trophy in 1937/38/39.

The 1922 Colmore Cup Trial had over 200 motorcycle entries and cars and 'bikes had to tackle a difficult course, with public-road acceleration tests (no official frowns then!), a stop-and-start on Saintbury's 1-in-6½ gradient and a new hill, rural Bushcombe on the Cleeve hills near Cheltenham, which none of the cars could climb, although a GN nearly did; called an "absurd test", curiously the three-wheelers, although driving on their single back wheels, unlike today's Reliant Robins, had no real problems here — maybe light weight was the answer. The only cars to survive the trial were two Rhodes, a Deemster and a GN. The PJ Evans Trophy was won by Yates' New Hudson three-wheeler.

The format was much the same for 1923, with a cold-starting test after the Cheltenham lunch stop. Otherwise, the trial was run non-stop apart from the officially-contrived pauses for tests; incidentally, sealed watches were used, for the time schedule. Only SUNBAC members could drive cars, of under 1100cc. New hills were Aston-sub-Edge (acceleration test), Gambles Lane (stop/restart), Stockhall, Buckland and Willersey — can they still be found? Some 23 cars and 10 three-wheelers (six TBs, four Morgans) ran with 200 motorcycles. Most popular car was the Rhode, at five entries, but there were three A7 Chummies. This time there was a rutted section which led to muddy Snow's hill and suited the cars better than the trikes. Three A7s and a Gwynne 8 were among those too high-geared to cope with the restart. Manifold's Talbot 8 burst both front tyres when cornering fast, something of a habit, but a trio of Rhodes ran impressively, keeping together, HB Denley's taking the top car prize. The Coventry Cup again went to a motorcyclist. The course proved too much for a TB, an A7, the Talbot (those tyres), one of the Rhodes and a BSA.

It was much the same in 1924, the 118-mile route so tough that it took toll of six of the 30 small cars. Some of the hills had had their ruts filled-in but new hills had been included. The Gambles Lane (Rising Sun)

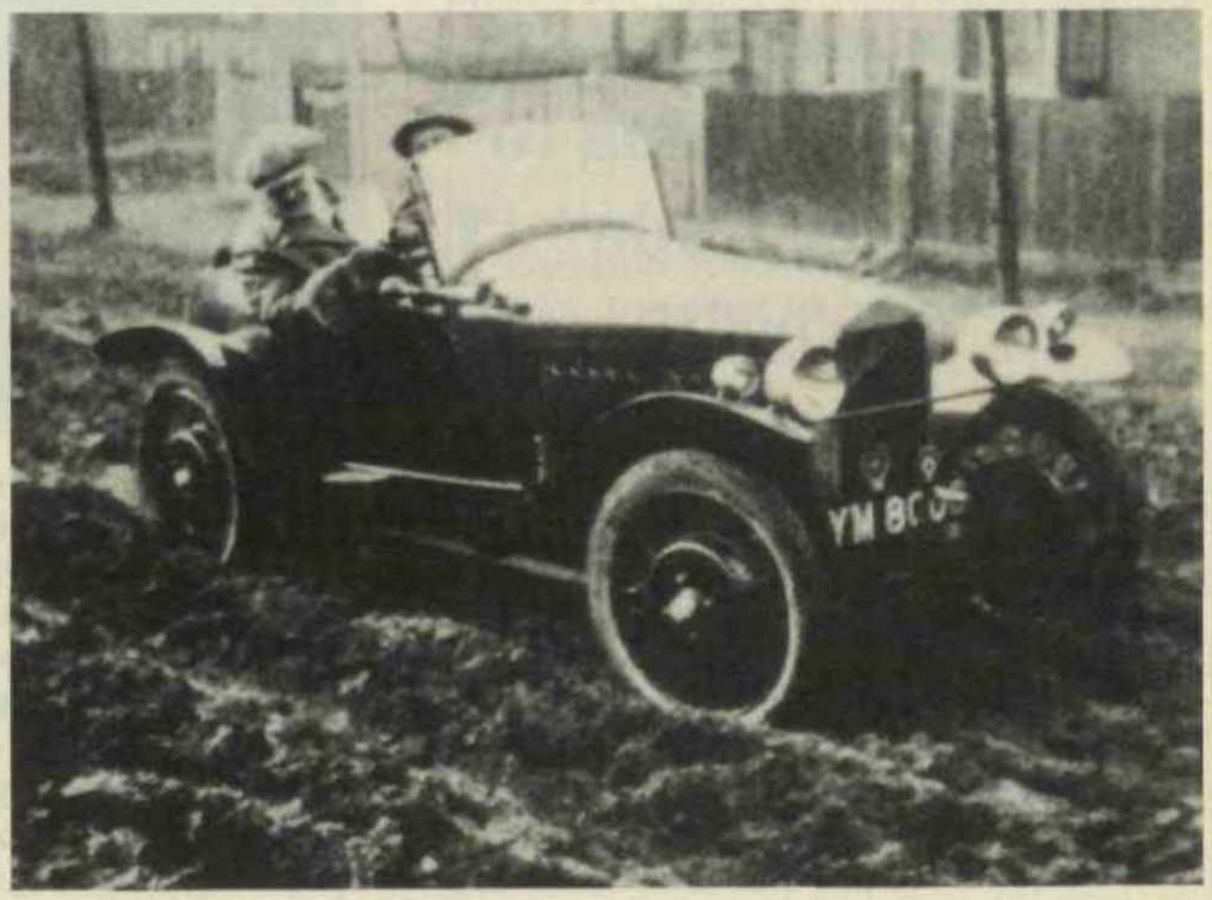


restart caused clutch problems for three of the six A7s (the most prolific make, as in today's VSCC trials). Miss Chilton (BSA) with brimmed-hatted lady navigator got a gold medal, but Miss Roper's Singer Ten finished *sans* an award. Best car was HB Denley's sports Rhode, the other two Rhodes of Norris and Hill also gaining golds. Trade drivers were taking an interest, such as, if I am not mistaken, Gunner Poppe (A7), Mead (Rhode), Brittain with the "Snowden Ranger" BSA and AJ Dixon (Singer 10). In this pre-knobbly-tyres era non-skid chains were allowed.

The entry for the 1925 Colmore included the two Bugattis of Lavy and Frank Taylor; the latter made very fast and spectacular ascents of some of the hills, although in the acceleration test Tatlow's Lea-Francis was quite the quickest. Humble Bee hairpin was so acute that even the sidecar-outfits were baulked but Carless, in a McKenzie car, bravely risked overturning by mounting the bank rather than reversing. CMC Turner ran a Gwynne 8, the long-time trade driver Sam Wright a Humber and a Cluley was competing. This time cars were restricted only by weight, maximum a ton, which let in a very effective 2385 cc sports Bean, but not for this reason did one A7 run minus mudguards, screen and hood . . . Many of the same drivers and cars took part in the Victory Cup Trial later in the year, Taylor again sensational with his Brescia Bugatti inspite of pulling off a front tyre. But Denley (9.5 Rhode) cleaned it up convincingly. Incidentally, some of the hills were used also by *The Autocar* when road-testing new cars, another facet which made the Colmore Cup Trial interesting.

Rain made the 1926 Colmore difficult but reports read like those on present-day VSCC trials: "Once more the little A7s showed their marvellous capacity for getting along anywhere" and "So far as teams went, the A7s and the Lea-Francis cars showed to the best advantage". Gypsy Lane out of Winchcombe proved very troublesome, even Denley's Lea-Francis bogging down. In a sort of driving-test-cum-restart, however, Denley was quickest (19.5s), with HJ Adlington (Frazer Nash) next best (21.0s). The finishers ran from the Bugatti and three Frazer Nashes to a couple of Jowett twins and a Clyno with twin rear tyres. HB Denley won the Norris Cup, F Denley (1086 cc Rhode) the Rhode Cup and "Aldy" and Morton (Lea-Francis) the special gold medals. The Team Prize went to the A7s. Later in the year the Victory Cup Trial was almost equally well supported, 18 cars to 23, and for the first time since its inception in 1919 a car, Denley in the Rhode, was the winner. The then-editor of MOTOR SPORT (Salmson) took a bronze medal in the Colmore but failed to score with a Senechal in the Victory Cup event, and Taylor's Bugatti collided with a non-competing Ford. For those who like to research old trials' hills on map or feet, these were Weatheroak, Noah's Ark near Stourbridge, High Oak, Liverage, approached through a "huge splash", and Abberly. Again: "The A7s made particularly





Main pic: FB Taylor's Grand Prix Bugatti won the 1926 Victory Cup Trial. Above left, Austin 7s did well in the Colmore. Here, one tackles a muddy Gypsy Lane in 1927. Abve right, MOTOR SPORT entered the 1926 Victory Cup in this Senechal.

easy climbs, impressing the large crowd of spectators". The start had been from King's Heath Recreation Ground, but the Colmore start had moved to The Unicorn, Stratford-on-Avon. These events attracted so many onlookers that a policeman might be seen at the hills and the SMM&T was threatening to restrict trade entries in these road trials . . .

Fortunately they continued unabated and by 1927 the Colmore and Victory Cup Trials were just two amongst many. The Colmore that year saw such delays at Mill Lane, a three-quarter mile 1-in-4 muddy track turning off the foot of Cleeve Hill, that when the 250 competitors got to the finish the results officials had gone home! Best up Gypsy Lane had been Miss Milne's Austin 12/4 tourer, but another delay resulted when Jacques' Frazer Nash broke a chain (which presumably jammed the transmission) and needed a horse to remove it — car, not chain. Harcourt's A7 got furthest up the notorious Mill Lane. For reasons of space, I will now summarise the rest of the Colmore story.

Suffice it then to say by 1929 car entries had declined, although racing drivers like Ron Horton (best on acceleration in his Morgan), Miss Worsley (sports Jowett), FS Barnes (A7), and rally driver Douglas-Morris (Triumph Super-7) took part. By 1930, the last "vintage" year, the event was still well regarded and entries had increased somewhat. Horton's Morgan won the Rhode Cup for best "car", runner-up an A7.

"These events attracted so many onlookers that a policeman might be seen threatening to restrict trade entries"

Trials were rapidly becoming extremely popular, soon to be contested by Austin (Grasshoppers), MG (Cream Crackers and Musketeers) and Singer, and amateurs driving sports cars of the pre-WW2 era. All this was extremely well described in *Wheelspin* by the late CAN May (Foulis, 1945, 4th edition 1971) which captures so well the atmosphere of those days of mud-trialling, which persisted, even after the RAC had banned "knobbly" tyres, with freak cars contesting the RAC Trials Championship.

Older events are relived now with the many trials for pre-1931 cars run by the VSCC. **W B**



The then editor of MOTOR SPORT, Richard Twelvetrees, tackles Gypsy Lane in a Salmson.

Loton Park vintage

The hillclimb course in Loton Park near Shrewsbury has much going for it. It has six interesting corners, one approached downhill, and the two-part grass paddocks and somehow carefree atmosphere are redolent of pre-war fixtures some of us enjoyed. Not any surprise, therefore, that the VSCC goes there once a year and it did so on May 29, a warm sunny day, with a programme of 181 competitors and 10 reserves. To the club's credit, but as expected, the event was run off very effectively.

As has been apparent this season, Bruce Spollon's ERA R8C is in splendid form and it scored another FTD, in 62.85s – a new record for the tortuous course. Spollon's start was exemplary with no wheelspin after the first few feet. Mike Walker also made a clean start in his Cirrus aero-powered Parker-GN (now on pump fuel) to win his class in record time (63.63s), beaten only by Spollon, and ahead of Guy Smith's Alvis-energised Frazer Nash (64.32s). Of the other ERAs, Donald Day's R14B, which made FTD last year, was second in class to Spollon, almost contacting the bank when heating up rubber before the off. Ricketts had magneto problems in practice and went off with a cloud of oil smoke trailing behind Sally Marsh's 1½-litre R1B, posting a class record of 65.23s, comfortably beating Dunn's blown Riley Special (66.30s) and leaving Dave Caroline's Morgan to a set fresh vintage class record (68.15s). The latter's engine has a big forward facing carb and twin magnetos.

Other records to fall included the vintage 1100cc sports car time, Geraint Owen clocking 77.37s with his so successful JAP vee-twin Morris Special, and the 1500cc sports car record, which Howatt's Riley engined Morgan 4/4 broke in 68.44s, with Densham's 1930 Aston Martin lowering the vintage time to 70.95s. Not to be overshadowed, Guy Spollon reduced the three-litre class sports car record to 68.60s with his Riley, and Jon Giles took the FN/AC up in 71.22s to a vintage record in that class.

And still they fell . . . Stewart's 1922/28 Bentley Special took another record in the big sports car class, in which Ben Black made a notable best sports car time and general record in the 2.9 Alfa Romeo (64.92s), beating owner Rodney Felton into second place (66.65s). But Felton was to delight the crowds with four demos in Tom Wheatcroft's V16 BRM – that wonderful sound! (The ribbon tachometer reads to 12,000 rpm.)

It was records all the way at Loton, Keeling's PB MG Special setting a new 1100cc racing class time (68.49s) and Lake's Amilcar-Riley, again going beautifully to shatter the previous vintage best, managing 71.63s. Hulbert's s/c Alvis was another record-bnreaker, in the big racing car section (66.94s). Felton, out of the immaculate BRM, used his Ferrari to set the sports/racing record at 68.91s. The Edwardians also performed. Roger Collings' 19-litre Mercedes-Maybach was quite the fastest (80.02s), after he had been forced to hold it in gear on his first ascent.

If you missed it, the Hagley & DLCC has another Loton Park fixture on July 16/17. **W B**

V to C Miscellany

Arising out of the recent reference in MOTOR SPORT to the 1927 Ensbury Park air races, Barry Stapleton writes to say that his 1928 FWD Alvis was sold by Motor Macs who sponsored aeroplanes at that meeting. It is the first road-equipped four-cylinder FWD Alvis, WK 5485, which Major Harvey drove in practice for the 1928 Essex MC's Six Hour race at Brooklands. The engine gave trouble and it was a non-starter. Its history is sought, after it had emerged in September that year with another engine and re-registered WK 7349. Motor Macs of Southampton then sold it – a two-seater with body by Carbodies of Coventry. It is now supercharged but no history exists for it since 1928, when it was black with green wheels. If anyone can tell the owner, who bought it in 1986, anything more, letters can be forwarded.

Following presentation of the new National Motor Museum Prince Henry Trophy for 1993 to MOTOR SPORT's WB for his contributions to the world of the historic vehicle and its preservation, this prestigious award was handed to Arthur Jeddere-Fisher and Peter Glover at the VSCC's 1994 Silverstone meeting by the museum's curator, Michael Ware. The award recognises their invaluable work in the vitally-important field of the FBHVC, which watches carefully any Euro, or other, restrictions on vintage and historic motoring.

Below: Michael Ware (right) presents the National Motor Museum's Prince Henry Trophy for 1994 to Peter Glover (centre) and Arthur Jeddere-Fisher.



Remember that great happenings are due at Shelsley Walsh on July 2/3. On the Saturday the VSCC stages its annual hill-climb there as part of its Diamond Jubilee weekend, when apart from the usual vintage and historic car entry, 10 ERAs are expected to compete. On the Sunday tradition will be upheld by a class for Shelsley Specials, of which 37 have been nominated already, and another class for aero-engined cars of the AECC, along with the sports cars and Edwardians. Do not forget, also, that the VSCC Jubilee events from July 3/8 based at Malvern will be varied and of great interest. Details from the VSCC Office, 121 Russell Road, Newbury, Berks.

With the idea of not being too far from the above-mentioned VSCC action, the Trojan OC will rally to the Verzons near Ledbury on July 3. It will be a busy time because the 750 MC's National Austin 7 Rally will be held at the NMM at Beaulieu on the same weekend and, if you can turn your back on vintage cars, the Popular Flying Association has its International Air Rally and Exhibition at Cranfield Airport, Beds, on July 1/3.

Rumour has it that after the aero-engined Cooper-Clerget crashed at Brooklands in 1921 it may have been buried in the rubbish tip at Zborowski's house. Remembering "Babs", it is not impossible that it may yet be dug up, if it really still exists, in which case someone might get a 1908 GP Mercedes chassis and a V8 Clerget engine, and possibly other racing-car artefacts that may have ended up there. The house has been empty for some time and on the market for something in the region of a million pounds, which seems to have forestalled any chance of an excavation.

The Crossley Register, which looks after all Crossley vehicles from 1904 to 1958 and subsidiary products, has its Cambermere Rally in Shropshire on July 9/10. Issue 27 of its *Newsletter* contains much very evocative matter from Crossley's past, including a reproduction of a colour advertisement, many old photographs, and much about the Crossley-Bugattis, among other interesting items in its 41 pages. Membership costs £13 a year (£16 Overseas). Apply to M Jenner, Willow Cottage, Lexham Road, Gt Dunham, King's Lynn.

In succession to David Sewell, Richard Day is the new Curator of The Bugatti Trust at Prescott, where an invaluable number of Bugatti records and artefacts are kept, and there are many plans for improvement.

Representative of the many events for older vehicles, the 10th Ludlow Festival on May 6 had an entry of 139 pre-1968 cars, with town parade and a run from Leominster. It has been organised, since 1984, by Philip Reckless, this year with the support of the local police inspector and four councillors. Templar Windscreens' Commercial Tray was won by a 1964 Dodge 106 P6 truck, Watson's Silver Cup by a 1949 Y-type MG, Watson's Shield by a 1932 Rudge motorcycle and the Judges' Choice Silver Cup by a 1931 Rolls-Royce P2 tourer.

Demonstration runs by cyclecars such as Baughan, Benjamin, Morgan, GN, Tamplin, Bramble, Bedelia and AV Monocar are expected at the VSCC Mallory Park race meeting on July 17. So it is appropriate that the VSCC Light Car Section's magazine has an article, by Mike Bullet, on the driving techniques cyclecars require . . . The Section's 1993 Light Car Trophy was awarded to Andrew Tarring, its Ladies' Trophy to Alexandria Thorpe and the Cyclecar Trophy to George Pitt.

The Morgan SCC has its sprint meeting at Elvington, Yorks, on July 23, to which the Morgan 3-wheeler Club is invited. Details from John Blower, on 0782-311201.

From September 10-November 13 the Mill Green Museum at Hatfield is to run an exhibition of the pre-war Sir Henry Birkin motor works at Welwyn Garden City, where the blower-4½ Bentleys and other racing cars were prepared for battle; the layout of the works is to be reconstructed and the link with Mike Couper remembered, also displays of some of the unusual work carried out at this racing-car factory. Details from 0707-853502.

The annual Bentley DC Silverstone race meeting takes place on August 20, with a Parade of Bentleys as part of the proceedings.

In an interesting historical byroad from the *Daily Mail* 's weekly series *The Street Where I Was Born* (which would surely make a book) — author Malcolm Bradbury refers to the first car in Macclesfield being driven up the steps of the parish church (?) and had a picture of his pedal-car, the sort made by Lines Bros, intended, I think, to represent a Morris, although they made them with R-R and other radiators. **W B**



The Duo

This venture was commenced in 1910 by Mr LF de Peyrecave, just as the Cyclecar Craze, the so-called "new motoring", was preparing to take off. Duos were originally supplied by Duocars Ltd of 70 York Street, London SW, though the factory was at Deptford, in Alpha Street, south-east London. The name was rather clever, because there was a tendency to refer to all two-seater cyclecars as duos . . .

The concept was commendably simple. The frame was reinforced ash, with half-elliptic springs. The tubular front axle had car-type stub-axles, but these were moved by three cables working independently, over a bobbin made of fibre. Wire wheels were shod with 650x65 tyres. A JAP 85x85mm vee-twin engine, fan-cooled, drove by chain to a countershaft and then *via* expanding-pulleys, giving variable ratios as these were expanded or contracted in sympathy with movement of the back axle (no clutch). Lubrication was by hand pump from an underseat tank. A Lukin carburettor and Bosch magneto were used. Braking was achieved by pushing forward the belt-tensioning lever, so that the belt-rims contacted two brake blocks. There was a normal accelerator pedal and the clutch and belt-tensioning pedals were inscribed 'Duo'.

That was the form of this simple cyclecar, which in 1912, when the craze was at its height, sold for £99.15/–, with a two-seater body. It weighed only 4½ cwt. Mr de Peyrecave obtained excellent publicity for his cyclecars. He and others drove them in reliability trials, took records at Brooklands, and *The Cyclecar* magazine (a Temple Press weekly which quickly sold out at the 1912 Motorcycle Show its initial print-run of 80,000 copies, so that another 20,000 had to be run off) bought a Duo as a staff car. There was also the distinction of the photographic front cover of the first issue of this journal, published on November 27 1912 (price 1d) depicting a procession of four Duos being driven along a country road, the first one by a lady, who I expect was Mrs Peyrecave. (Incidentally, this effective full-page photographic cover, before the age of colour, was to remain a feature of this magazine for a great many years, even after it had been renamed *The Light Car & Cyclecar*.)

Before the end of October 1912 de Peyrecave and McArthur (Duo directors) had set records of up to nine hours and 300 miles, at Brooklands, averaging over 38.3 mph.

At the first rally of the newly-formed Cyclecar Club (which was to become the Junior Car Club and after WW2 the British Automobile Racing Club), held at The Bear at Esher, five Duos turned up. Mr de Peyrecave then took part in the 100-mile Midlands Trial, carrying a spare tyre on his Duo's lamp-bracket, but ran off the road. In the 1912 MCC London-Exeter-London Trial one Duo retired while RF Messervy's Duo gained a gold medal. Soon after this de Peyrecave scored full marks in the Bournemouth & DMCC's trial, completed the course in the Children Trial and climbed Alms Hill non-stop.

A Duo (IT 39) was modified in respect of a pointed-tail body Plater body, disc wheels, lowered seats and steering column, gas headlamps, battery-fed horn and P&H side and rear lamps and a Selfridge's 13/6d clock. This was regarded as an enjoyable exercise, the owner saying that he dreaded the day, should it ever arise, when the Duo would reach such a state of perfection that nothing more would improve it.

Thus more useful publicity, enhanced further when Percy Bradley ran one of these

cyclecars when he became Secretary of the Cyclecar Club — he went on to be clerk-of-the-course at Brooklands in 1930, long after Duos were forgotten . . . Meanwhile Messervy had failed in one trial when a belt-rim detached itself but Bradley and others put up many more good performances and a standard Duo climbed Chalk Pits hill for its new owner, with a racing Duo also present.

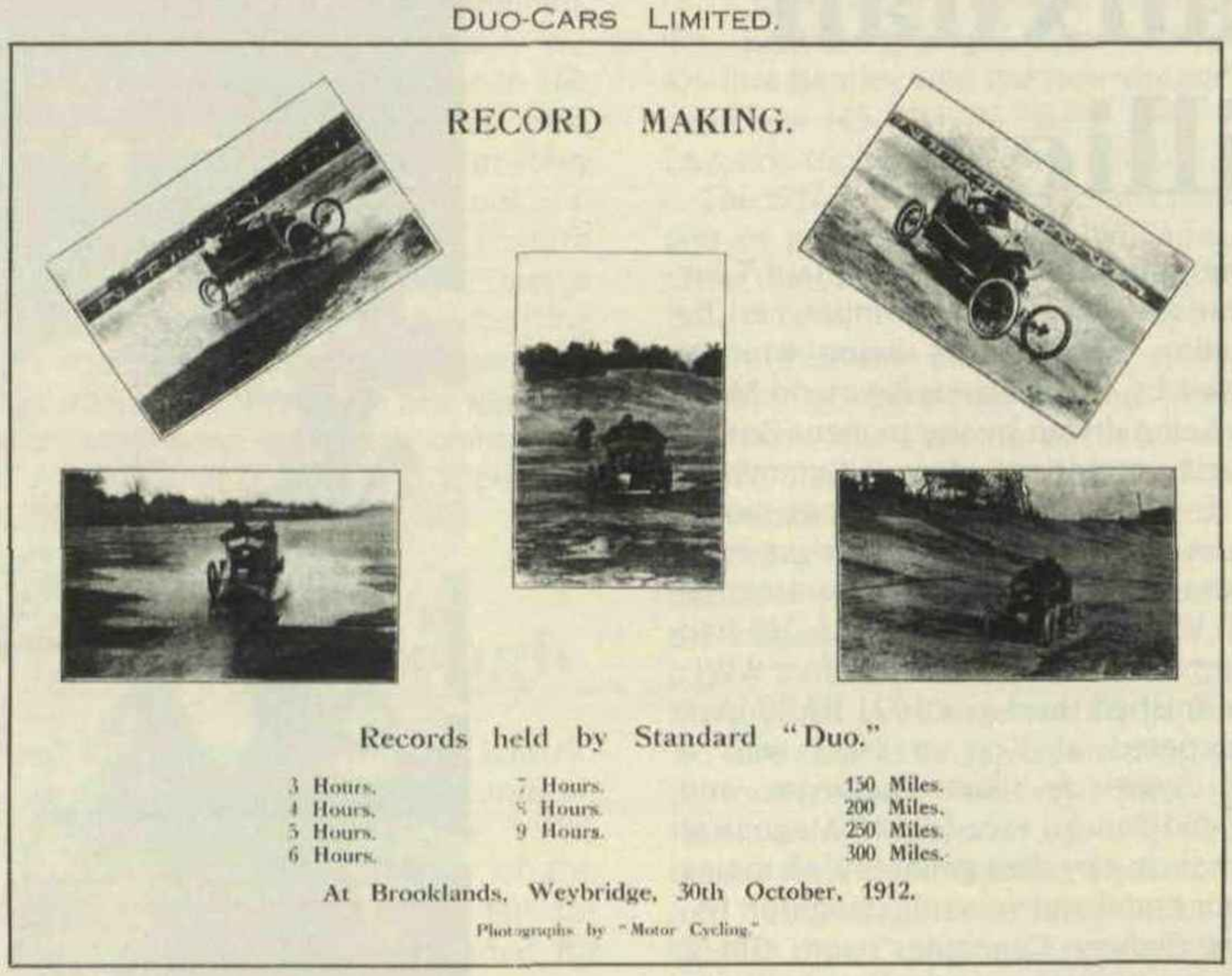
In 1913 an improved Duo was announced, with an extra countershaft, driven by Reynold chain, on which were two sprockets for a drive to the belt-pulleys countershaft. With dog clutches to engage these free-running sprockets an extra two-speeds were obtained, GN fashion, and with the variable-belt-drive from the rear countershaft, this gave an unusually wide range of ratios, from 4-to-1 to 16-to-1. It involved three levers, for the new change-speed, the variable ratios, and the belt-tensioner.

The front countershaft run in Skefko self-aligning ball-bearings in gun-metal

"The Duo factory was probably too small to make munitions"

housings bolted to the chassis side-members. A cover over the side belts formed a step into the cockpit. All nuts and bolts on Duo were secured with spring washers or split-pins. The new model cost 106 guineas, the older model 97 guineas. Meanwhile, *The Cyclecar* had done 3000 miles in its Duo and spoke highly of it.

Good performances continued to pile up. For example, while it is impossible to refer to them all, in the 1913 Stratford Rally, led by Bradley's Duo, de Peyrecave restarted his, four up, on Sunrising Hill. Bradley's



Period success advertising (above) and, opposite, the Duo factory's 40-strong workforce.

racing Duo 'The Deuce' had lost its exhaust pipes, so on a good climb made 'Brooklands' noises. In the Cyclecar Club's Fuel Consumption Trial three JAP-engined Duos, using respectively Lukin, Stewart-Precision and Solex carburettors, gave 40.2, 50.7 and 53.1 mpg. Not to be outdone, Messervy climbed Saltbox hill near Cudham fast on a stripped chassis and 'The Deuce' did a four-up restart of a freak hill near Buxton. Clearly, the Duo was one of the better cyclecars . . .

However, de Peyrecave did not stop there. He also made the De P light-cars, using a variety of proprietary four-cylinder engines. The 10 hp 1098cc model had a wheelbase of 8' 6", pressure lubrication, a four-speed gearbox, 700x80 tyres and, unusual for a small car, three-quarters elliptic back springs. It cost £210 when a Deemster was priced at £205, a Singer at £225, a Standard the same, a de luxe Morris Oxford £220 and an AC the same as the De P. The cyclecars were continued as well.

Alas, the war-clouds were gathering. The Duo factory, although with a staff of 40 and making an average of nine cars a week from 1910 to 1915, was probably too small to make munitions. So Mr de Peyrecave patriotally joined the RFC, and was posted to Italy. When he was demobbed he reasoned that he could not compete against the giants like Austin and Morris. So he went instead into the Estate Agency business. It is nice to know that his son, Victor de Peyrecave, and *his* son, continue this business; I am indebted to Victor de Peyrecave for some of the above information. **W B**

Paris-Rouen centenary

On Saturday June 4, when the Allies were finalising preparations for the 50th Anniversary of the Normandy landing, another group of veterans from France, Britain, New Zealand, Australia, Holland, Belgium and other countries gathered in Paris to commemorate the centenary of another significant event — claimed to be the world's first motor race, which ran from Paris to Rouen on the July 22 1894. Some 250 cars, the oldest of which was an 1892 Panhard and the youngest a 1917 Chénard et Walcker, recreated the event.

The start was at the Place de la Concorde at 8.00, and the 125 km route — as close to the original as possible — ran up the Champs d'Elysées, past the Arc de Triomphe, and then followed the river Seine through Poissy, Rosny and Bonnieres, before traversing Gaillon, St Etienne du Vauvray and Le Vaudreuil, and finally heading to Rouen on Route Nationale 15.

In 1894 the rules called for "self-propelled vehicles (steam, electric, gas or petrol) with a minimum of four seats", and stated that the first car home would not necessarily be the winner — first place would be judged on a combination of "safety, passenger comfort, minimal damage to the road, and speed". Qualifying took place during the week preceding the race, when entrants had to cover 50 km in less than four hours. A total of 21 competitors (14 petrol driven, the remainder steam) started the race at 8.00 in perfect weather, and about half of them finished. First across the line after 5h 40m was the steam powered De Dion Bouton et Cie entry (a four-seat Victoria); however the winner was judged to be the second fastest finisher (5h 45m), a petrol driven 4-seat Phaeton entered by the *frères* Peugeot.

On June 14 this year, cold and wet weather conditions kept engines cool, and probably accounted for very few of the 246 competitors failing to finish, with the fastest cars completing the course in under nine hours. It would have been quicker had the event run non-stop, but this being France however, there was serious entertaining along the route . . . **C W**

Vauxhall Villiers

The Vauxhall Villiers of the late Tony Brooke will now be campaigned by Julian Ghosh. It is being wrongly stated that by 1936 this ex-Raymond Mays car was being driven by the pioneer Brooklands racing motorist Sydney G Cummings. In fact, by then Sydney Cummings would have been nearing his 60s and might have found the powerful and temperamental Vauxhall Villiers a bit of a handful. He had raced Cummicar and Scar cars before WW1. He then finished third in a 1921 BARC race and competed at Kop in 1922 with a pre-war *Coupe de l'Auto* Sunbeam, and won an 'Old Timers' race for MG Magnas at Brooklands, but by then generally left racing to his successful and versatile daughter, Ivy.

It was Sydney Cummings' son, Sid E Cummings, who took over the Vauxhall in its later pre-war days, when for many years his father had been a prominent official at Brooklands and elsewhere. **W B**



Sydney Cummings (right), who went on to become an official at Brooklands, in discussion with Miss Lister, a well known Aston Martin racer at the track.

VSCC Scottish Trial

Far flung for some but a very welcome event in the VSCC calendar, the Scottish Trial was held this year on May 22, at Biggar, Strathclyde. Of the 29 entries, all started and only W Fletcher's Alvis failed to score full marks at Snaip Hill, but 13 other sections sorted things out. Retirees were limited to T Richardson's 1934 1.6 Riley and Dr Carr's 1932 A7 Special.

First Class awards in Class 1 went to Campbell Cup winner James Baxter (1929 A7), just a point ahead of Tony Moy's 1929 standard A7. The only driver to get one in Class 2, which had only five entries, was Geoff Toms with his 1921 Fiat. Second Class Award winners were Barry Clarke (A7), Dr Gray (A7/JAP) and S Welsh (A7), with Class 1 runners P Longhurst (Riley 9) and J Hindle (A7) taking Third Class honours.

S Gordon (A7) won the Sammy Davis Cup. **W B**

Aero-engined cars

The prevailing and growing band of those building aero-engined cars has recalled some more others from the past, proving that more such monsters roamed the roads from the 1920s onwards than is usually recognised. There was, for instance, the racing Sunbeam into which Warwick Wright had a vee-eight-cylinder Sunbeam Sirdar aero-engine installed, with the idea of using this roadgoing two-seater for continental motoring.

This airship engine had side valves beneath detachable valve-caps and it fitted neatly beneath the bonnet of what looked like a very normal car, with spare wheel on the o/s running board. It was a six-litre 80 × 150 mm engine similar to the 50 hp Crusader vee-eight aero engine Coatalen put into a standard 24 hp Sunbeam for CA Bird to drive at Shelsley Walsh in 1913, and was completed just in time, driven to the hill, and was second fastest, in 58.4s.

The chassis was, in fact, one of the Indianapolis Sunbeams, but as the Wolverhampton company built cars for six of these 500-mile races, from 1913 to 1921, it is impossible to determine which was used. The huge engine developed 200 bhp/2200 rpm, at which speed the car was doing 100 mph, yet it was said to be able to pick up from 25 mph in top gear and to be generally "gloriously docile". The four-speed racing gearbox, back-axle and road springs were retained, as they were sturdy enough to take aero-engine torque and power. The only admitted shortcoming was the very restricted clearance between the oil-pump casing and the ground. This was a problem which most of those using aero-power in cars got over by replanning lubrication systems to draw lubricant from a tank mounted at chassis level. By 1923 this Warwick Wright Sunbeam was for sale for £1000.

I am also reminded that a friend used to tell me of an old Napier with a Rolls-Royce aero engine residing at a Northamptonshire garage at about the same time, and which was not, I think, the R-R Falcon-powered Napier in which Lt Col HG Henderson used to deport himself here and on the continent. Even earlier, an avid schoolboy reader of the motor papers, I seem to recall that *The Motor* had a brief description of an aero-engine which had been installed in a Buick chassis. Even at that age, I thought this seemed perhaps too flimsy a frame for such a power implant. Nor should we overlook the Hall Scott-engined car which the late Lord Donegal, editor of *The Sherlock Holmes Journal* for a time, ran when he was at Oxford.

Apart from these aerocars of the early between-wars period, such formidable monsters are now being built again. The latest of which rumours concerns the possibility of a Curtiss engine, as used so successfully by Mark Walker in his Monarch Special, being put into a pre-1914 Renault chassis, driving through a four-speed Lorraine Dietrich gearbox and cooled maybe by a Hispano-Suiza radiator. **W B**

VSCC Northern Rally

The outcome of the VSCC Northern Rally based on Buxton on May 14 was: **Northern Jug (Winner of Class 1)**: P Hart/D Smith (1930 Humber). **Potter Trophy (Best Novice)**: A King/G Bethel (1939 Alvis). **Newcomer's Award**: S Flathers/S White (1926 Bentley). **First Class Awards**: P Easter (Sunbeam), J McEwen (Riley), M Tomlin (Alvis), R Rouse (Bentley). **Second Class Awards**: K Burnett (Alvis), D Baker (Rolls-Royce), T Jones (30/98), P Cattell (Riley), Jo Winder (A7), F Ashley (MG), J Baxter (A7). **Third Class Awards**: J Harris (Lagonda), P Glover (Alvis), G Winder (Alvis), A Lupton (Lea-Francis), P Thomas (Riley), C Webb (Alvis).

Topically, a burglary at the start at the Pavilion Gardens caused some delay. There were 74 entries, and two non-starters. Shaw's 1927 Alfa Romeo retired with a duff magneto, Phelps' 1937 FN-BMW broke a halfshaft and Harris' 1934 s/c MG Special had differential trouble.

The next 'Northern' is in 1996. **W B**

VSCC Wiscombe

One week after the Curborough speed trials the VSCC held its annual speed hillclimb at Wiscombe, the picturesque and sinuous Devon course. Spollon's ERA R8C was again in fine fettle, setting FTD in 47.63s to Day's 47.66s in the "oversize" ERA R14B, with Giles in the vintage FN-GN quicker than Morris's ERA R11B, by 48.38s to the blown ERA's 48.56s.

The smallest sports car class was won by Rides's Riley (56.57s). The vintage winner Owen's effective Morris with vee-twin JAP engine set 58.10s on its first run, when most drivers were better at their second attempts. Of the 1½-litre road-goers, Howatt's Morgan 4/4 scored 51.93s, best vintage car being Robert's 1927 Frazer Nash (52.49s). Best of the three-litre sports cars was Guy Spollon's Riley 2500 Special which, with a climb in 51.81s, broke the class record. Moreover, the vintage equivalent, fell to Giles, who got the AC/FN up in 52.21s. The class for the biggest of the sports cars saw Sparrowhawk's impressive 4.3 Alvis Special clock 50.97s, which beat Felton's blown 2.9 Alfa Romeo by the narrowest of margins — 0.01s! Vintage honours here went to Biggins's 30/98 Vauxhall Special (56.72s), which did well to vanquish two 4½-litre Bentleys.

Four Edwardians turned out. Bill Lake, giving his 1914 TT Sunbeam an airing, was quickest (64.66s). Next best was Lemon's early 30/98 (66.33s) and Pipkin driving Barry Clarke's little Singer Ten won on handicap, although it took him 79.45s to do so.

The 1100cc racing car class went to the rapid Austin/Fiat of Campbell (51.01s), best vintage time going to Lake's Amilcar-Riley (53.24s). Two vintage Morgans took on three pvt Riley Specials in the 1½-litre division, and aided by a s/c engine, Dunn's Coventry car was quickest (50.37s), beating Caroline's Morgan (51.83s). The classes for three-litre and over three-litre pre-war cars and post-war racing cars were combined, which is where we came in; honours to Bruce Spollon and to Freddie Giles. **W B**

VSCC Curborough

The Curborough event near Lichfield is a sprint of not too long duration, with cornering added. The VSCC uses it once a year. The results of the meeting on May 1 came in just too late for inclusion last month, but are appended, for the record. This was the 31st such meeting, at which 89 competitors had their cars divided into 10 classes, sub-divided into vintage and pvt in the majority of them. Bruce Spollon's ERA performed well, posting FTD and netting him the Curborough Trophy, his second run taking only 36.66s.

S Roberts's 1927 Frazer Nash (40.94s in Class One), set a vintage and general course record, vanquishing the pvt opposition, Beebee's 1932 FN taking 44.57s. The 1½-litre sports cars were led by K Pointing's Riley 9 with a good time of 43.86s, and T Watson's 1936 1½-litre Riley won his section (41.91s). In the over-1½-litre sports car, special and hybrid class only two vintage cars turned out, Miss Newson's 1930 FN with two-litre power scoring (45.17s). From a field of 14 later cars the quickest was R Gilbert's 4¼ Bentley (39.36s). Ann Shoosmith's 4½-litre Bentley won the next vintage sports car class (45.74s). N Hall's 1935 4½-litre Lagonda took the pvt class (43.82s).

The Edwardians and Veterans provided a sort of punctuation, Jonty Williamson clocking the best run in the venerable 1908 GP Itala (47.84s), though his son won on handicap in the same car. The only car with the benefit of aero-power, the Mercedes-Maybach, was slipping its clutch and took 49.08s. I am quoting the better of two runs of course. Hernandez got his A7 *mit* blower motoring well in the 1100cc vintage racing-car class (41.30s), to which the best of the pvt brigade replied with 45.59s, by Skeavington's 1931 unblown A7. Caroline's Morgan set a vintage record in the up to 1½-litre class (39.63s), where the fastest pvt performer was T Poultney's Riley (40.84s). Half-a-dozen racers of up-to-3000cc contested their class, Spollon winning outright and best vintage time being set by Freddie Giles in the AC-engined Cognac (38.29s) – a new record – though it failed on its next appearance.

It then rather tailed off, with only three drivers contesting the big racers' class, with Guy Smith's pvt Alvis-FN and two aero-engined cars, C Baker's 27-litre Delage-Hispano Suiza (the latter make applying to its V12 engine) and Mark Walker's six-litre Cirrus-powered Parker-GN. The capable Mark broke the vintage record on his second run (38.94s), against 46.58s by the larger aero-car, and Guy upheld his FN's honour in the pvt division (37.07s). Finally, the *Short Shorts* won the Team Contest, and were found to consist of Cannell's 4.3 Alvis, Mrs Tomlinson's 2.7 Alvis and Badderley's 3.5 Alvis. **W B**

OBITUARIES

John Griffiths

John A Griffiths will be remembered as the enthusiastic producer of the JAG sports cars, at first at JAG Cars at Thames Ditton for two years and then from the works of RGS Automotive Components Ltd, at Winkfield near Windsor, from 1954 to 1956. During this time some racing successes were achieved and about 50 cars built, using originally Ford V8 engines, later Ford 10, MG and Coventry-Climax engines, in simple ladder-frames, of tubular construction. He built many specials apart from his production ventures, and drove the first JAG in the 1949 Brighton Speed Trials; there was a s/c Riley Special, and Dickie Steed raced the MG-powered JAG HRX 734 from 1953-1955.

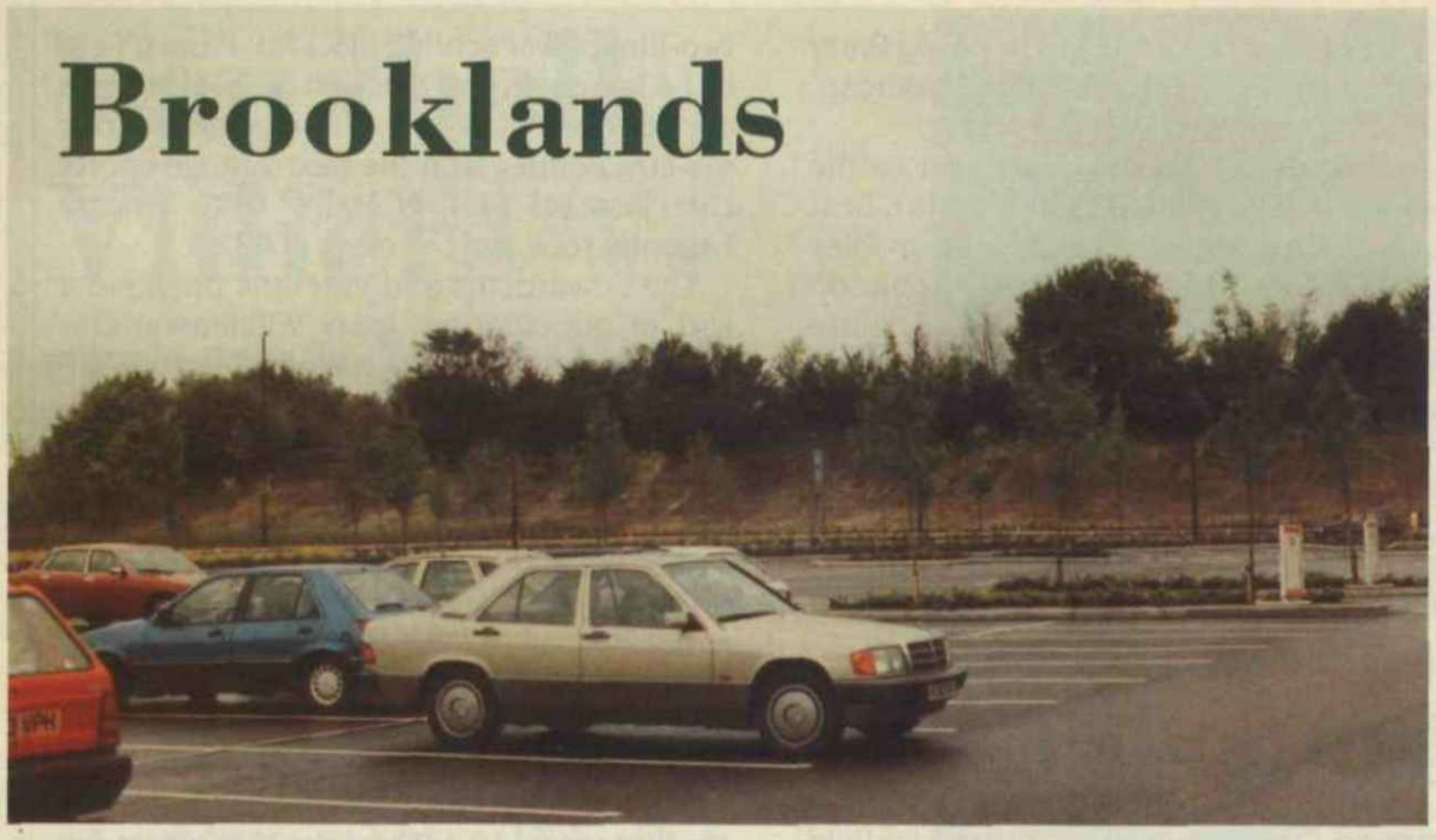
John's friends included Dick Shattock, for whom he made several RGS Atalanta frames, and Spen King and Peter Wilkes of Rover, which led to him building the body for the well-known single-seater Rover and later a short-wheelbase Rover 2000 tourer. The production JAGs were notable for their all-enveloping bodies, of hand-beaten aluminium or fibreglass. In 1970 JAG No 21, with transverse mid-engine, interested British Leyland when they were contemplating such a car. The idea was stillborn. But John used the car up to 1990 and it is being restored. Car No 20 was ordered by Hamish Orr-Ewing in 1956, never collected, but still exists.

In 1960 Griffiths moved to Cornwall, becoming a wood-carver. He made his own boats, was a keen water-skier into his 70s, and built a three-wheeler last year, as personal transport, a reminder that he did the chassis for the Vincent trike in 1955.

Recently remarried, aged 79, he died peacefully in his sleep during May. He will not be forgotten. **J S / W B**

● Brigadier WEH Grylls OBE has died, aged 91. He had a brilliant military career and will be remembered in our world for seeing the great possibilities of the VW Beetle when, as Commander of Britain's secret T-Force, he was in temporary control of the war-damaged Wolfsburg plant. He sent blueprints to Lord Rootes, but the car was turned down as quite impractical! Born at Funtington Hall near Chichester, Brig Grylls was educated at Harrow and Sandhurst.WB

Brooklands



I took advantage of a staff visit to Brooklands Museum to discuss last month's 70th Anniversary issue of MOTOR SPORT. (I bought my first copy of *The Brooklands Gazette* from the bookstall on Marylebone Station in 1924, at the age of 11. I was there with my mother, awaiting the arrival of her sister from Aylesbury, and ordered all issues from then on.)

After the meeting, I went round to the other side of Brooklands, and had tea in the big Tesco there. The overgrown Byfleet banking curves round close to the supermarket and its enormous car park (above), and there is a hole in the banking to permit entry and exit. For me, that was goodbye to the old Brooklands . . .

Tesco has, admittedly, put up on its walls about a dozen sizeable photographs of Track happenings (one incorrectly captioned), but I regard this as no more compensation for the devastation of this once historic aerodrome than the memorial Vickers-Armstrongs erected in 1957, which the late Lord Brabazon of Tata called "Brooklands' tombstone". As we drove away I felt very, very sad . . .

We then went on to Old Byfleet Church, where Parry Thomas was buried in 1927. Not far away we found the grave of another Brooklands exponent, Herbert le Vack (below), the greatest of all the motorcycle riders, who lost his life in a road accident in Switzerland in 1931 while returning to Geneva, where he was then based, having joined Motosacoche.



assembly of members and guests with commendable efficiency.

Next it was to a buffet lunch at the Forest Hotel in Dorridge, where Ian Glass had called for as many of the surviving Rover 75-based Marauder sports-cars to gather, at this venue very close to Mead's factory (now a garage) where these cars were built.

Although the total made in 1950/52 numbered only 15, it is notable that 12 can still be accounted for, including the prototype KAC 313 and a coupé MOE 645, with BMW-like radiator grille. Seven came to the jolly, although one of these was a three-litre chassis and another a similarly rough engineless example, both on trailers awaiting rebuilds.

The running Marauders comprised Glass's own Mead-bodied OUG 777, well-known from LeJog and other competition events, the 2.6-litre HFT 330, the Wilkinson-rebodied KW 111, the Abbey-bodied BSN 823 and MOL 629. Past owners eagerily inspected these, produced photographs, and compared experiences. Moreover, George Mackie attended, which reminded me of being asked to collect any Marauder photographs I needed at the press preview 44 years ago and inadvertently gathering up all they had, thinking they were different views of this new sports Rover, when, as I later discovered, these were all the same, *and all they had . . !*

Back-up cars included two Rover 12 tourers, of which the tuned-up one has an overdrive gearbox incorporated, for motorway crusing at some 80 mph I was told, a rare Rover 16 saloon, its dark green body and wheel discs gold-lined, and a white Rover 110 "auntie". A small gathering, and a happy, interesting occasion . . .

Richard Mead, who made the first Marauder bodies, pictured with Ian Glass's car in 1991.

Events

Other happenings recently include dinner with doctor Sir Stephen Miller Bt, grandson of Sir Alastair Miller Bt, who was a well-known Brooklands driver with all manner of cars, including the aero-engined Wolseley Viper. He had started with a Matchless motorcycle in 1912.

Lunch next day was at Moreton-in-the-Marsh, where the "wake" for the late Tony Brooke, of 30/98 and Vauxhall-Villiers fame, was held. Many notable VSCC personalities were there, including Keith Schellenberg, Anthony Heal, Patrick Marsh, Julian Ghosh, Peter Hull and Roger Collings (in his Mercedes-Maybach).

On the following evening were were invited by Johnny Thomas to the dinner which concluded the Welsh Rally of the Bentley DC. Never do I remember seeing a larger assembly of these cars, all immaculate, to the tune of 109 of them, 83 of which were vintage. The Metropole, a hotel known to the rally fraternity almost from time immemorial, handled the enormous

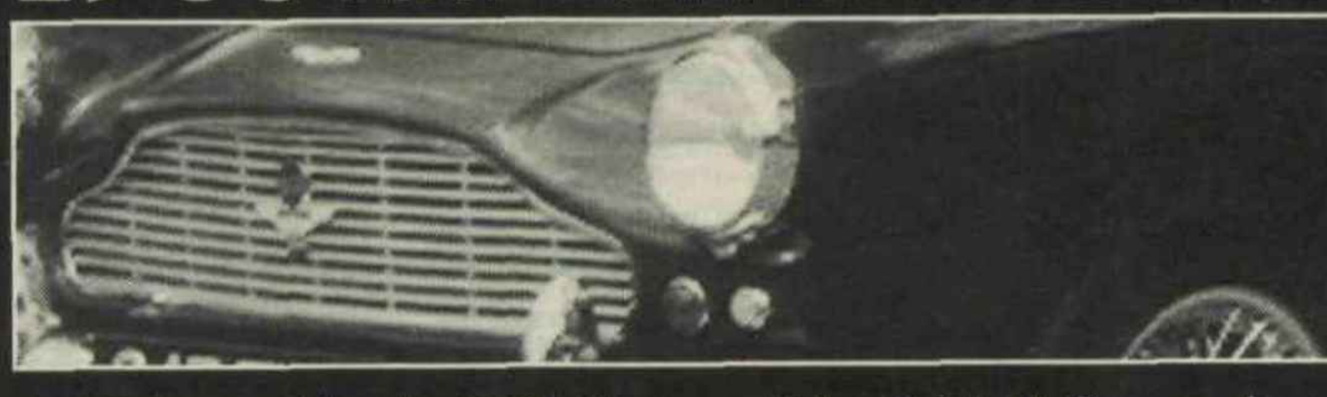


The things they say

The first motor race: such I call it, for as such it will probably always be known in the annals of motor racing; but as a description of the Concours des Voitures sans Chevaux, organised by *Le Petit Journal* in 1894, it is almost ideally inaccurate. For this concours was not the first ever event organised for motor cars. It had been preceeded full seven years by the competition organised by M Fossier of the *Velocipède* in 1887 . . . but one car took part in it, a steam tricycle of the Comte de Dion; but the event of 1894, although it did unite a number of competitors, belied the description of the first motor race in a second respect in that it was in no sense of the term a race" — MOTOR SPORT's one-time respected and valued contributor the late EKH Karslake, writing in *The Autocar* in July 1933. **W B**

Unrestored and Collectors Motor Cars at Beaulieu

1963 Aston Martin DB4 Convertible.





1963 Aston Martin DB4 Convertible. Sold 11 September, 1993 in the Unrestored and Collectors Motor Cars sale at the Beaulieu Autojumble for £78,500.

1948 Talbot Lago Grand Sport Vanden Plas Body.





1948 Talbot Lago Grand Sport Vanden Plas Body (totally unrestored). Sold 11 September, 1993 in the Unrestored and Collectors Motor Cars sale at the Beaulieu Autojumble for £3,220. (Estimate £300-500).

c1915 Harley Davidson Motorcycle and Sidecar.





c1915 Harley Davidson Motorcycle and Sidecar (unrestored). Sold on 14 May, 1994 in the Collectors' Motor Cars at the Spring Classics Autojumble for £6,900. (Estimate £2,000-3,000).

Entries are presently being accepted for our annual auction to be held at the Beaulieu Autojumble, on Saturday, 10 September, 1994.

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CHRISTIE'S

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When Nuvolari Raced, by Valerio Moretti. Veloce Publishing, £75 (leather binding £225).
It is futile trying to compare the top racing drivers of quite different eras, although it is done. Surely, in the pre-war period, Italian Tazio Nuvolari was the greatest? And here is a very great book to commemorate him. It was chosen by the Mantuan Committee on Nuvolari's Centenary, in fact, to be the official history of his long career, on motorcycles as well as in cars. Written by Valerio Moretti, the Italian representative on the Historical Commission of FIVA, this is the English translation, by Alfa Romeo expert and author Angela Cherrett.

There have been other books about the great Nuvolari, notably that by Count Lurani, but now we have a splendid reference work. The Veloce volume not only contains a history of Nuvolari and his racing exploits but it has a section describing every car race he contested. The race accounts are from various well-known writers and publications, mostly in warm praise of the Mantuan's performances. They recall all Nuvolari's races. These are not detailed reports but they are a fine outline of a remarkable racing career.

One even learns some new facts from them.

The book points out that Nuvolari's great ability as a car driver was apparent in the 1928 Circuit of Pezzo, where he unexpectedly beat Bordino with a Type 35C Bugatti. It caused Morie Morasse of *Motori Aero Cicli di Sports* to write: "There is something about him which has impressed us and that is his calmness when racing. He is a new man, with his own attitude and his own style, agile and decisive, simple and energetic when at the wheel, characteristics which come naturally to him. In him we discover a new type of driver, a champion of a new generation . . ." How fully that assessment was to be proved right, in the years that followed! Even as a sick man, when persuaded to compete in the 1950 Monte Pellegrino hillclimb in a Cisitalia 204A with unsuitable gear ratios and no practice, he won his class.

So here it all is; the pictorial records alone are essential to any genuine Nuvolari admirer. The foreword is by the Mayor of Mantua, the origins of the Nuvolari family are traced and historic documents reproduced — In Italian. I have only the slightest criticism — that we are not told why, after practising in it, Nuvolari did not drive Earl Howe's Type 51 Bugatti in the 1933 Brooklands Mountain Championship race. Supporters of the Nuvolari legend *need* this book.

Apart from it being the definite work on one of the greatest racing drivers, and arranged as an easy reference work, it has so many interesting asides — an explanation of the Tripoli sweepstake, which is shown to have been legal so far as the participating drivers were involved, how reconciliation with Enzo Ferrari was achieved when Nuvolari found the current Maserati dangerous and needed to race for Ferrari, speculation about why he stayed with Bugatti when he might have joined the victorious Mercedes-Benz team, and his comment to his lawyer on accidents, of which Tazio had his fair share — "You can see who is a real champion after a serious accident; if he still has the courage to race without sparing himself, then it proves that he really is someone."

If you want a copy, hurry: only 2000 will be printed. **W B**

Aston Martin DB2, Le Mans 1951. MPH Models, £220.

Quite how one finds 139 things to modify on an established 1/43 model remains something of a mystery, but that is what MPH has done to its Provence Moulage-based DB2. Headlamps lowered by 1.5mm, handbrake release button picked out, reprofiled silencer,twin glove lockers hollowed out. . .

The price of such attention to detail is high; the availability is not. Only 25 such Astons are being produced. Details from MPH at Hookgate Cottage, Hookgate, Market Drayton, Shropshire TF9 4QD (0630 672903).



● Another Veloce publication, in quite a different direction from their Nuvolari tribute, is what they claim to be "the best owner's workshop manual in the world". It is for those who want to completely dismantle and then reassemble their Mazda MX-5s or just maintain them correctly. Veloce's Rod Grainger, with assistants Judith St Clair Pedrosa and Pete Shoemark set about discovering all about the MX-5, in a domestic garage using tools. Two years later the manual, by the two men, arrived. It has more than 1200 photos and 400-plus line drawings. It costs £20.00 and can be obtained from most decent bookshops (ISBN: 1 874105 05 5). **W B**



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F1 safety...

Sir,
After seeing the accidents of Gerhard Berger and Derek Warwick, in Ferrari and Lotus respectively, death in Formula 1 seemed a thing of the past. Unfortunately not.

It will take a long time for the motoring world to come to terms with the absence of Senna from the race track and from this world.

My deepest sympathies to both the families of Senna and Ratzenberger. Their sons paid the ultimate price for the sport they loved most.

I hope such a sad weekend never happens again in motor racing.

Simon Iskenderian,
Addis Ababa,
Ethiopia.

Sir,
I am writing to air my views about F1 safety. This has been prompted by the recent deaths at Imola.

I think that one modification that could be made to the cars to good effect is to restore the width of the tyres to what they were a year or two ago, or possibly make them wider still. Today's tyres may be good enough for a computer controlled car (active suspension) that does not make mistakes and has far finer judgement than any human being, but there should be a wider safety margin to make the cars easier to drive and reduce consequences of an accident.

The other important point about wider tyres is that braking will have a greater effect, so collision speeds should be lower. Would this have saved Ayrton Senna? We will never know, but I think this is a good idea nonetheless, because there have been enough accidents so far this year (both fatal and non fatal) to make one think that something is wrong. If you think this is not a valid point, you only have to look at an IndyCar panic braking — as we all know, the tyres screech and the car carries on regardless. F1 cars used to be the opposite, but not any more in my opinion.

The other point I would like to make is concerning the tragic death of Roland Ratzenberger. Why was the race at Imola not called off out of respect alone? At that point the governing body could investigate the accident (and other accidents) behind the scenes and make changes before the next race. We can't expect the track officials to call the race off due to self-interest. It is up to FIA to have procedures set in place that have to be carried out when a serious or fatal accident occurs. Would you fly on a Jumbo if one had been involved in a fatal crash the day before? The first thing the aviation authorities do is find out whether the aircraft type needs grounding or not, while further checks are carried out. While this is not a watertight analogy, the point about procedures and the FIA, I think, is.

Also, there is no place for complacency with such a potentially dangerous sport as car racing. Any track where there is a good chance of hitting something hard at speed is dangerous. I thought that dangers like this were a thing of the past. Perhaps something will be done now Senna has died, but it should not have taken the death of a superstar to initiate it.
Senna's death has spoilt my enjoyment of F1 for ever.

Philip C Johnson,
Colne,
Lancashire.

Tell-tale signs

Sir,
Elimination of electronic throttles to ensure Formula 1 cars do not have traction control overlooks electronic fuel delivery and ignition timing manipulation to manage the rate of engine acceleration. Although traction control through reduced fuel delivery alone provides a distinctive tell-tale exhaust note heard last year, clever development using ignition timing alone or combined with fuel delivery should be able to provide traction control without a tell-tale. If technology restricting regulations are to eliminate capabilities of the cars then the next regulations might include non electronic fuel mixture and timing controls (manual!).

Perhaps a 'smoke test' — break traction with power to the wheels — during the warm up for the race would be both entertaining and ensure traction control was not in use at that point. A technical audit could ensure that traction control could not be turned on and off by the driver to cover the rest of the event. Rather than limit race car technology in areas where road cars might become more sophisticated, test directly for desired results.

To control costs and provide close racing, many organisations, NASCAR, Formula Ford, Karts etc., limit technology to ensure the cars are evenly matched and provide excitement through driving. May we hope Formula 1 does not follow and become technically boring as a result. With CART/IndyCars becoming a worldwide top championship for drivers of controlled technology open wheel racing cars, shouldn't Formula 1 be different — and be the top championship for both technology and driving?

Wilson Walthall
1220 Arroyo Blanco
Fairview, Texas USA
75069

Lagonda lover

Reader William Hutton of Leeds wrote to agree with our sentiments about the Lagonda Rapide (MOTOR SPORT, November 1993) and to offer advice to fellow owners.

Sir,
When I first got my Rapide it would break down after about seven miles with symptoms of fuel starvation. After a month or so we worked out, with a little help from our friends, and the loan of a DB5 wiring diagram, that the car had incorrectly been fitted with a 12-volt coil and starter resistor so that after about five or six miles the coil became so hot that the engine could knock the spark out on acceleration. After that was sorted the car has been 100 per cent reliable, regularly doing 400-mile round trips. However, it remained thirsty at 12-14 mpg, never bettering 15 on a trip.

The clue to this lay in the plugs, the front three being much darker than the rear three. A trip to GRV Developments revealed all. They attended to and mended the advance-retard spring, replaced the new plugs I had fitted with NGKs and then replaced the contacts and condenser. Only then did they attack the carbs with the rolling road and exhaust analyser. An hour or so later we discovered the main jet in both the main and secondary venturis of the front carb were 210 and the rear 140. Eventually we settled for 160 all round and since then engine idles completely smoothly and revs with consummate ease. The Solex carburettors are very good. Once they're right, they stay right, and the tickover doesn't fluctuate. Now the mpg is 18-19 on a trip and up to 17 running around.

It is as you guessed a fantastic car, capable of well over 100mph at Bruntingthorpe, sideways progression at Silverstone, all in great comfort. Mine, I think, is fairly quiet. They really were ahead of their time in terms of quality of ride and electric windows all round, a solenoid to open the petrol cap, twin fans to the footwell for hot weather and a separate heater and fan below the rear window, picnic trays for rear passengers, etc.

The roadholding on 205 radials is fantastic but the ground clearance suffers slightly. The boot is adequate for any Mafia gangster but oddly for such a large car the passenger compartment isn't as big as that on the Riley Pathfinder I used to own.

The Rapide has sometimes been called the ugly duckling of the DB series but I think it is already a swan. I have owned and driven a DB2/4 MkIII, DB Vantage and a V8 and none had this svelte ride and steering, and only the V8 had better straightline performance (which admittedly was staggering – so was the rate the fuel gauge moved!). It's a great chassis thanks to the torsion bar rear end. I used to race mine and the handling at speed is superb. The tail will go out, but it's terribly forgiving. Mind you, you really need a tailgunner to say, 'It's gone, Milord...'

William Hutton,
Horsforth,
Leeds.

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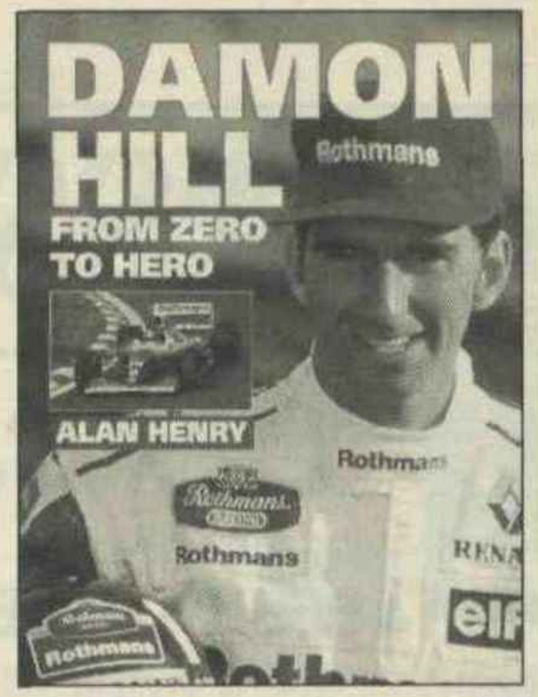
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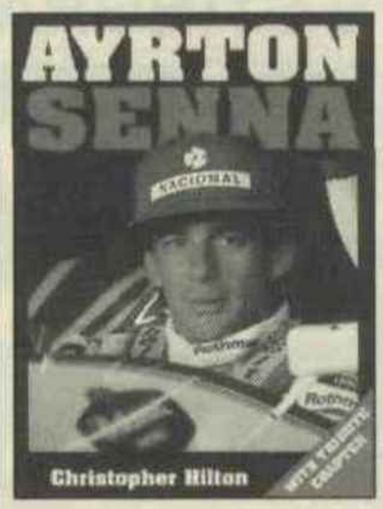
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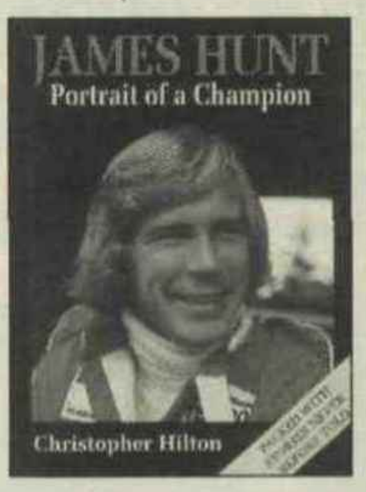
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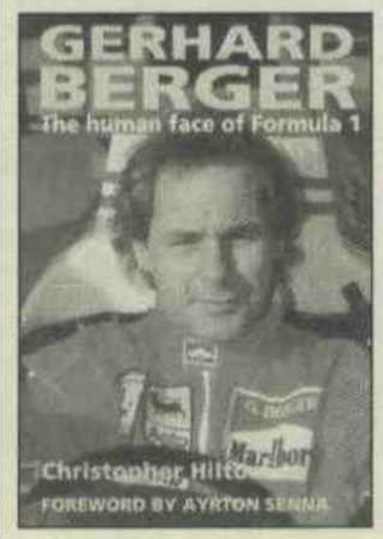




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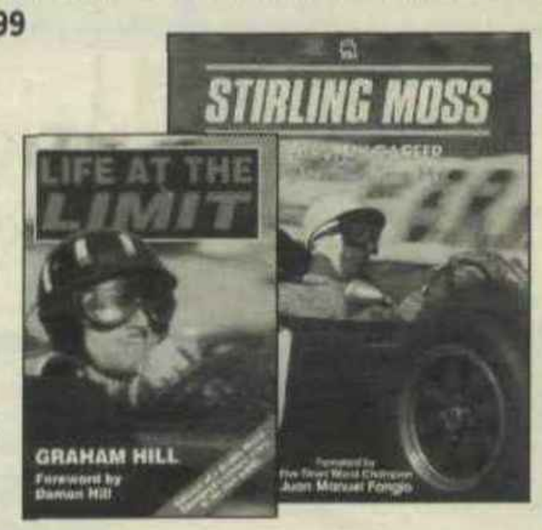


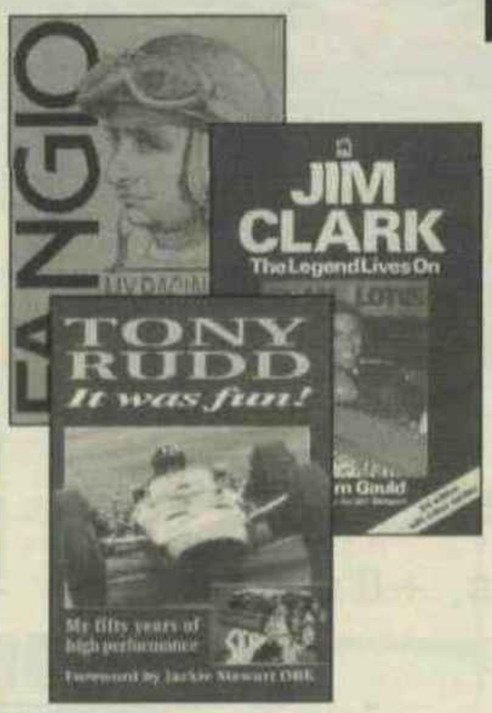


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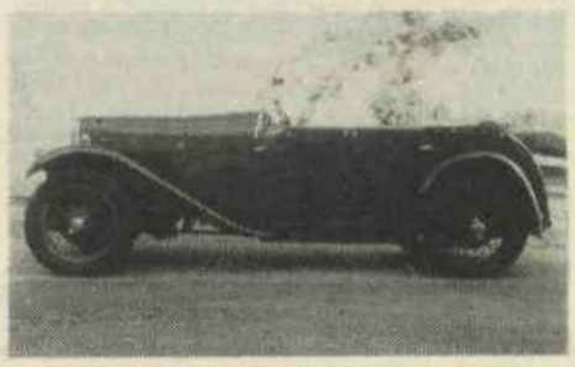
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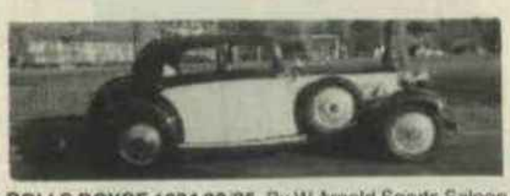
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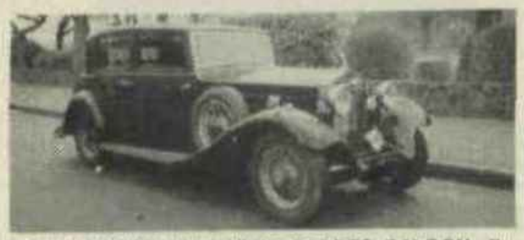
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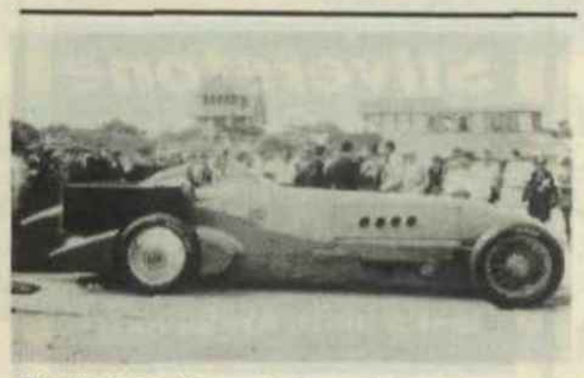
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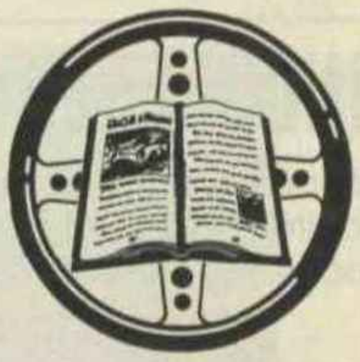
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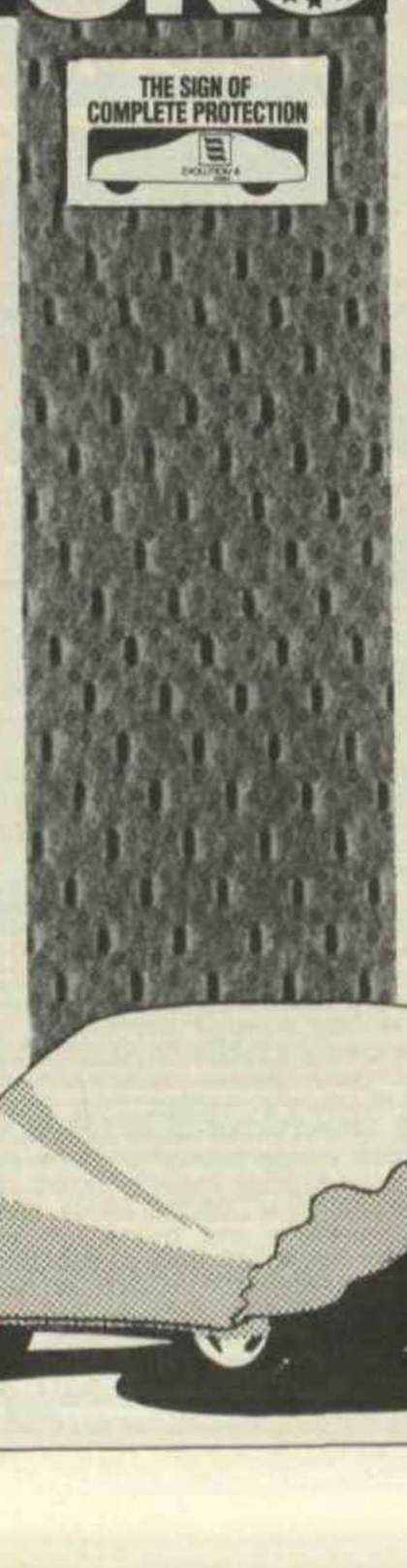
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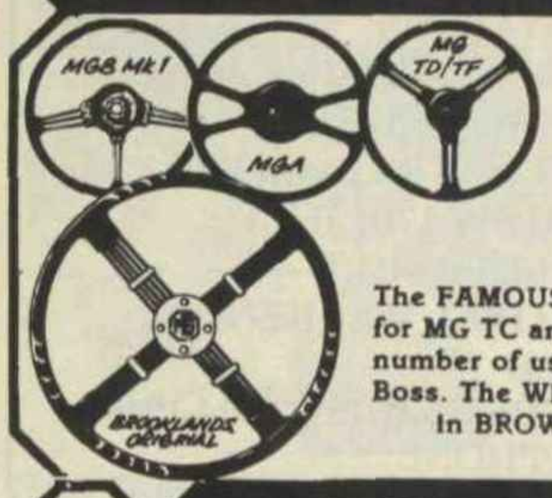
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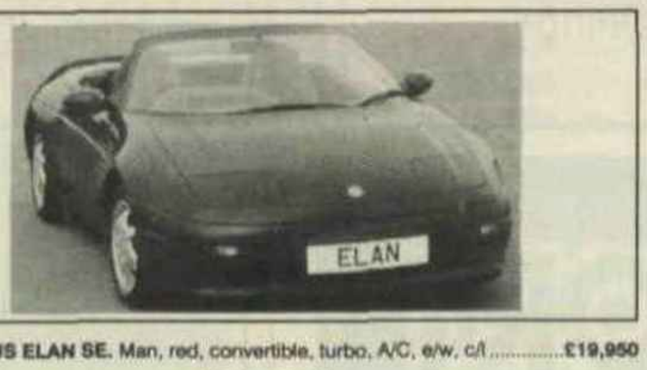
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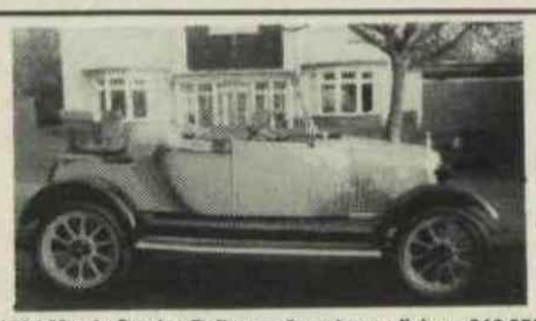
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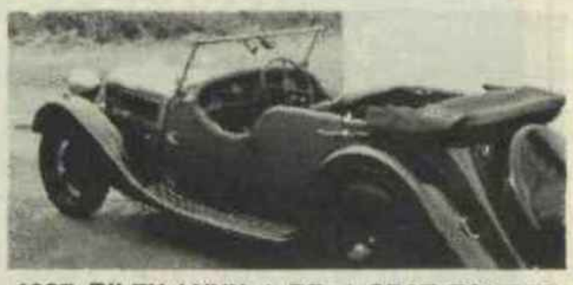
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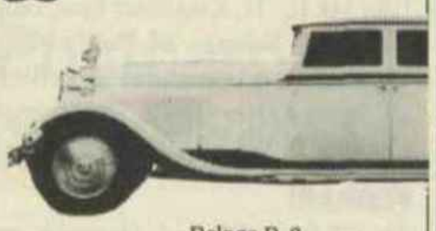
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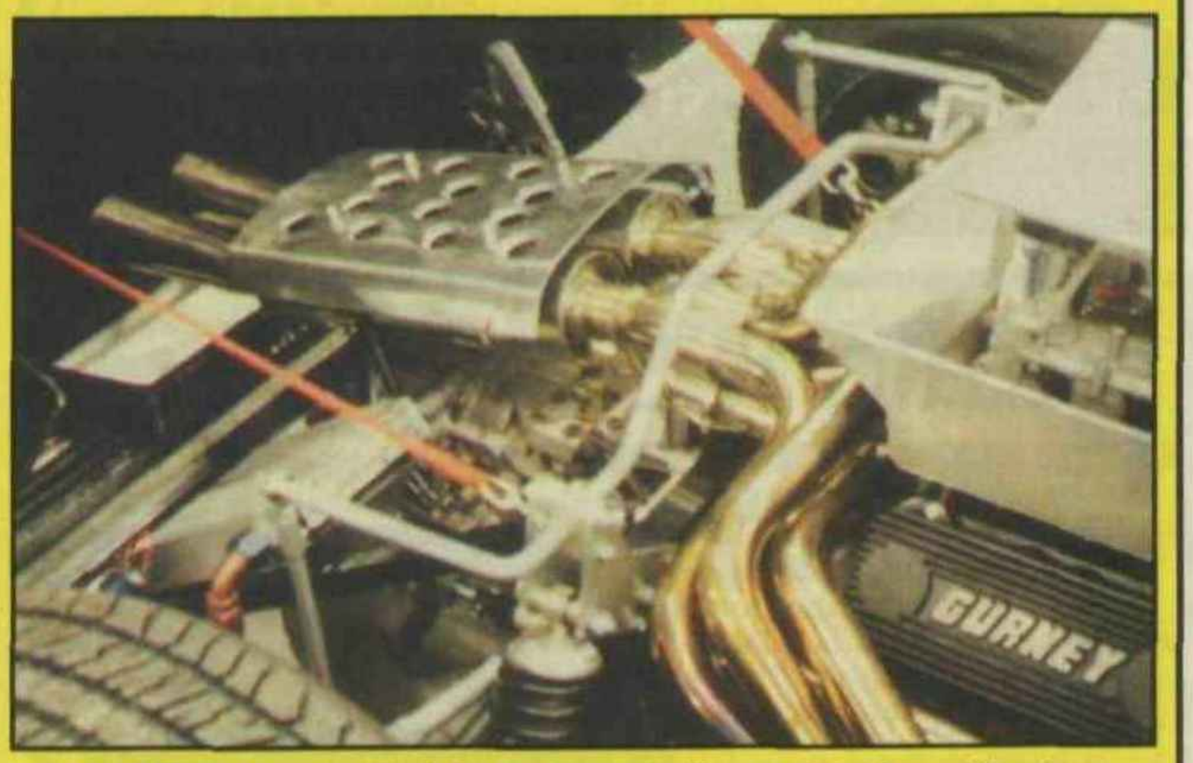
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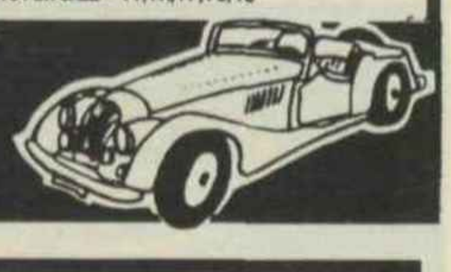
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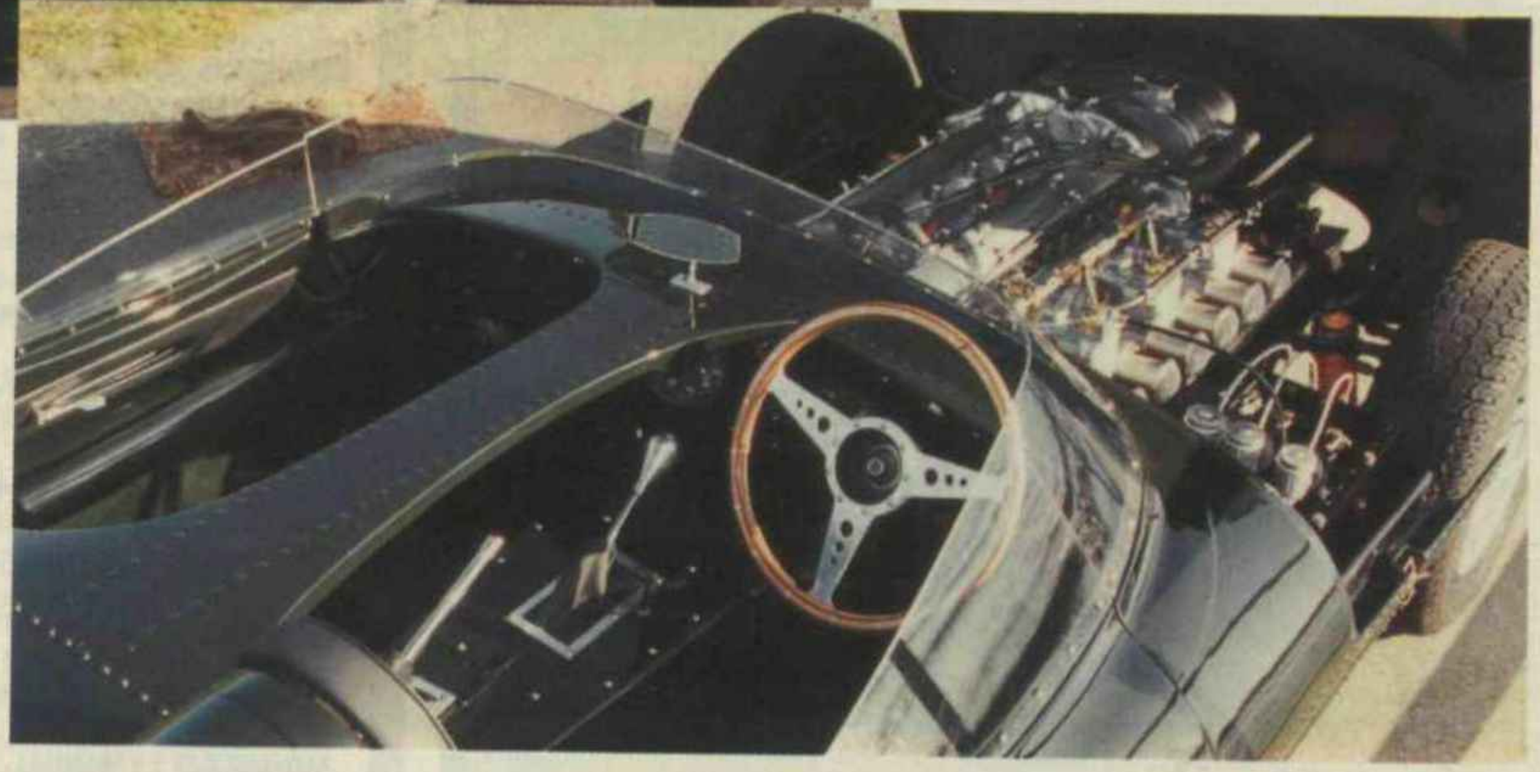
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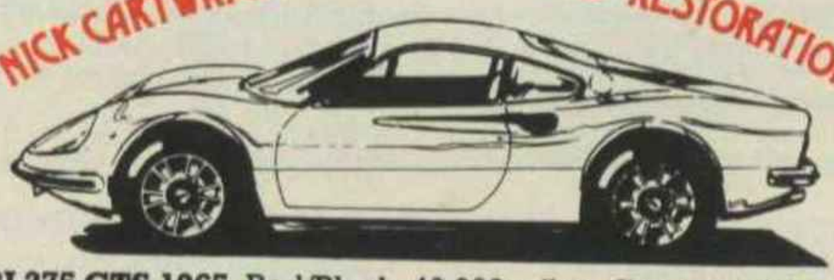
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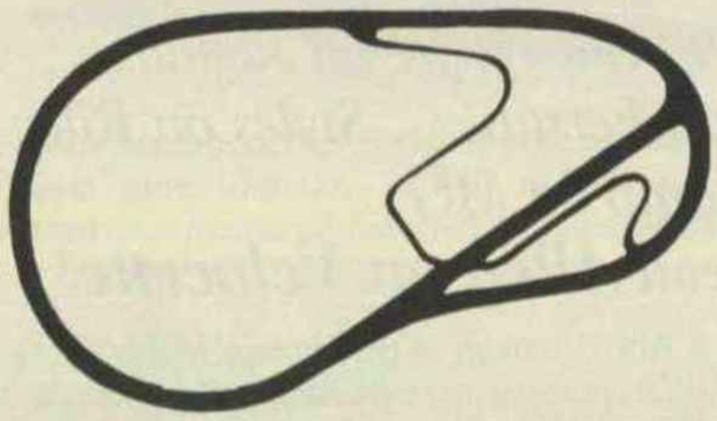








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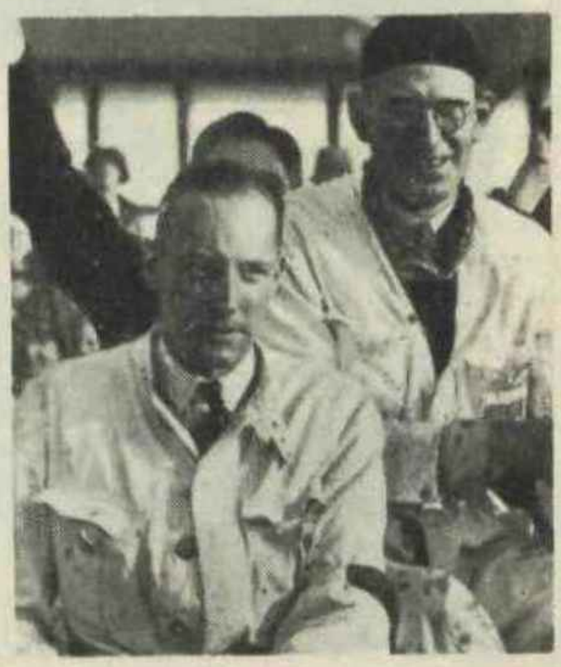


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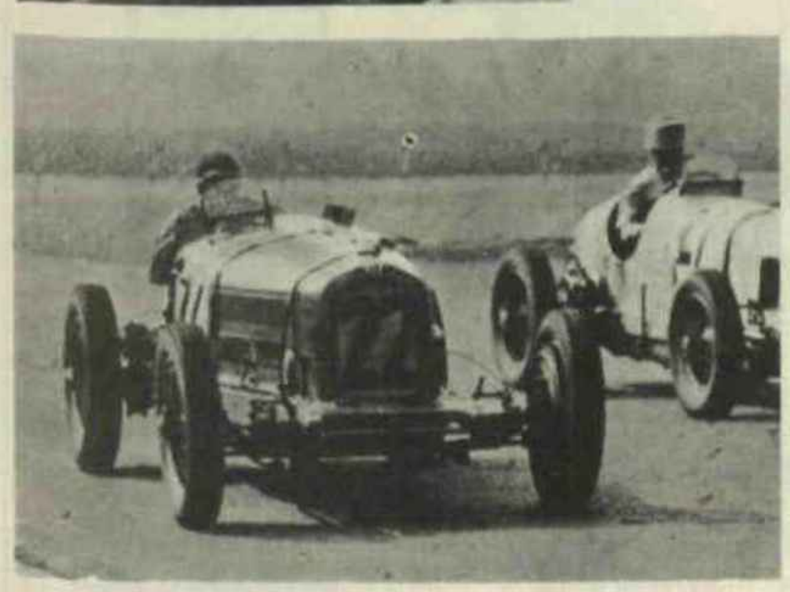
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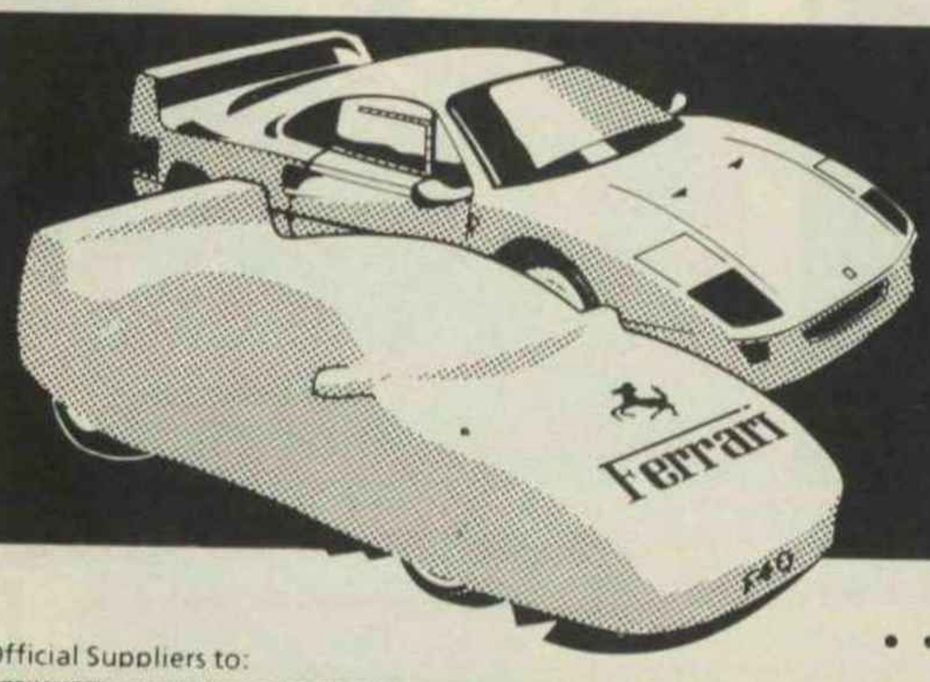
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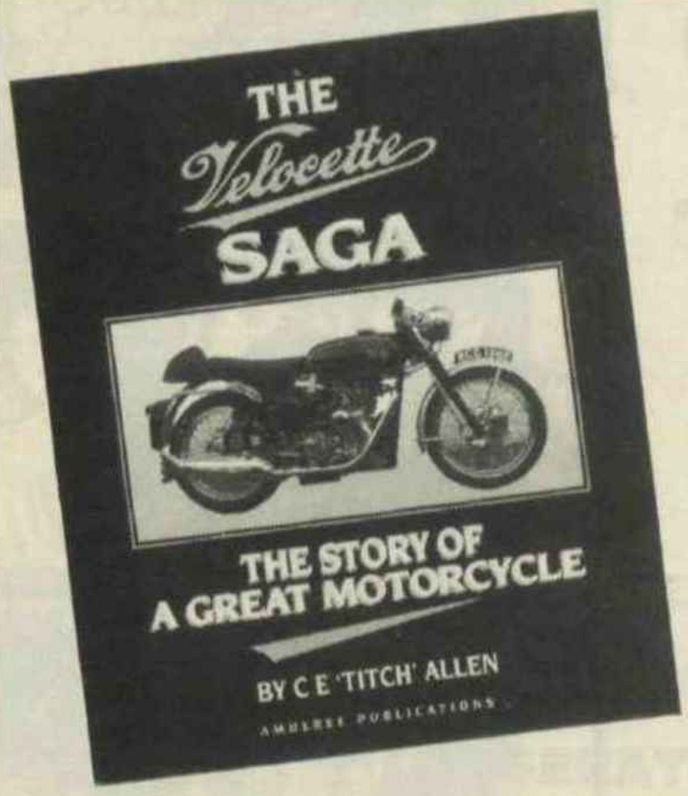
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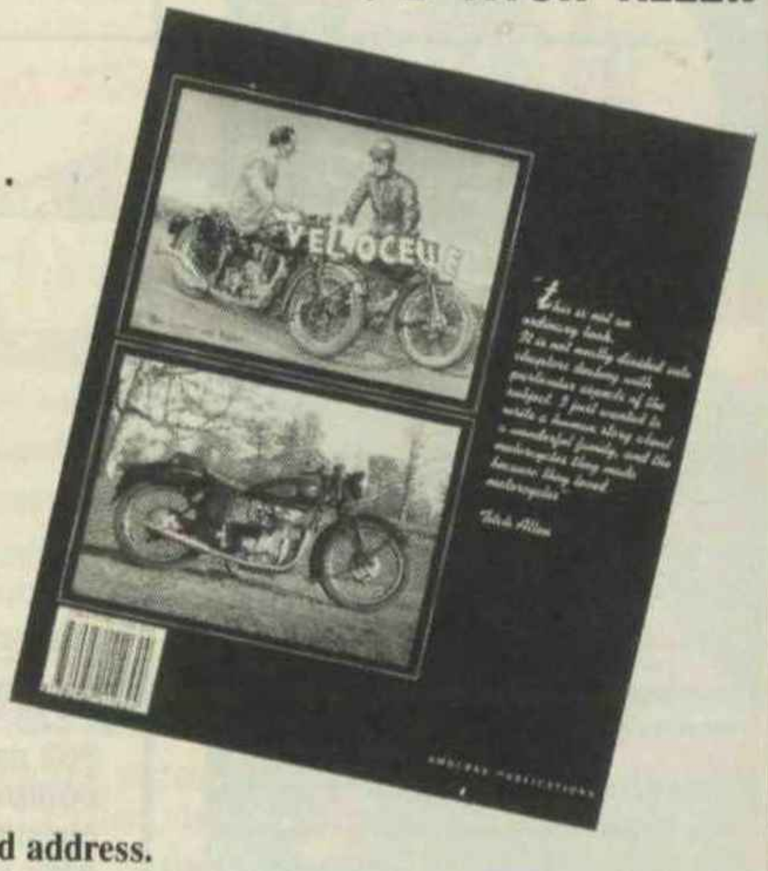
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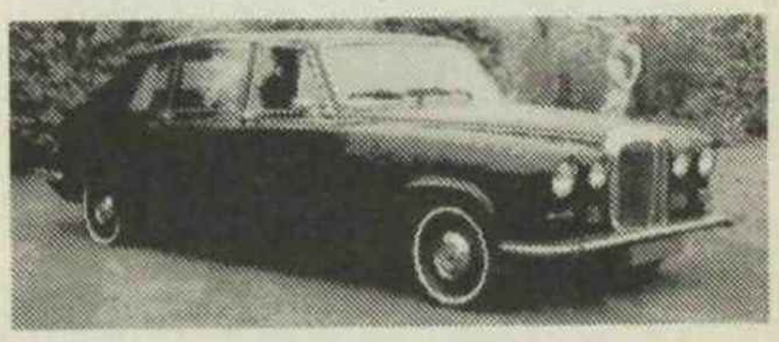


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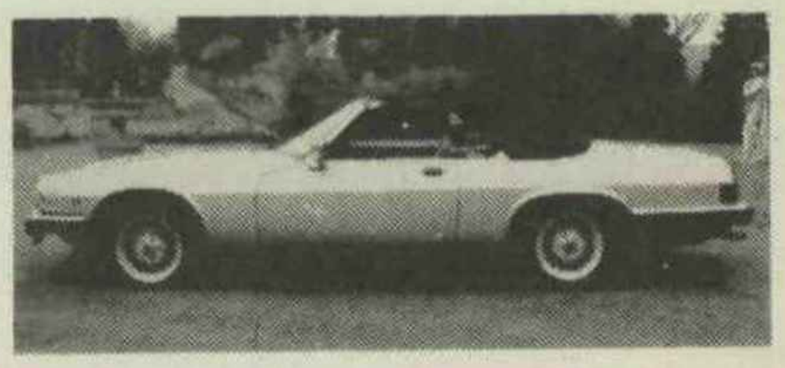
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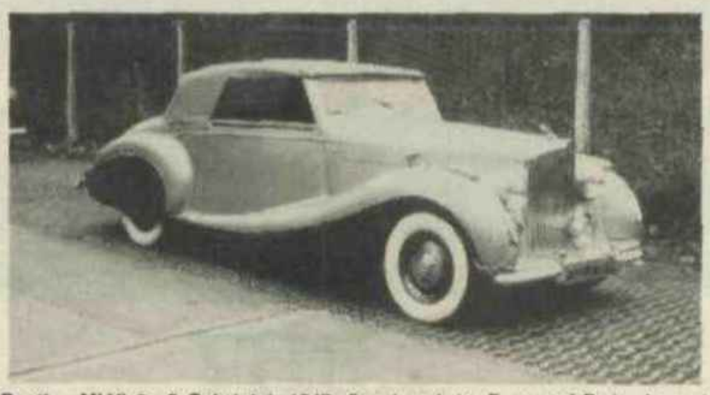
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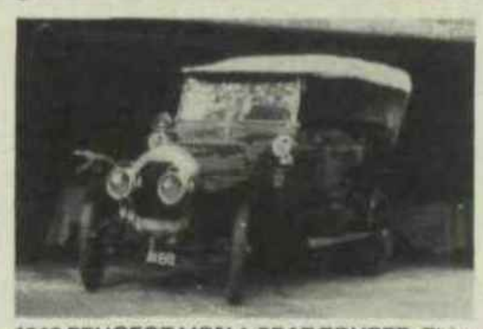
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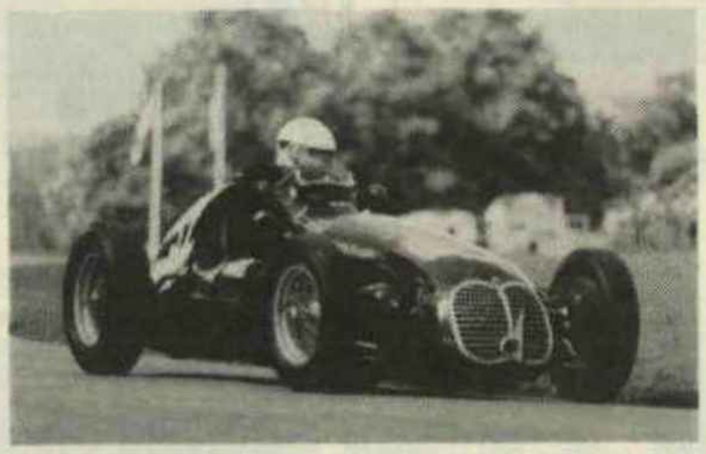
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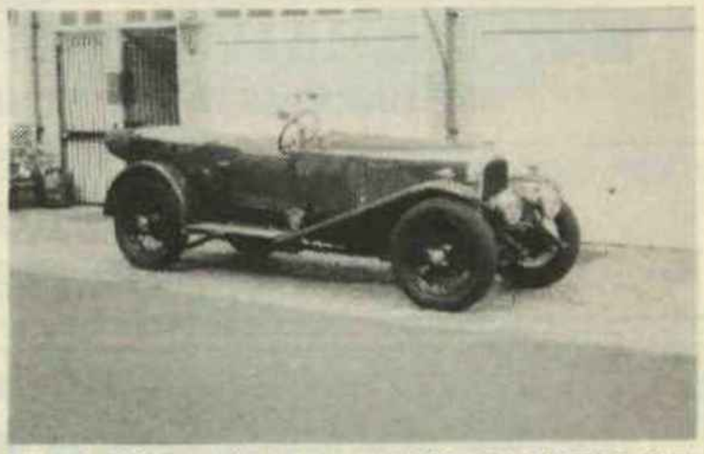
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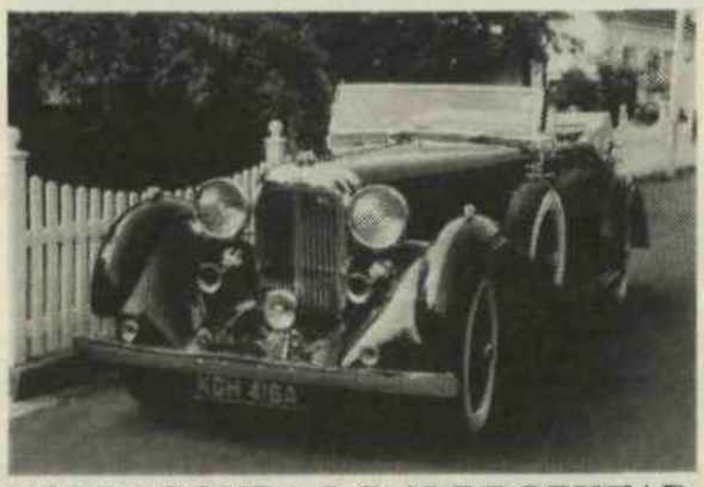
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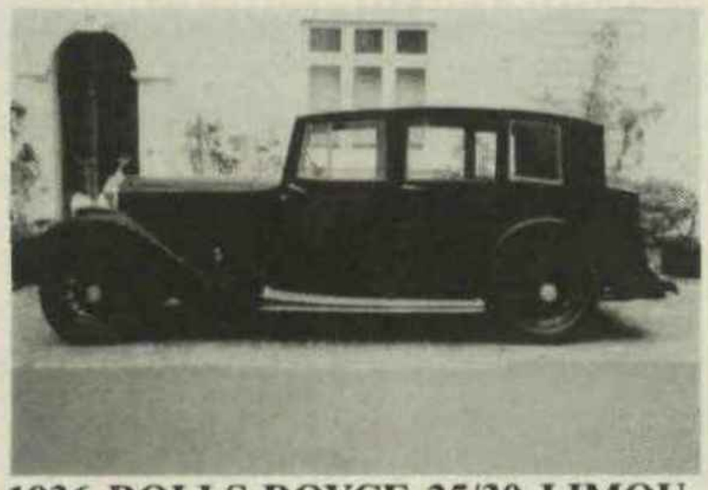
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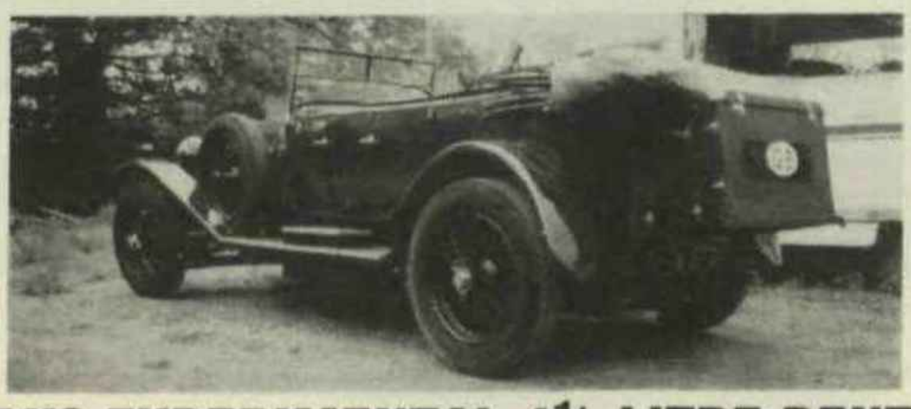


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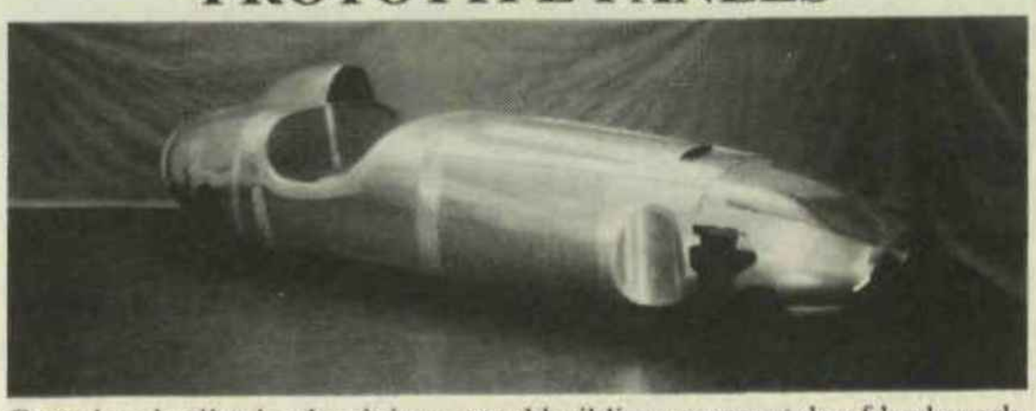
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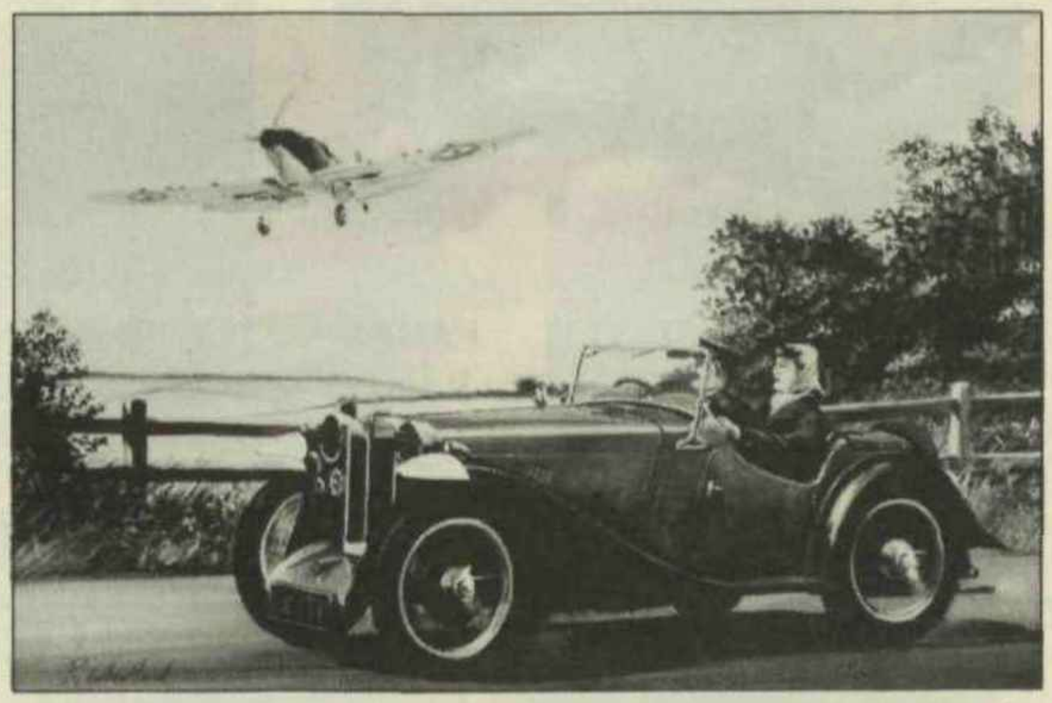
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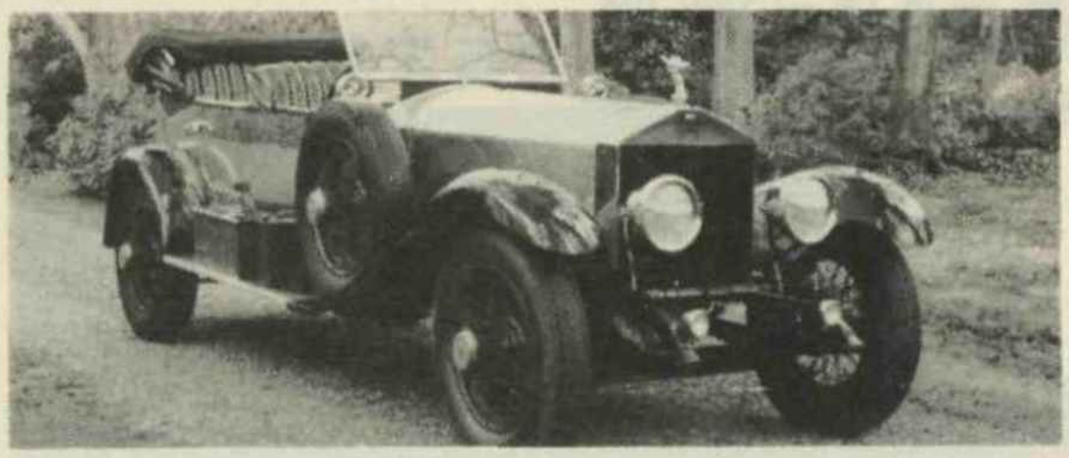
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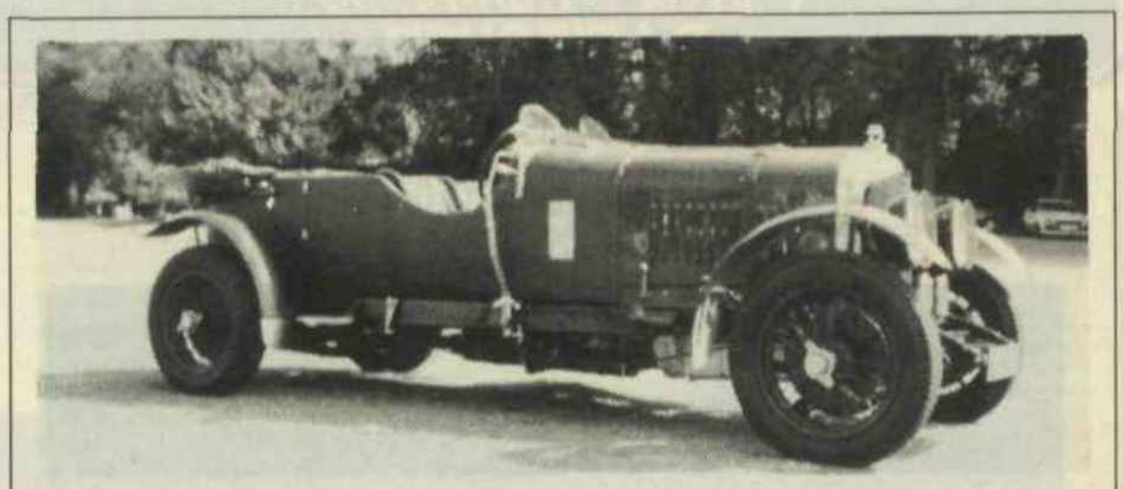
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MOTOR SPORT

BRITISH GRAND PRIX PREVIEW

In association with

GOODYEAR
#1 in Racing

1994

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IN ASSOCIATION WITH

GOODYEAR #1 in Racing

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★ ALL INFORMATION IS CORRECT PRIOR TO THE FRENCH GRAND PRIX

ROTHMANS WILLIAMS RENAULT



0 DAMON HILL (GB)





Lives: London
GPs: 24 Wins: 4 Poles: 2

2 DAVID COULTHARD (GB)





Lives: Twynholm & Milton Keynes
GPs: 2 Wins: 0 Poles: 0

There have been few blacker seasons in the history of Frank Williams' brave equipe and it will be a long while before anyone in the team begins to feel that they are recovering from the loss of Ayrton Senna.

Even before Imola it was clear that this would be no ordinary season, for the FW16 has shown itself to be intolerant of bumps and a far less satisfying proposition than its illustrious FW14B and FW15C forebears.

In Brazil and TI Aida Senna drove his heart out just trying to keep Schumacher in sight, and though the indications are that he suffered mechanical failure in Imola some still believe that he was simply pushing too hard for the effectiveness of the chassis on that fateful day.

Damon Hill has coped manfully with the pressure of leading the team, and with the numerous changes to the regulations, and in David Coulthard clearly has an ideal foil, a team-mate who is fast, aggressive and uncompromising. It remains to be seen what effect the addition of Nigel Mansell might have.

TYRRELL YAMAHA



3 UKYO KATAYAMA (J)





Lives: Tokyo & Monte Carlo.
GPs: 36 Wins: 0 Poles: 0

4 MARK BLUNDELL (GB)





Lives: Royston
GPs: 36 Wins: 0 Poles: 0

On the face of it, the answer could not be easier. Take one 021 chassis, and discard into bin. Take one capable engineer as Managing Director (Engineering) and one aerodynamicist. Mate their 022 chassis with Yamaha's ever-improving V10 engine, add a couple of motivated drivers, and go racing.

For Ken Tyrrell, magic tricks to rebuild his race team are nothing new. Witness what he achieved in 1989 after the disaster of 017.

When he again regrouped for 1994 with Harvey Postlethwaite and Jean-Claude Migeot you expected a neat, no-nonsense little car, and that is precisely what the team now has.

Perhaps Mark Blundell and Ukyo Katayama have been a little unlucky, barring Mark's excellent third in Spain, but the ingredients are there and so is the inherent pace. With a little more development of both the chassis and the engine, Tyrrell could spring some major surprises in the second half of the year.

MILD SEVEN BENETTON FORD



5 MICHAEL SCHUMACHER (D)





Lives: Monte Carlo & Kerpen
GPs: 44 Wins: 7 Poles: 3

6 JJ LEHTO (SF)





Lives: Monte Carlo
GPs: 58 Wins: 0 Poles: 0

At the beginning of the year most people expected Benetton Ford to offer the sternest challenge to Williams Renault, but few truly expected it to supplant the established champions, especially with Ayrton Senna driving. Yet the manner in which Michael Schumacher walked away with the first two races, and has subsequently proved an unopposed paceseter since Senna's death, could not have been envisaged prior to the Brazilian GP.

The B194 is a logical successor to the B193B, and Ford's Zetec-R V8 is a neat evolution from the trusty HB, but the manner in which they have been combined – in Schumacher's case – to produce such a formidable weapon has left rivals agape. The package is scarcely the most powerful – estimates suggest 745bhp for the Zetec-R to Renault's 780 and Ferrari's 800 – but the Benetton chassis is notably more at ease with bumpy surfaces than either of its principal rivals, and the ease with which the V8 can be integrated confers a significant advantage.

Schumacher himself has yet to put a wheel wrong; the jury is still out on why the second car is such a woeful match for his.

MARLBORO McLAREN PEUGEOT



7 MIKA HAKKINEN (SF)





Lives: Monte Carlo
GPs: 44 Wins: 0 Poles: 0

8 MARTIN BRUNDLE (GB)





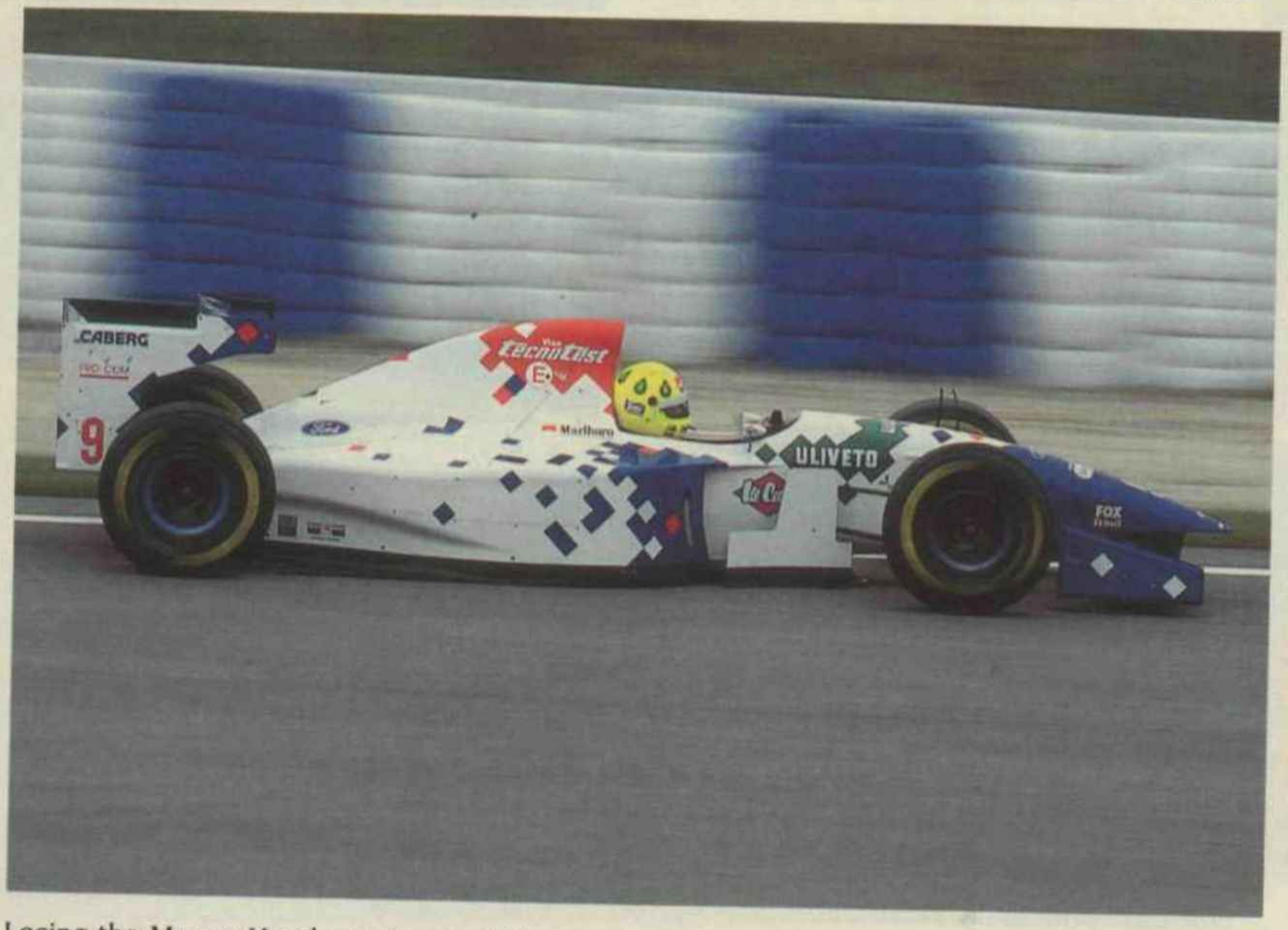
Lives: King's Lynn
GPs: 121 Wins: 0 Poles: 0

Given Ron Dennis' own admission that he feels pain upon waking the day after any Grand Prix that his cars haven't won, 1994 must so far have been a very hurtful season for him. Certainly, for a man used to winning, and a team which takes it as its creed, the first half of the year has been difficult as McLaren develops its relationship with Peugeot.

Already some basic expectations have been filled: it has become apparent that the McLaren side of the operation is pretty much up to par, and that Peugeot has a lot of work to do. No surprises there. But the signs are encouraging. The MP4/9 brakes better than anything and handles well. Peugeot knows what it has to do and is pursuing its goal logically. By season end, the first victory would not be a surprise.

In Hakkinen McLaren has a charger in the Rosberg mould, whose confidence currently knows no bounds; in Brundle, a solid, highly experienced car sorter who demonstrated terrific poise when it mattered at Monaco.

ARROWS GRAND PRIX INTERNATIONAL



Losing the Mugen-Honda engine could have been a body blow to Arrows (nee Footwork, nee Arrows!), but instead Jack Oliver allied himself with Ford by taking over the old Series VII and VIII supply used by McLaren in 1993 and revamped his team round a couple of hungry young chargers.

Alan Jenkins has come up with one of the most attractive cars with his small, neat FA15, and even after the regulation change for Barcelona it has proved quick and agile at all types of circuit. Its Achilles Heel has been the transmission, which has been weak since it first tested.

9 CHRISTIAN FITTIPALDI (BR)





Lives: Lausanne.
GPs: 30 Wins: 0 Poles: 0

10 GIANNI MORBIDELLI (I)





Lives: Pesaro
GPs: 40 Wins: 0 Poles: 0

Fittipaldi is a good racer whose qualifying performances are improving, while Morbidelli is proving an inspired choice after rather taking the F1 fraternity by surprise when nominated at the beginning of the season.

TEAM LOTUS



The first half of the season has been an uphill struggle for the team which finished fifth in the 1992 championship and sixth last year.

It was obliged to run the overweight 107Cs until Spain, and the debut of the 109 was marked not only by the change in the regulations but also marred by the unpleasant accident that befell Pedro Lamy in a 107C at Silverstone during a test the previous week.

There is thus rather an air of false-start about the campaign with the new car, which has not helped to bolster flagging morale.

11 ALESSANDRO ZANARDI (I)





Lives: Bologna, Italy
GPs: 17 Wins: 0 Poles:0

12 JOHNNY HERBERT (GB)





Lives: Wootton Wawen
GPs: 53 Wins: 0 Poles: 0

After overtures from McLaren early in the year Johnny Herbert desperately wants to be off, though quite where isn't certain, but the return of Alessandro Zanardi in Lamy's place has injected some much needed life and direction.

SASOL JORDAN



In 1993 Jordan began the long climb back to the respectability of its first F1 season, following the slump of 1992. This year it has been able to build on that new foundation, and the Silverstone team looks stronger than ever.

After his tricky start Eddie Irvine is now backing Rubens Barrichello well, and with Brian Hart's V10 and Gary Anderson's nimble chassis the team is once more a potent force. More than anything, however, it needs to massage greater reliability into its transmission software to capitalise on its promise.

14 RUBENS BARRICHELLO (BR)





Lives: Banbury & Sao Paulo
GPs: 21 Wins: 0 Poles: 0

15 EDDIE IRVINE (GB)





Lives: Oxford
GPs: 5 Wins: 0 Poles: 0

TOURTEL LARROUSSE



Up and down. That's been Tourtel Larrousse's season so far. At times the LH94s have been surprisingly fleet, at others they have languished on the back rows of the grid.

The cars are neat and uncomplicated, slimmer versions of the Lamborghini-powered cars which now rely on the Ford HB. On paper they should be reliable enough for regular lower top 10 finishes.

Erik Comas still continues to show flashes of promise, while team-mate Olivier Beretta is looking more and more assured as his experience grows.

19 OLIVIER BERETTA (F)





Lives: Monte Carlo
GPs: 6 Wins: 0 Poles: 0

20 ERIK COMAS (F)





Lives: London
GPs: 50 Wins: 0 Poles: 0

MINARDI SCUDERIA ITALIA



From the two small teams of Minardi and Scuderia Italia has grown Minardi Scuderia Italia, Italy's second F1 team and one of the most popular in the paddock.

Minardi has ploughed its familiar furrow with the uncomplicated M194 which was finally introduced in Canada, and its use of Ford Series VII HB V8s has permitted both Pierluigi Martini and Michele Alboreto to show great promise on occasion.

Both drivers are still hungry, the one of Latin fire, the older Italian possessed of more Anglo-Saxon calm. Each is the perfect foil for the other.

23 PIERLUIGI MARTINI (I)





Lives: Ravenna
GPs: 100 Wins: 0 Poles: 0

24 MICHELE ALBORETO (I)





Lives: Monte Carlo and Milan.
GPs: 184 Wins: 5 Poles: 2

LIGIER GITANES BLONDES



After months of speculation Flavio Briatore finally succeeded in taking control of Ligier, and his press conference to announce that fact in Monaco was a triumph of testiness.

So far other outward manifestations of the Benetton chief's ownership have yet to become apparent, but already it is obvious that the overweight JS39Bs, hangovers from 1993, are getting too long in the tooth to challenge anything, Renault power notwithstanding. Both Eric Bernard and Olivier Panis have regularly struggled, both in qualifying and the races. Their sole trump card appears to be reliability.

25 ERIC BERNARD (F)





Lives: Entressens
GPs: 37 Wins: 0 Poles: 0

26 OLIVIER PANIS (F)





Lives: Lyon
GPs: 6 Wins: 0 Poles: 0

Bernard, a stylish customer invalided out of F1 for a time with leg injury, lacks pace this year, but Panis, the reigning F3000 champion, has made the most of his opportunity and has consistently outperformed his more experienced partner.

FERRARI

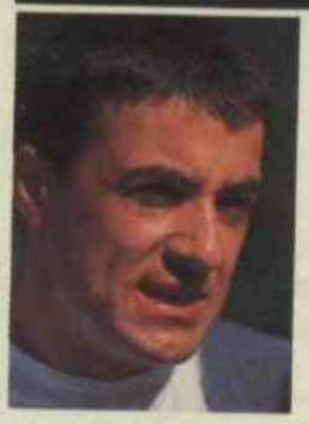


"I do not expect that we shall be challenging for races until the middle of the season." Thus spoke Jean Alesi at the beginning of the year, and the indications are that he may be proved correct in his prediction.

While front-running pace isn't something that they showed right away, the elegant 412T1s have been relatively reliable, and both Alesi and Gerhard Berger have been able to garner some reasonable points finishes between them.

Interestingly, power seems to be the least of the team's worries, and for Magny-Cours it was due to debut evolution versions of John Barnard's chassis, with revised aerodynamics aimed at taming edgy handling. If JB's work bears the right fruit, expect the red cars to pose a serious challenge in the second half of the year.

27 JEAN ALESI (F)





Lives: Nyon
GPs: 75 Wins: 0 Poles: 0

28 GERHARD BERGER (A)





Lives: Kundl & Monte Carlo
GPs: 153 Wins: 8 Poles: 8

BROKER SAUBER MERCEDES



Sauber sprang out of the box quite strongly at the beginning of the year, with its new C13 and Heinz-Harald Frentzen to push Karl Wendlinger along, but after an initial burst the Swiss-German team seemed to lose some of its momentum.

Wendlinger's unfortunate accident at Monaco then knocked it sideways, and it has taken it a while to recover its equilibrium.

Frentzen has displayed all the speed expected of him, but until Canada he had barely put a wheel wrong apart from spinning in Brazil. What he and the team desperately need now is a strong finish.

MTV SIMTEK



No new team can ever have had a more cruel baptism to F1 than Simtek, with Roland Ratzenberger's fatal accident at Imola in only its third race followed so soon after by Andrea Montermini's hefty incident at Barcelona.

Nick Wirth's team set new standards for presentation and professionalism on a limited budget when it entered the formula this year, and has weathered the blows with commendable fortitude. Hopefully it can now start to move forwards again, as Jean-Marc Gounon comes in to support David Brabham on the driving front.

PACIFIC GRAND PRIX



The lot of the newcomer is rarely easy, and Pacific's struggle to establish itself in the highest echelon of the sport is all too graphic an illustration of that.

Nevertheless, Keith Wiggins' team has steadfastly overcome oil system problems, lack of finance and lack of testing, and has already gone on a lot longer than many of its detractors anticipated. Hopefully the recent extended test session at Silverstone will have enabled Bertrand Gachot to unlock more of the potential he is convinced lies within the PR01.

29 ANDREA de CESARIS (I)





Lives: Monte Carlo
GPs: 200 Wins: 0 Poles: 1

30 HEINZ-HARALD FRENTZEN (D)





Lives: Monte Carlo
GPs: 5 Wins: 0 Poles: 0

31 DAVID BRABHAM (AUS)





Lives: Maidenhead
GPs: 14 Wins: 0 Poles: 0

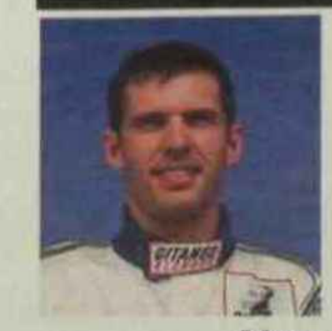
32 JEAN-MARC GOUNON (F)





Lives: Aubenas
GPs: 2 Wins: 0 Poles: 0

33 PAUL BELMONDO (F)





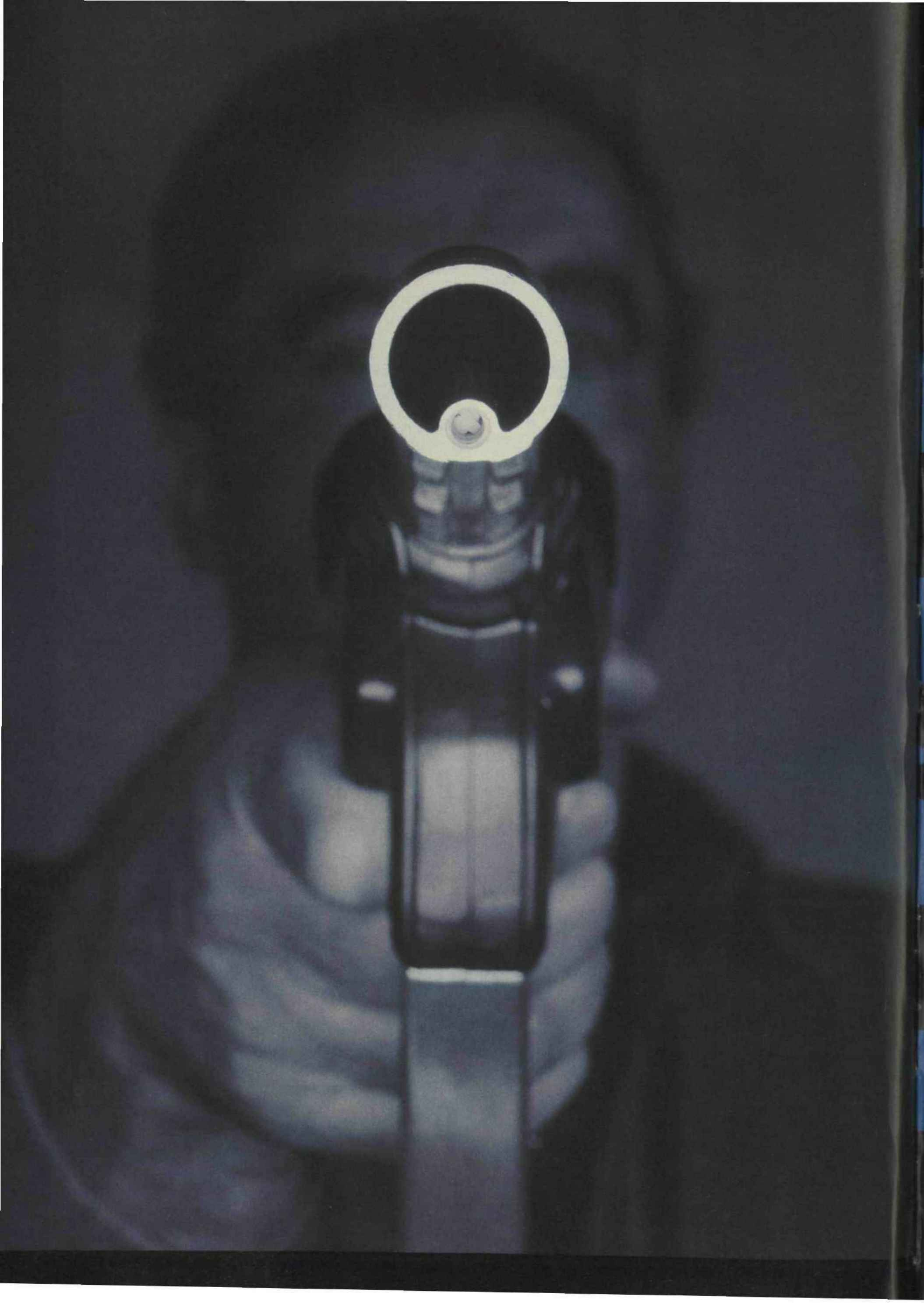
Lives: Monte Carlo
GPs: 8 Wins: 0 Poles: 0

34 BERTRAND GACHOT (B)





Lives: Brussels & London
GPs: 36 Wins: 0 Poles 0



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At just 25, Michael Schumacher has the world at his feet.

The loss of Ayrton Senna, allied to Prost's abdication and Mansell's 'exile', leaves the German the brightest star in the F1 firmament, heir apparent to the Formula One throne.

Understandably, perhaps, he grants fewer interviews these days. On the evidence of his devastating performances since the '94 season commenced, his opposition's opportunities are likely to be more limited still than those of the media.

The mistral is gusting hard when we track him down in testing at Paul Ricard. A makeshift chicane, hastily constructed from straw bales at the daunting Signes curve, bears testimony to the chill wind of change also blowing through Formula One as a whole. For once the Benetton is upstaged, a crowd instead gathering to admire a bright yellow Bugatti EB110 in the paddock. No prizes for guessing the owner, who also possesses a Mercedes 500 and can often be found cruising the Monte Carlo streets on a Harley Davidson. But if the spoils of war are lucrative, the last few months have taught that his sport may also demand the ultimate price.

Schumacher has always driven with a maturity which belied his lack of years. Nor, as somebody fêted in Germany as Stefan Bellof's successor, is he any stranger to pressure. It was as much the attentions of his countrymen, as those of the tax man, which drove him to exile in Monaco. Yet the sudden manner of his elevation not just to championship leader, but the figure to whom many look as the mouthpiece of Formula One, has occurred at shocking speed.

The mantle does not rest easily upon shoulders so young. "I've always had my targets, which I've tried to follow," he says. "That is the pressure I always give to myself. This hasn't changed. But I don't see me as the leading person just because I'm leading the championship. I think when you talk of a spokesman you do not need someone who is leading, but someone with good inputs and who can help in some areas. The experience I have gained in these last three months has been enormous, and this shows me how much more I have to learn before becoming a person like, say, Gerhard or Martin, who have all those experiences already, who can see things differently and can judge them better.

"But I don't want to separate myself and say, 'Okay, I don't need this.' I want to be involved in the GPDA and I feel I *have* to be involved. I have a good view, I understand things very well, I think, and I can help. We need to keep together at the moment."

Schumacher is perhaps the finest product of an Age of Innocence, a generation for whom death had become little more than a dusty page in the history books. The transition to the Age of Experience has been a particularly brutal one. On track, the turbulence seems only to have heightened his skills. Yet far from enhancing his reputation, the German's composure in a time of crisis has been noted by some with dark overtones. After all, unfazed by witnessing Senna's fatal accident, he proceeded to dominate from the restart at Imola. There is a suggestion that he was even prepared to test there the week afterwards.

At Monaco, even though friend and former team-mate Karl Wendlinger lay in a coma, Schumacher went straight out and demolished the field in qualifying. While his rivals' nerves have jangled at every subsequent incident, the German has merely capitalised upon their uncertainty. Has this man no feelings?

"I believe there isn't one driver who hasn't had a lot of problems with what has happened," he responds quietly, stressing that on neither occasion was he initially aware of the gravity of the situation. "Myself, I had so many sleepless nights, where I had to think all this through. Before I tested at Silverstone after Imola I was really doubting whether I could be the same person as I was before..."

"Sometimes to the outside Michael looks arrogant," acknowledges Willi Weber, his manager since the early days of his career, and the man who broke the news of Senna's death. "After the deaths, and to see him drive at Monaco, you would think this man has no nerves. But that's not true... The death of Ayrton hurt him so much. I have never seen him like this in six years. He was crying like a little boy. He was very shocked. Don't tell me this is a man without nerve and feeling."

While Schumacher shed his tears in private, furtive whispers did the rounds. No more so than when he failed to attend the Brazilian's funeral.

"I believe in God, but I believe I don't have to go to church to prove that," he says, with the slightest hint of exasperation. "If I have strong feelings for Ayrton, I can have them everywhere. I don't need to go to the funeral and show myself to be there.

"I had my own feelings about this. One reason why I didn't go was safety: the team told me not to go there; we have seen things happen in Germany, and all over the world, where people have got attacked. I don't know how my situation would have been. Not just in Brazil either, because let's say a German Ayrton Senna fan may have thought I was the cause of it..."

One thriller short of a full library? Think again. The shock of Monica Seles' stabbing, at the hands of a Steffi Graff fan, has reverberated throughout Germany. Furthermore, some sections of the Brazilian media went so far as to lay the blame for their hero's death directly at Schumacher's door. Had he not pressed the Williams so hard, they suggested, Ayrton may never have gone off.

Such astonishing resentment is perhaps the legacy of a number of well-publicised clashes

between the two since Schumacher burst into F1. Never one to be over-awed by reputations, he speaks as he finds. Senna too, called a spade a spade, and on occasions called the young pretender far worse. Did any enmity linger between the two?

"To call us friends is maybe too much," the German concedes, "but we were much closer at the end than we were at the beginning. After the drivers briefing at Imola we had a discussion – Gerhard, myself, Michele, JJ and Ayrton – about safety and we had agreed to see each other again in Monte Carlo. This was a very easy discussion, as we had before in Japan.

"Certainly Ayrton was under a lot of pressure and he had the situation in Brazil where people tried to build up a fighting situation between us which didn't exist. He came to me and said, 'Hey what's going on? Do you have the same problem in Germany?' and we talked about this. We were much closer than anybody expected."

That such an accident could claim Senna, around whom an aura of invincibility seemed to have descended, unsettled many drivers to the extent that they experienced a very public crisis of conscience. Privately, Schumacher was tormented by the same doubts.

"They are not 26 idiots out there – there are a lot of clever guys. They think they know what they do. We always believed that if we had a problem like a broken wing, as we saw with Ratzenberger, and it happened in the wrong area, we could die. But we didn't believe that the accidents that happened to Ayrton and Karl could happen. At least, I didn't. We are growing up.

"I know now that I can still sit in the car and concentrate in my natural way, but at first I wasn't sure if I could continue like this. I made the point to myself, said, 'If this is not going to be in me any more, if I don't have this feeling for just getting in the car and driving it like I do, this is the point to stop.' For me, Silverstone was the big question mark: Is it the same, or isn't it?

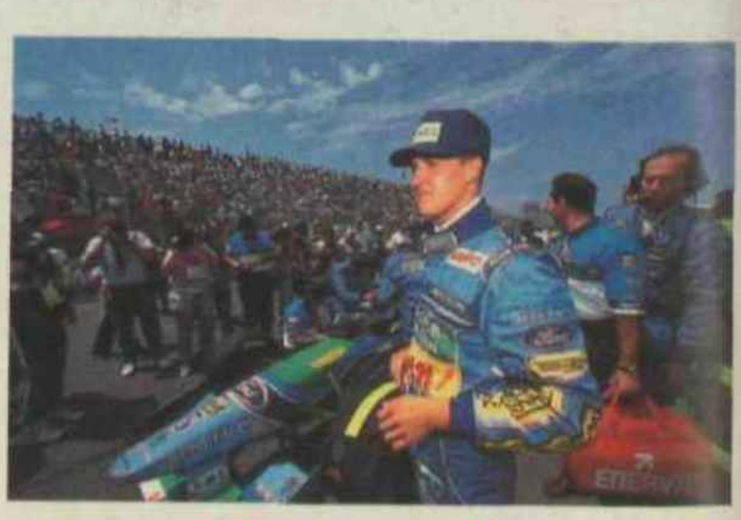
"Whether I would have finished the season, then quit, I don't know. I hadn't thought that through. I just knew that if I didn't have this feeling I had to make a decision.

"I wasn't fine the first day. It was wet and I just did the two laps and said, 'Okay, these are not the circumstances I like to drive in.' Sometimes at Silverstone when it is wet it can be a bit dangerous. I didn't want to prove myself in an already-dangerous situation. So I said, 'No, I don't want to continue.' We stopped for the day. It was dry the day after and immediately when I went out it









was fine from the first moment. Don't ask me how this is possible."

His performance from that moment on suggests he has as little cause to examine his conscience as he has to examine the mirrors of his Benetton.

"I have learned quite a lot out of these things," he says, "and I think that is why I still do the job I do. I don't need to sit there thinking about the accidents and stuff like this. Once I am in the car I can take away all other things and just concentrate on driving."

He concedes that it has been harder to exorcise the horror of the past few months when away from the circuit. Sadly, though, these are times when xenophobia is no longer a word confined to a desperate moment on the scrabble board, but instead increasingly invades the media. For some, Schumacher's domination smacks too much of the machine rather than the man. That he is German merely embroiders the story nicely.

Not one to shirk a challenge on the circuit, neither is he inclined to evade one away from it.

"I think this has nothing to do with being a machine," he responds with a shake of the head. "All the people who know me know I am not a machine. The point is I have a bloody good car which is why I am able to do this job. If, let's say, Ayrton had this car, he would have done the same or even a better job – I don't know because I didn't have a proper comparison between me and Ayrton. But we have this good car and since Ayrton left us it seems to have been a lot easier for us to have won races and that's why people straight away like to turn this over into a different situation."

Wary of the sycophants drawn to his star in its ascendancy, the German has also noted an increasing number willing him to fall to earth.

"When I started climbing up the stairs three years ago I was nobody, and anybody who was nobody seemed to be welcome! If you do a good job everybody is behind you. As soon as you start to go further up, you still have a lot of people there behind you, pushing you, and these are the people you have to believe in. But in the same way, because you get so much more crowd, there will be people there who are jealous. That is difficult to understand sometimes, but that's the way it is."

Does this bother him? "I shouldn't let it. But..."

The response betrays a trace of irritation. Not with his detractors, but with himself, for he is perhaps his own biggest critic. He is well aware that survival





in Formula One's rarefied atmosphere requires as much mental strength as it does physical. How is it, you wonder, that with F1 in turmoil from Imola onwards, the German has remained rooted, like a great tree in the wind?

"I think the biggest shock was Imola, where we had the accidents of Roland and Ayrton, plus the mechanics, plus the spectator," he says. "Nothing worse could have happened. I think if I made this decision [to keep racing] after this, I had to stick with my decision. If Karl has the possibility to go straight back in the car, I'm sure he would do. I would too, because the feeling that we can excite is what drives us all down this road. We all love this sport, we all live for this sport..."

If his words have a chilling ring at times, they merely indicate an ability to compartmentalise – a mental survival instinct, if you like – that also characterised Senna. Like the Brazilian, he pays great attention to detail and is likely to be as demanding at a windswept test session as he is on race day at a GP. Nor is his self-confidence a commodity in short supply. Some cynics may ask where you draw the line between confidence and arrogance? Martin Brundle, Schumacher's team-mate at Benetton in 1992, reckons the German draws the line pretty well.

"I can understand his situation," he says. "I've had it to some extent after Monaco as well. Everybody, and I mean *everybody*, wants a slice of your time. But if you can't give them that they immediately turn round and call you arrogant."

The bottom line is that the media can call Schumacher what it likes, but by the year's end everyone expects to be calling him champion. It gives him immense satisfaction that his success is being achieved with Benetton.

"We have grown together," he beams. "I always believed in this team, even when – particularly last year – everybody was saying, 'You should go away, you should go to Ferrari or whoever, there is no chance at Benetton.' I don't know why, but I felt comfortable. I was not sure I had reason to be comfortable, because last year we didn't look as if we could succeed like we do now. But I didn't have any real feeling to move away from this team. I always said I would rather come second with a team which I feel I gave some input to, than winning in a team where I didn't do this, where I just got into a car which was the best – just stepped in and won."

Benetton's success at the start of the season, with Lehto out injured and Verstappen still a novice, endorsed Schumacher's assertion that he is still learning. Two years ago, the team was still reliant upon a second driver's input; now, Schumacher's prowess in this area has developed dramatically. So too he has tempered the erratic edge he occasionally displayed when he entered Formula One. Add this to natural speed in qualifying, good racecraft, and a grooming in PR by Mercedes, and you have a driver at his peak.

Has he any weak points?

"In his heart he is a winning driver," admits Willi Weber. "If he enters a race he wants only to win it. He has nothing to do with Olympian ideals, you know! His whole life is for winning. Sometimes you have to do only as much as you need, like Prost. That is not in his character, but he needs to learn it if he is to survive at the top in Formula One. You can't always be a winner... I think the only man who can stop him winning the championship is himself."

Brundle is inclined to agree: "He deserves to be World Champion. In a way it is sad that he will have won it this year without Ayrton, and that the season will be remembered for Ayrton's death. But I'm sure he will win more. Like Ayrton, Michael is blessed with a natural speed."

The parallels between the two are, for that matter, inescapable. "I tell you something he doesn't like to hear," says Weber, who also knew Senna. "I never say this when Michael is around, but there are so many things that remind me of Ayrton. So many things. Oh, Jesus Christ. They could almost be brothers."

Now that Senna's throne lies empty, there seems only one man qualified to ascend.

MARK SKEWIS



Strategic intent

How and why Cosworth Engineering has developed such a successful "closer focus on winning" with the Ford Zetec-R V8



Suggest to Cosworth Engineering Chief Executive Chris Woodwark that the company's latest rampant success in Formula One stems from the fresh attitude and determination he has brought, and he adopts a well-meaning, 'We'll talk about that,' attitude, but personal modesty notwithstanding it's quite clear that he has fostered a completely new outlook and rekindled the spirit of the workforce. Sectors of the racing world have talked of little else since the start of the season. Gone is the conservative Cosworth of old. Everyone in the company exudes a fresh motivation and determination to succeed. It's as if they have been freed from strait jackets. And the results speak for themselves.

"Cosworth is a team effort, very much," says Woodwark immediately. "It's a widespread company, and I guess it's got three key strengths. First of all, its engineers. We're fairly unique in British industry; we look after our engineers very well, take a lot of care and trouble to recruit them, train them and nurture them. We have a low staff turnover, a lot of long-service people.

"Next is its racing heritage, which is why it exists. It's what drives the whole company. What gives it a competitive spirit. And it's harnessing the racing spirit, the engineering skills, that's the key thing.

"The third key strength is that Cosworth makes so much in-house. There's no other engine builder in the world that I know of that casts its own blocks and heads and other parts of the engine – timing covers for instance – makes its own crankshafts, its own con-rods, its own pistons.

"And it's that ability to do that, and to do it so quickly; we've had instances this year with the Zetec-R where we wanted to change certain parts of the cylinder head where we've been able to hand-rub the cores in our Worcester plant and get a new head casting back within two or three days. The same with the pistons. This year we are running very big, heavy pistons, and we had to change the specification several times before the start of the season..."

He is not shy to admit tacitly that there was a problem, as suspected by the outside world, in that area when the Zetec-R first appeared. "We were developing right at the limit," he says candidly, and that's another change for Cosworth to be heard to make such admissions. "You've got a lovely comment in *Motoring News* last week where Dick Scammell said that the engine didn't quite last long enough..." (speaking of Michael Schumacher's Friday afternoon Zetec-R eruption in Canada). "Well that's what it's about. We're only designing this engine to last long enough to win, and sometimes we skate a bit close to the edge. We have to come back. But by doing so much in-house, we're able to do that.

"It's a matter of pulling that team together and setting that strategic intent, and what we've done is established, across Cosworth, that its aim is to win. So Cosworth's strategic intent is to win wherever it competes.

"When I came in I sat down with the management team and we decided that we have tremendous resources here, but we had to get a closer focus on winning. Now that means improving, and getting very close to, the other important elements: Benetton, the management of that team and the engineers within it, and the drivers. It meant getting close to major sponsors, and our major sponsor in this is Ford. We were able to get a focus which was agreed between Ford, Benetton and Cosworth that we want to win. So it sharpened up on all of that, and it means that we're taking decisions in Cosworth now, and spending money, and getting a speed of reaction, because we *want* to win.

"The key thing about the Zetec-R project is that it was building on the heritage and the engineering expertise that exists within Cosworth. And we had embarked on a new project, Project 95, which of course, now, under the new regulations, has been stillborn. We've invested quite a lot of money in a new engine for 1995, which we've now had to wrap up. We've brought it to a state where, if things ever change, we could pick it up and go again, but we've had to close that down completely because the regulations changed and that engine was no longer going to be suitable."

So much for rule stability.

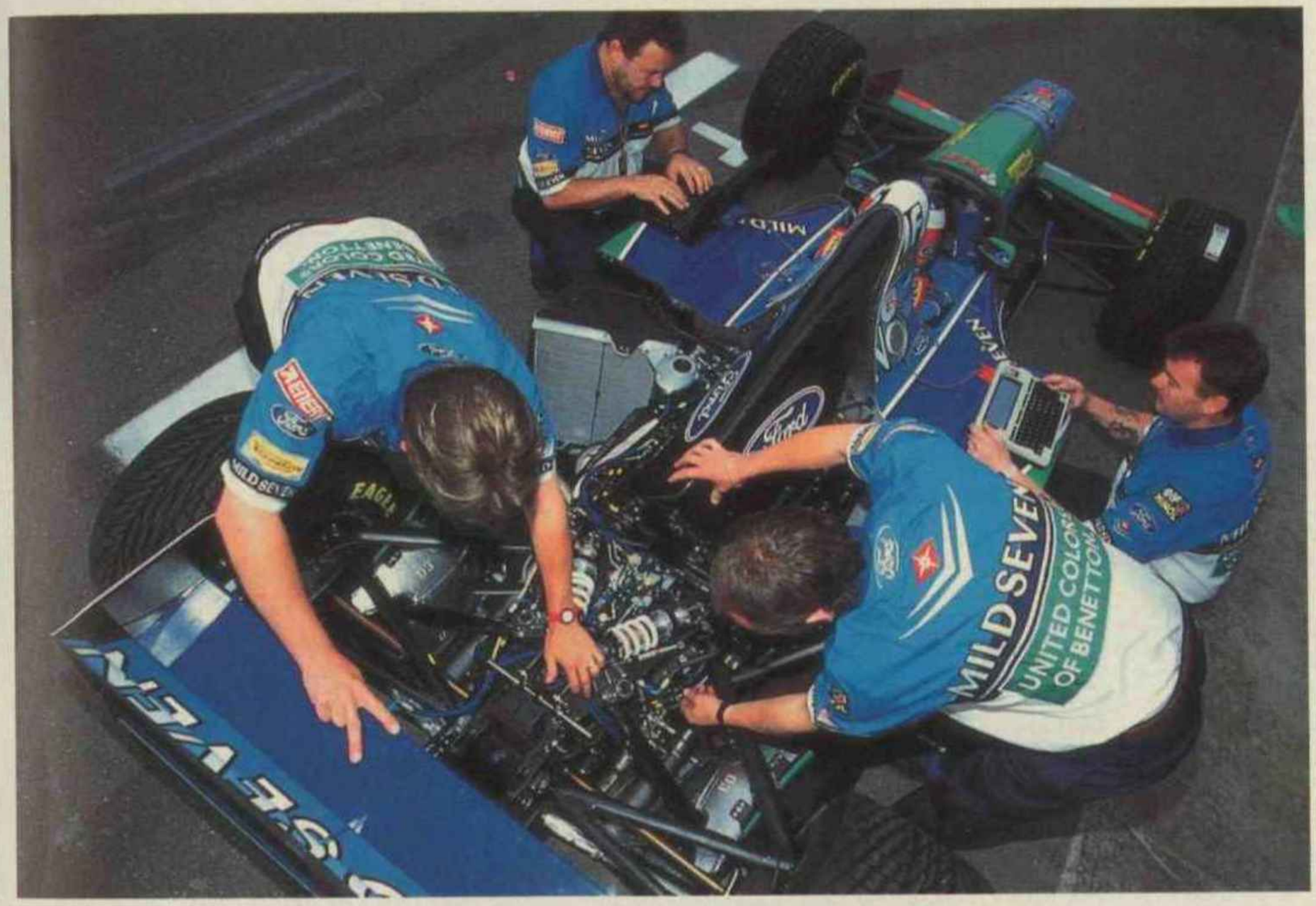
Woodwark feels no malice, understanding the underlying reasons for the change in the regulations, but it's naturally frustrating to lose such a project when it's built a real head of steam.

"I said to the guy that drew it that it must have hurt a bit to scrap it, but he said, 'No. We've got to win, and that engine wasn't going to win any more. I've now got to start work on one that will.'

"That's a really refreshing attitude, and that's the sort of spirit that I have to harness."

The alternative would have been a fuel flow valve formula, and Cosworth, in common with all the other engine manufacturers, had no wish to see that even if it had meant 3.5 litre engines could be retained. "I can't speak for the competition," he stresses, "but Cosworth's attitude is that it's got to continue to invest in new engine developments to stay in front. We will find the money to do that. We could have linered down, or whatever, but I think that any engine that's built round a compromise can only be a short-term solution. After all, you wouldn't do it with the chassis, so why think of doing it with the engine?"

In the past Cosworth's perceived conservatism has tended to overshadow its inherent engineering integrity, but the Zetec-R went racing with far less angst than the HB, and with but one wet race



distance run to its credit from Silverstone before it was shipped out to Interlagos. This year the whole process has deliberately been calculated far more finely than in the past.

"We set out to speed up the process. We decided last year we wanted to be first out testing, we wanted to have the largest number of miles run under our belt and we spent a lot of time during the winter establishing a very much uprated mechanism of working between Cosworth and Benetton, with Ford involvement where necessary. Ford was very much behind this and wanted to see it happen, so that we were able to make sure that any changes in the design of the Zetec-R engine as they went in were completely compatible with the chassis. Or, if the chassis was demanding certain things, that we looked at what we did with the engine."

There has been a significant increase in investment to back up the change in philosophy as Ford and Cosworth tackle Renault, Peugeot and Ferrari, and Woodwark admits that the Zetec-R costs a considerable amount more to operate than the HB. But the research lessons of the stillborn brace of V12s – the VBs – that were created in the past few years have frugally been incorporated into the new unit, which is far and away the fastest-revving V8 engine in history. He throws a few statistics at you: 110 litres of water are circulated per minute, the piston crowns take loads of nine tonnes, the air valves (whose components resemble those of jewelled watches) operate 250 times per second; and doesn't demur when you suggest revs well in excess of 14,000.

"Design is an iterative process and it's an evolutionary thing. It's continuing to build on what you do and get right, and our new engine would have been a further development on that although it would possibly have been a different configuration. So we learn lessons and apply them as we go along. We have the confidence to do that because we do so much in-house.

"Continuity has been very important to us. There's the continuity of Martin Walters working with Ross Brawn and Rory Byrne down at Benetton, and at the commercial level working with Flavio Briatore and Ingvar Sviggum of Ford and myself, is so important. And we had all that in place. We worked at it and we improved it a lot, as we set out to. We've brought a businesslike attitude towards it. Ford has exploited the engine name far more clearly and carefully for this year, and we set out to give them far more value out of winning."

Ford and Cosworth have the same sort of ring as Marks and Spencer, but earlier this year rumours linked the latter very strongly indeed with a possible Audi F1 project. Even now, Ford's future F1 plans are beyond the knowledge of the majority.

Woodwark pauses. "At the end of the day Cosworth is a completely independent company wholly owned by Vickers. I'm answerable to the Chief Executive of Vickers, so I have to deliver a business plan at the same time as winning the World Championship. Sometimes we have to work hard to marry the two things up. But, with our strategic intent, that gives us the focus. We have, over the years, had a number of evolutions of the Ford contract. It rolls along and every so often it has to be renewed. 1994 is a year in which the contract is renewed, there's no secret about that. Cosworth or Ford have not made any comment about it, and we're not going to now. We are working closely with Benetton and Ford to win the Word Championship this year. And you will see the outcome of our commercial discussions."

Whatever happens, Woodwark is adamant that the company will always be involved in F1. "Cosworth has to tread a fine line between exposing its engineering secrets, and showing the world that it is a company that it should do business with. That's what I'm trying to do. I'm trying to lift the veil. Formula One being the pre-eminent form of motor racing, and our ambition being to be the best in the world and to win, Cosworth fully intends to stay with the very best combination of team, driver and sponsor that it can obtain. Formula One has got to be the top of the pyramid, because it demands the best engineering, it demands the best machine shop, it demands the best customer support."

Chris Woodwark took over the reins last September and up to Montreal, its 171st Grand Prix victory, Cosworth Engineering's engines had won 11 of the intervening 12 races. Ford is once more regarded as a totally serious player after seeming for a while just to play at Grand Prix racing. All thanks to a fresh management style at Cosworth – and its concentrated strategic intent.

DAVID TREMAYNE

The crucible

Why Goodyear goes racing

If Formula One is an iceberg, in all its various aspects, then 99.9 percent of the development that goes into tyres is firmly hidden beneath the often far from tranquil surface. Back in the middle of 1992 the FIA (at that time still the FISA) decreed that tyre widths must be reduced for the following season, and introduced new legislation to that effect at a stroke. To the layman, the idea of taking three inches off tyre width might not seem such a big deal, but to men such as Perry Bell, Goodyear's Chief Engineer, Race Tyre Programme, it meant cramming more than six months' work into two as he and his team at Akron set not only about designing new tyres, but also making sure that they were as efficient and effective as the predecessors.

"Overall, that's a 16 percent reduction, so it's more significant than you might think. We started designing in July of 1992. One of the goals was to avoid air freight shipping charges, because all of the tyres were being built in the US and would then be shipped to Europe. That meant the tyre design process had to be complete and the tyres released to production by February. The problem is that we have to consider our other race tyre production commitments in the US. That was all part of the incentive to complete the job quickly. It was a very accelerated process.

"You're also faced with the fact that initially you don't have access to race cars designed to the new regulations. We went to Estoril following the Grand Prix in 1992. That was our first evaluation of the new tyres. But we were still testing with modified cars, and that did lead us astray a little. If anything the cars became better balanced, and easier on tyres, as the season progressed. The initial tyre tests indicated that the cars would be required to race a compound one step harder than that used in 1992 at the majority of the circuits. However, after the first couple of races it became apparent that we were able to use compounds very similar to what we used in 1992. Maybe half a step harder.

"In designing the new tyres we were trying to take into consideration what was happening at the front of the vehicle as well as the rear, striving to keep the car relatively well balanced. We were trying to compensate for the loss in front aerodynamic downforce, because of the front wing changes, by narrowing the front tyres. his, we reasoned, would allow the race car designers to regain front downforce to balance the vehicle. However, when we arrived in Estoril for our first test, everyone looked a the tyre package and said, 'Oh, wow, the fronts are way too big!' Now, if anything, the teams want the front tyre a little bit bigger. You're always fighting that! The teams have their own impression of what they think they need. We all work together to satisfy the needs of each customer. However, sometimes we have to remind these customers that the tyre is a complicated structure and that our record over the years demonstrates our understanding of the fundamentals of tyre design and compounding."

Part of the problem that faced Goodyear with the narrower tyres was that the regulations still insisted on the same diameter, so there could not be a commensurate increase in tyre wall to cater for the reduction in width.

"That was the major problem with the rear tyre. The maximum O/D had to stay at 26 inches. The FIA was not interested in changing that. We were negotiating for a better compromise, but they insisted on standing firm with the regulation the way it was originally written. That was part of the delay in getting started. We needed to be certain of the tyre dimensions before we could order the moulds to produce the tyres."

Moulds, of course, are one of the biggest expenditures and most time-sensitive factors in any new tyre programme, particularly with wet tyres.

"That was the next problem. The dry moulds, we were able to produce relatively quickly, but the wet moulds required longer lead time. We actually went with an interim rain package. It was definitely a compromise, but it was the best we could do. With the new rear tyre we went to the Aquatro tread pattern, but at the front we had to go with a modified Gatorback pattern for the first two races."

They got some rain in Brazil, but the new Aquatro tread fronts were ready by Donington, which would prove distinctly good timing!

"It was a very exciting programme. Probably one of the fastest race tyre programmes that we've ever done. And it all worked out very well. I was very pleased with the way it all came together. Personally, I think it went so smoothly that people just took it for granted!" He laughs. "I felt that perhaps even our management didn't appreciate the magnitude of what was done. For us it was really some undertaking, and we had no margin for error. We had to rely on simulation data as well as the data the F1 teams were supplying us. This information provided us with the speeds and expected tyre loadings that needed to be taken into consideration in designing the overall tyre package. We really just had one, *possibly* two shots at it." Multiply any problems by the number of cars running the tyres at a race meeting, and you begin to appreciate the potential magnitude of the problem if anything did go wrong . . .

"We had to complete the testing and give the race tyre recommendations to production as soon as possible, because the first race was in South Africa, which is quite a ways to get to, and then on to Brazil. We had to have production for the first three or four races completed before the start of the season to put us in position for the remainder of the year. What people don't realise is that the races where production really starts to become tight is when you get your Magny-Cours, Silverstone and Hockenheim. Production requirements for those races just start building and you have to have your act together. You have a big lead time at the beginning of the season and it looks like you will not have any problems producing the required quantity of tyres. But by mid-season the races start coming back-to-back, it's like being on a slide."

With the width and diameters fixed, Bell and his team preferred not to stiffen the sidewall, but rather to concentrate on the cavity shape. "We modified the shape to produce a tyre which would meet the new reduced width regulation. But we had to increase the tyre air pressure because there is a direct relationship between contained air volume and the load a tyre can carry. The air pressure inside the tyre had to be increased to compensate for the reduced volume because of the narrower tyre width. We had to push very hard with

the teams, because they were used to running only 16psi at the rear with the wide tyres, and we were telling them they had to go up to 19psi. They were shaking their heads, 'Oh, we can't do that!' But they worked with us, they understood where we were coming from. So we were able to compensate for the 16 percent reduction in tyre width by modifying the mould cavity shape and increasing the air pressure.

"The FIA not only reduced the width of the tyres, but in the interest of reducing the cost of racing to the competitors they also put a limitation of only seven sets per race meeting. So once again that didn't give us any margin for error in determining the proper tyre recommendation. If we had to do anything we would err on the conservative side, because we certainly didn't want to get ourselves into the situation where the recommendation was too soft and the tyres were blistering, because then seven sets might prove insufficient for the entire meeting."

In fact, nobody had any serious tyre problems in 1993, and the only public failure was Damon Hill's when he was leading the German GP at Hockenheim. "That was an unfortunate incident," says Bell quickly, "but the evidence indicates that the tyre lost air because of a puncture. The data acquisition showed that the tyre did not lose air suddenly, but the air loss occurred over a short period of time which is consistent with a typical puncture. We were never able to totally confirm this. The tread and belt package were never returned because of supporting races immediately after the GP. For this reason we were not able to examine the tread surface for possible cuts or punctures. That was an unfortunate incident, and I hate to see that."

As Bell is well aware, without opposition the only time there is a real tyre story at a race is when something goes wrong . . . It's a testament to what Goodyear achieved in such a short time for 1993 that people barely noticed there had been a tyre regulation change. But nevertheless, Bell would welcome some opposition. "Everyone says, 'We've got this monopoly at the races, isn't it great?' Well, from an engineering standpoint, no! It's not very rewarding. Race against yourself, and you race only to not have a problem. You have a tendency to be somewhat conservative. When you're racing against competition, you feel, from an engineering standpoint, more satisfied. You know: 'Our tyre is a better product.'"

Part of that was disguised, however, by the teams' use of traction control to promote better grip out of corners and to save the rear tyres, but Bell has some interesting observations on that subject that tend to be borne out by the lack of drama there has been since traction control was banned. Some observers predicted a spate of tyre problems now that there was nothing to protect the narrower rears, but it hasn't worked out that way.

"Traction control certainly clouded the issue, and still the question in my mind is: 'What was the end result of traction control? Did it help us or did it hurt us?'

"Obviously now I think it helped. But with treadwear, I think if anything it probably in many cases increased tread



wear at the rear. Without traction control, the driver could feel the tyres spin and he would back off to save them. With traction control you were able to optimise the setting to generate a certain level of slip all the time. The driver just put his foot in it and drove away, so you were always getting a certain amount of slip. You're not breaking it away, but you're probably getting continually, over the life of the race or pit stop, a higher level of slip than the driver would be able to control himself."

Even without traction control, Goodyear is still looking within the same compound range for its 1994 tyres. Spain was potentially tricky, with the FIA limiting downforce but being a step out with limiting power, but that was rectified by Canada and in any case nothing untoward was evident in Barcelona. Again, that's a tribute to the work that went into the new tyres.

Motor racing is a perfect proving ground for Goodyear, not simply because it places its products in a crucible, but because its personnel and techniques are formed there too.

"We like to think of it as a training ground," admits Bell. "What our engineers learn in racing, they can apply in other areas of the company. They learn to think on their feet, many times making proper decisions with only limited amounts of data. And they have the opportunity to evaluate and receive rapid feedback on many new concepts. And once these engineers move from racing into other areas of the company, they also have the ties back to racing, and they talk back and forth. A good example of this is our new dual-channel Eagle Aquatread; the engineer that designed that tyre did in fact come from Formula One. We talked with him quite a bit as we were developing the Aquatro Formula One race tyre. The end result was the Eagle Aquatread. We designed the Aquatro in 1992, and the Eagle Aquatread passenger tyre was introduced to the marketplace in '94. That's typical of the time required to take a passenger tyre design from concept to the marketplace. Obviously, to develop and design a race tyre the requirements are a lot different than developing an 80,000-mile tyre. While we have modelling techniques and accelerated tests to evaluate long term performance it still takes time to verify 80,000 capability.

"That's what gives racing the ability to evaluate so many different things so quickly and get instant feedback. In a really competitive situation, we can be reacting in two, three, four weeks, quickly developing new ideas, evaluating these ideas, and getting results.

"We like to think that racing provides the perfect environment to develop new engineers. They experience the full tyre development spectrum in racing. The engineer develops the concept, designs the tyre that will utilise the concept, writes the specification, follows the tyre through the factory in the production facility located in the Technical Centre, and then goes to the racetrack and sees the application of his concept first hand. So he gets the full gambit, all the way from designing the tyre, following it through production, going into the field and performing the sales engineer role. It certainly gives the engineer a better appreciation of what he's doing, especially in a competitive situation."

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This is it, this is what it is

Brian Hart is a no-nonsense but charming engineer who refuses to compromise in his search for mechanical perfection. We look at why his £2M V10 engine is matching Peugeot's far better funded effort

The first thing you need to understand about Brian Hart is that he loves engines. Loves them, and takes an inestimable pride in them. To see the familiar bronzed bald head bent over one of his units at a race meeting is to watch one of the sport's more straightforward racers doing what he loves best.

There is a story from the old days that epitomises Hart. A racer of competitive stature right up to F2 level, he gradually made the transition to engine builder, and his standards were always high. "In the old days," recalls a former mechanic, "nobody *ever* returned their engines to Brian for a rebuild if they were dirty. He wouldn't accept them. He actually left his staff instructions that they weren't to touch them if they came back oily, with bits of rag stuffed in the exhaust pipe. Old Jam Tart made them send them back as clean as when he'd delivered them, then he'd do the rebuild. But not before. He's still got that sense of pride and discipline about him..."

It's one of the things that has stood Brian Hart Ltd in good stead, even through the lean years when the odd F1 team has used his engines and services but forgotten to settle its bills. He's not a loner, but he *is* a man who likes to work in his own way. That's one reason why he bought himself back out of Cosworth ownership a while ago. He was born to be an independent. One senses that he also relishes the sort of David and Goliath situation, such as that highlighted by the similarities between his engine and Peugeot's. On the one hand there is the French company with its very strong budget and personnel resources, and then there is a small British company from Harlow cocking a quiet snook, in the nicest possible way. Hart employs only 26 people, looked after by the indefatigably loyal Jane Brace, "a super lady who has been with the company almost since Day One. She's got a great understanding for it, and it doesn't matter who it is, if I'm busy . . ."

Hart is not a great man for meetings or committees, but he knows that he can have components taking shape by the Tuesday after a race if need be. "I suppose one thing that we have, and it's completely obvious, is response. If I go back on Sunday night, I can have faxes and it's happening on Monday morning. I presume Renault can do that, but it's got to go through a *certain* process of engineers and decision making, and maybe even cost. But I can just decide, 'Bang! Do it!' I think that just because we're small doesn't necessarily mean that's a hindrance."

More like an artist who creates things in metal than simply an engineer, he hates to see his creations suffer. So far, since his 10.35 V10 started racing in South Africa in 1993, he can count the number of serious failures on some of the fingers of one hand, and that is a matter of tremendous pride to him. Grudgingly he will allow Jordan a handful of extra revs here, another handful there, but much of his conservatism is the product of limited resources.

Hart began to look at the feasibility of the project in late '91. "In actual fact it started off as a V8 for a variety of reasons. Then I went to a couple of races and completely reappraised my thoughts. Long-term, given all the stability that we thought we had, there would be more potential, as I saw it, in a V10. You have to remember then how the fuel regs were, too, things like that. So we decided on a 10. We laid down three prototypes and ran those continuously from very early 1992 onwards.

"It took us about five months, full concept, design and drawing. All the major components, so that the long lead items, such as crankshafts, were in process. I did the design work myself, with a friend at work called John Lievesley."

That little comment encapsulates Jam Tart. Somehow you couldn't imagine anyone he worked with being anything other than a friend, such is the manner in which he conducts his business.

"He's particularly into cams and valve gear, that sort of thing, whereas I tend to do the structures more. So having sort of laid the concept, the pencil lines, we pressed on with some detail drawing. My brother, who is semi-retired, did some for us as well. He used to work for me.

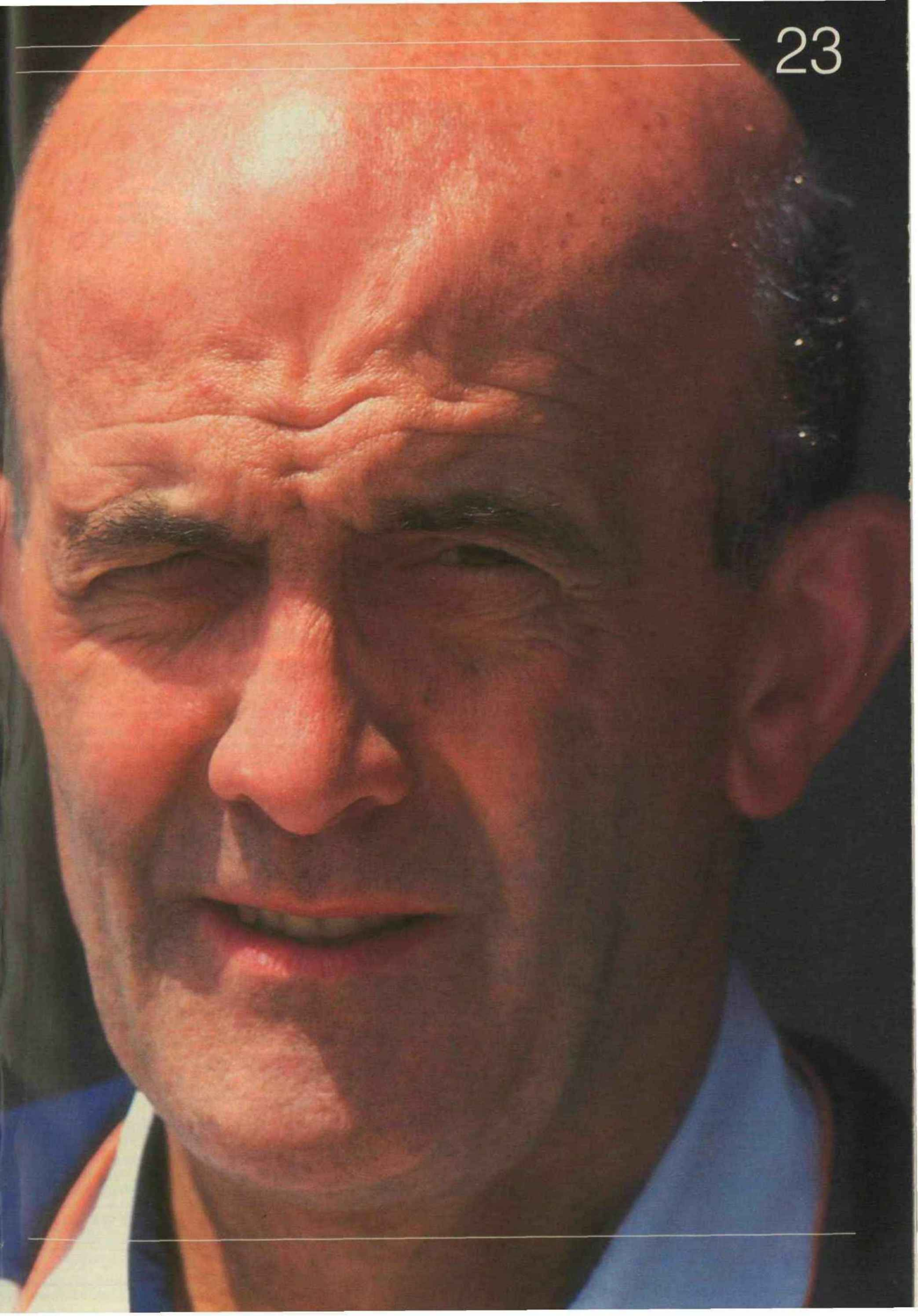
"During 1992 we were faced with a bit of a dilemma, really. Should we plough in the remaining money that we had – because we weren't with a team then but were financing everything ourselves. But it was a matter of biting the bullet, really, because it was the only way that we could really carry the company forward. So we just bit the bullet and went for it with our own engine.

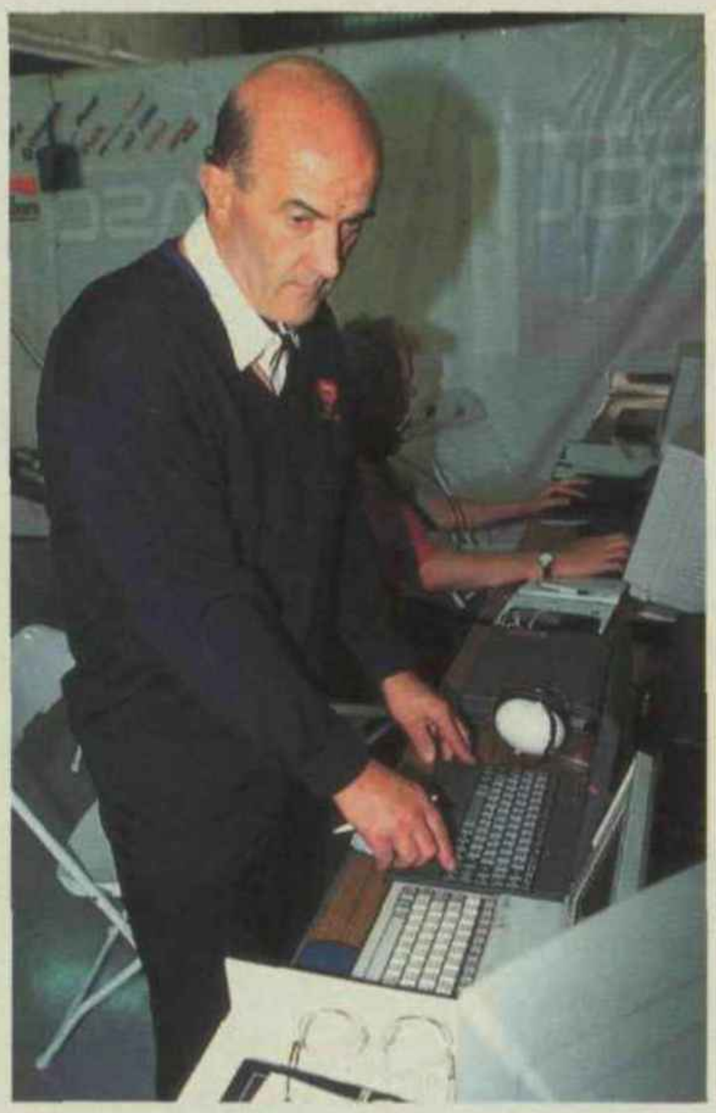
"Having made that decision we then had to make another: How long do we carry on doing the initial work? The actual cost of getting to a prototype engine is fairly calculatable, if you know what I mean. You know how long people are going to work on the drawings, you know how much the patterns are going to cost, you know how much the castings are going to be. The bit that then costs a lot of money is running it on the dyno, and finding what you need to change.

"I went to Imola, to the Grand Prix in 1992, just to feel what was going on, see who might be interested. There wasn't really a *lot* of response, although there was interest from a variety of teams. We got to talk, through Trevor Foster and Gary Anderson at Jordan, with Yamaha. But it wasn't really anything more perhaps than some joint effort to help look at the V12. We got a 'phone call from Trevor and we got together with Yamaha, but in short it didn't work out. We got very close to coming to an agreement to do something with them but, I might as well be honest, we decided not to do it. We looked at it from the long-term future thing, and it probably wouldn't lead us where we wanted to go."

All of these discussions concerned the unloved Yamaha V12, which Hart is too polite to say that he didn't rate. At no time was his emergent V10 discussed at all.

"So we carried on talking to various teams, then I went along to the pre-Grand Prix test at Silverstone for a look round, got to talk to Gary again, and by this stage it was fair to







Artist at work: Hart ponders the performance of his neat 10.35 V10 in the Sasol Jordan.

say that they were wondering what they were going to have to do, or where to go. So after the Grand Prix he said, 'Well, what about your engine, then?' That's fact. That was the first time he or Trevor had mentioned my engine. Even when they'd been down to the factory to talk with the Yamaha people, it was totally Yamaha. Nobody had asked about the 10 at all. So I said, 'Come down and have a look.' They came down, we showed them the prototypes, how many hours we'd been running. We talked in great detail. All the basics. Weight, size, length, what we thought it would take to cool it. So then Gary said, 'Well I'd like to do a proposal to Eddie.'

"This was early August, and the problem was that it was very tight to get it built. And the regulation changes meant that it would almost *have* to be in a hybrid V12 chassis, which isn't what Gary or I wanted but we really didn't have a choice.

"Then from Monza the deal was all done by telephone and fax, and in mid-October we signed a deal for two years exclusive, which we both thought was very important. We both thought, and still do, that you have to work on a one-to-one basis in Grand Prix racing. It has to be a one hundred percent effort with one team."

There are some interesting little stories within the main narrative, but you have to know them. Hart isn't about to blow his own trumpet. In his days with TOM'S Toyota John Barnard was very interested in the V10 and there was for a while a possibility that it might be badged by the Japanese company. Then when Barnard went back to Ferrari he tried to interest the Italians, but that was more than their pride could swallow. Then, legend had it that Jordan literally beat Ron Dennis to the Hart 10.35 by a matter of days. Hart smiles, and the grin widens as he says: "That's not far off. The only people that we hadn't talked to, direct, were McLaren, funnily enough. The information we had is that they were almost certainly going to attempt to do a deal with Ligier, or the Ford. Then we received a call from Ron, and I told him we'd done a deal with Eddie. They went off to Japan, and there Eddie said that was correct, we'd done a deal, it was fixed and we were very happy with it. It was one of those things. I don't know . . ."

He is quite comfortable with the idea of a major manufacturer badging his engine. "We have had an approach. It would be improper to say who from," – he is not referring to Rover, whom Jordan attempted to lure in with a publicity stunt that backfired early last year, and came at a time when Rover's financial resources were too stretched even though its technical staff were very keen. "We agreed that Jordan could co-seek engineering back-up finance for the engine, leading up to badging it, which we were quite happy to do provided the terms were agreeable. We were very happy to do that. I think it's probably fair to say though that the recession killed off any chance of it happening. But we are still actively looking for more engineering finance." Hart would have no problem cementing the sort of deal that Ford enjoys with Cosworth, rather than just assisting a manufacturer. The Yamaha situation, for example, was more a direct consultancy on research and development, whereas he would far prefer to be hands on.

Brian Hart has come a long, long way on the sort of budget that wouldn't keep the publicity machines of Renault, Peugeot or Honda lubricated for a season. To the point of going racing with Sasol Jordan last year, he had probably spent very little more than £2M. Small beer to a grandee, a vast sum of your own money. If he was a film maker, he would be a Mike Leigh character, capable of turning in the fantastic performance – and coaxing something similar from his actors – through a mixture of pragmatism, practicality and pure commonsense. He derives great pleasure from seeing the Jordan-Harts running ahead of the likes of the McLaren-Peugeots, as they did at TI and again recently in Canada, but is far too good-mannered to crow about it. He's disarmingly modest, too, when asked to quantify the attributes behind his engine's creation.

"There were a lot of small things. There was no one major thing. Part of it is having a reasonable understanding of the priorities, I would think. Like, it has to cool and it has to be pretty reliable, otherwise you can't improve the car. You can't try and make the engine work at the track. When it arrives here it's like a set of tyres. You just put them in and take them out. Though we weren't funded enough, we did have the benefit of several months of r&d without the pressure of going racing as well. And I think that had quite a bit to do with it.

"I think another percentage reason is that at the end of 1992 we finished up with a fairly highly developed version of the DFR, and without being too specific, we were able to cross-fertilise development between the two. Certain components. The oil system. We did a lot of development on the oil system, and carried that straight over. That helped a lot."

To date the closest a Hart engine has come to a GP win was at Monaco with Ayrton Senna and the turbo four in the Toleman in 1984. The Brazilian always had a soft spot for Hart the man and Hart the engineer, appreciating the investment he makes in his projects, the personal touch. It's the indefinable little extra that's hard to quantify but harder still to duplicate, and it has its roots in his vocational approach to his work. Brian Hart plays a straight game, with no time for subterfuge or politics. "This is it, this is what it is..." is how a past collaborator summarises his approach. Blunt, maybe, but charming.

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DAVID TREMAYNE



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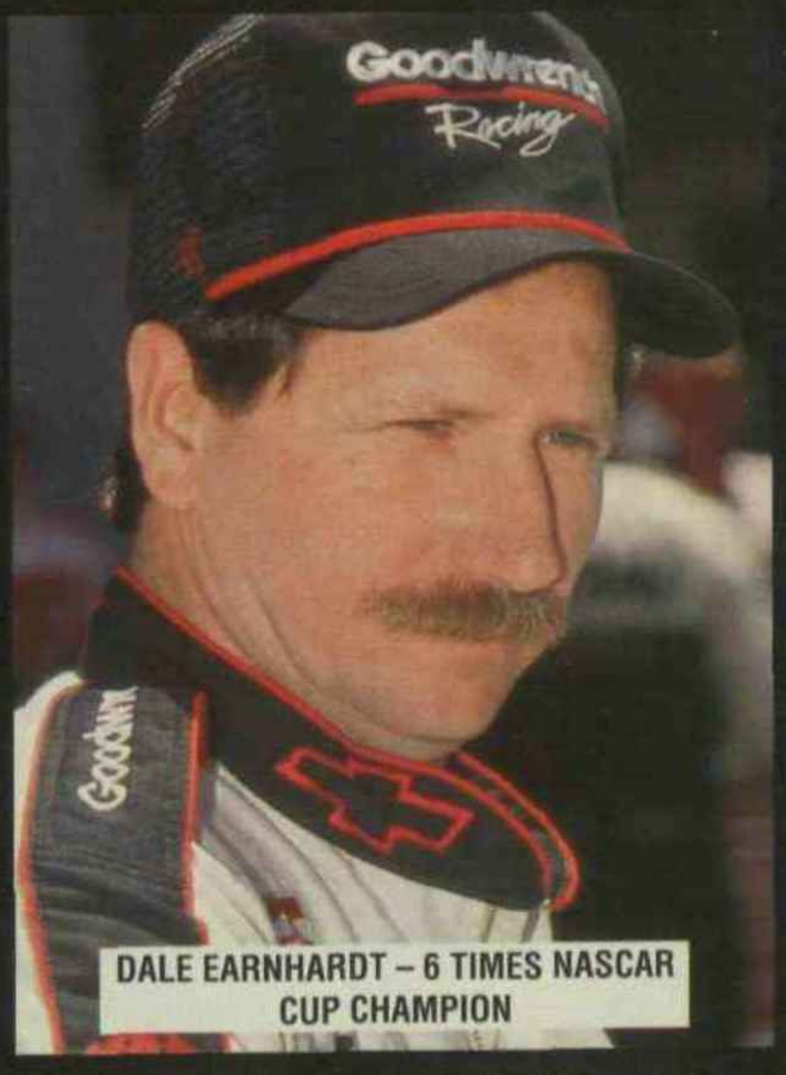
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Cats among the pigeons

Jackie Stewart shares some thoughts on the British racers this weekend, but sees bigger futures for the new generation than for those who have already made their names...

"British motorsport is probably responsible for more people on the Formula One grid than anything else. Certainly than any other country in the world. Because that's where they come for their apprenticeships and their schooling, and that's the great currency that Britain has..."

Jackie Stewart is off on a familiar tack, but as usual his words make sense, especially at a time when the economy is beginning to pick up but British companies fight shy of the sort of investment in motor racing that has grown Italy and France fresh generations of stars year after year.

"There have been periods in racing where all of the good work that we've done has been spent on drivers from others countries who have used Britain as a tool of learning," continues the Scot, warming to his theme. "Britain has been slow to financially support its own talent coming along. Almost in spite of it . . ."

Does he now see that changing?

"I would like to think so. I myself am doing more and more speeches to marketing societies, to the Institute of Directors. To invited, targeted audiences from the large agencies such as J.Walter Thompson, for example, where I did a speech at the end of June to some of the chief executive officers and marketing heads of some of the largest companies who operate out of the United Kingdom. The only reason I'm doing those, is to try and get the word over. Whether Paul Stewart Racing is going to benefit in any way or not, is almost incidental. I mean, I hope it might one day benefit to some extent, but the chances are that it's going to influence other people to look more seriously at motorsport as an option.

"So therefore, in spite of the fact that in the past Britain has not supported its young talent the way that Brazil or Italy or France have, we find ourselves with Martin Brundle for example. He's a very workmanlike driver, who now drives in probably one of the four most important Formula One teams in the world. He's driven almost everything since his very big year of Formula Three as Ayrton Senna's big rival, so he is a very competent driver.

"You then have Damon Hill, who is now a multi-Grand Prix winner. He's come through the hard way, through having no money at all, and struggling right through until the Frank Williams test contract.

"You've got Mark Blundell, who's now driving a Tyrrell that might have the best chassis that it's had, and engine combination, for maybe the last 10 years. He's already shown that he's quick enough in a Ligier and I think he is a very talented driver.

"David Coulthard is coming along, and he is certainly going to get some more Formula One races in 1994 at least, and will obviously be viewed by others because I think he will show himself to be valuable. And I think he is one of the new generation who have come along, and that new generation is better prepared today . . ."

Coulthard's Grand Prix début in Spain was totally self-assured and highly impressive by any standard, but Stewart is hardly surprised, having helped to steer the younger Scot in the right direction at a key stage in his career.

"Well, that's because I think he was brought up the right way. That's not for me to say that, but I really believe it's a fact... He was a very easy student.

"Then you've got Eddie Irvine, who's obviously got the spirit. He had a sort of stall at the end of his F3000 programme, had to go to Japan, earned a lot of money there and got some self-assurance back in the cockpit which he never seemed to miss outside the cockpit. He's still a quick driver and still a good driver.



"Look at Johnny Herbert, who, at the present time is a bridesmaid, but could one day be more than a bridesmaid . . .

"All of those drivers, however, we have to look at – including people like Derek Warwick, who doesn't have a drive right now. However competent they are, we've got to differentiate between being very good to get where they are – because to be one of 26 drivers in the world to drive Grand Prix cars is in itself an enormous success – and being good enough to go all the way. Because what makes the difference from being the World Champion or the multi-World Champions, you know, whether you think back to the Mosses, the Hawthorns, the Clarks, the Hills, the Stewarts, the Hunts, John Watson, Nigel Mansell? To get to that level takes so much, and I don't know whether the established group has it. Because apart from Damon, the others have been there long enough to have been chosen by very big teams if those very big teams really thought that they couldn't do without them."

Coulthard, he admits, is his possible exception, "because in his case the jury is still very much out and he is probably the one that I would point out to have the best chance."

Stewart concedes a vital point: Both Hill and Coulthard came in virtually at the top level with Williams, the former after just one part-season of scratching round in a Brabham while testing for Williams. Neither of them has really had to go through the confidence-sapping angst of pedalling a totally uncompetitive car and watching their reputation slide from comingman to the point where they are just accepted as another part of F1's furniture. Michael Schumacher is the greatest exponent of this particular art in recent times, vaulting insouciantly into F1 with Jordan back at Spa in 1991, and then being swept immediately into the Benetton machine without so much as a backward glance. So far, there have been no setbacks of any description, and his confidence has literally soared with every successive race.

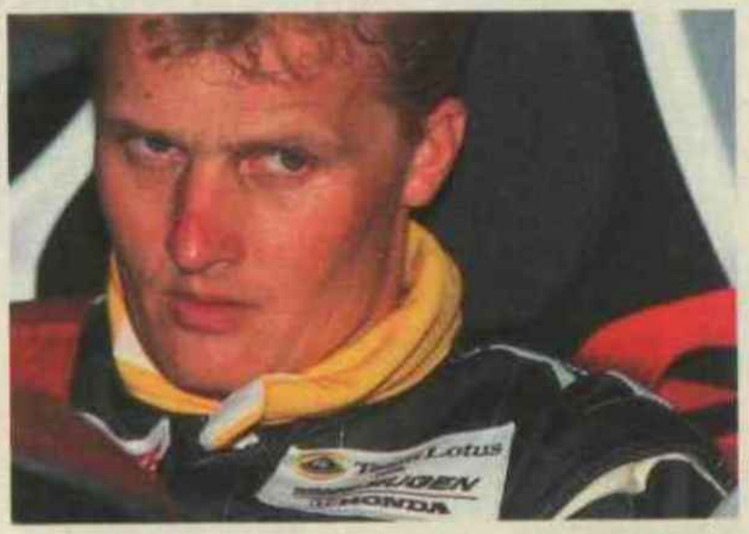
"The British guys have to say, 'That's the situation,' and you must see it straight in the face. You must see it as it is. I think Damon still is capable of going out and winning a Grand Prix, as has been demonstrated. He's done it. Okay, he's been driving a wonderful car. You know, we've all driven wonderful cars at one time or another. But I think it's a worthwhile comparison to mention that because there is no point in us pumping the boys up if you don't really look at it objectively and say look, 'They've been around a while now.'"

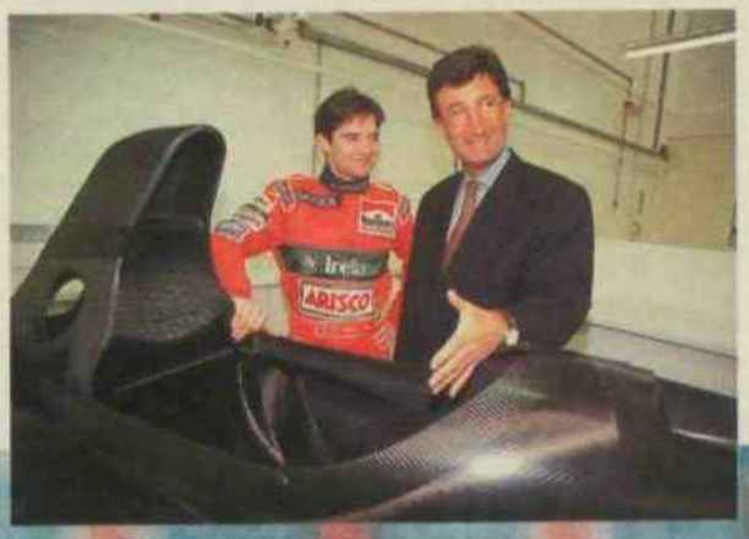
It's clear that Stewart has already begun to shift his focus to the new generation rather than the old, and he has no doubt that Coulthard has all it takes to go to the top.

"Yeah, I do," he says reflectively, almost *sotto voce*. "I think he's got it. I think he's got a lot of it. I like him. And I like de Ferran, Barrichello, I'm talking about the young drivers now. I think Kelvin Burt is very good, too. I'd have loved to have had him in F3000 this year. Nothing would have pleased me more. But we just didn't have any financial opportunities. We haven't seen him in a proper car yet . . ." He pauses. The gut feeling? "I think he's very good. He's certainly got the talent behind the wheel, and he's a very good strategist in a car. He was the most self-assured Formula Three guy that we've ever had. Even beyond David. Knowing when he wanted to do it, and how to do it. And when he didn't know, he admitted immediately that he was lost and he got help. I have a very high opinion of him."

He's careful not to say *too* much about Coulthard – "Here he is," he said in Canada, "in his second Formula One motor race, at a circuit he's never been on . . ." But . . .

Now that the Old Order has changed in Formula One over the past two seasons, you sense that Stewart is all in favour giving the new kids on the block full rein to their talent, no matter how unsettling that might be for the old hands who've patiently been waiting their own chance after failing to jump straight into a top seat at the outset of their F1 careers. **DAVID TREMAYNE**





Above: Johnny Herbert could be much more than just a bridesmaid. Kelvin Burt (below, with Eddie Jordan): self assured. Main pic: Coulthard impresses by leading team-mate Hill in Canada.



How much does it cost?

Ever wondered just where all the money gets spent in an F1 season?



DRIVERS

The market is depressed right now, with Alain Prost's retirement and Ayrton Senna's death. Gerhard Berger is on around £8M at Ferrari, Michael Schumacher £3M or so at Benetton. Others get a lot less. Nigel Mansell, meanwhile, is looking for nearly £750,000 a race at Williams. Remember, you need two drivers, and probably a cheap upcomer for testing at around £50,000 in case your prima donnas tire themselves out counting all their money.

ENGINES

If you're lucky you have a freebie deal with a manufacturer which pays for everything, including rebuilds. If you're not, and have to pay full whack, this could set you back around £3M to £4M.

CARS

Racing cars don't come cheap, when you look at all the research that goes into them before any material is cut. With wind tunnel testing, and the price of carbon fibre structures and autoclaving, you'd be lucky to get by on much less than £4.5M a year.

TYRES

Goodyear has a monopoly, but only supplies Williams, McLaren, Benetton, Ferrari and Sauber gratis. The rest have to pay. At a fraction under £370 per tyre, seven sets per car per race meeting (more if it rains), and 16 races a year, that's expensive, although there are bonuses for top three finishes. And don't forget, you'll need more for testing . . . Budget for £½M and you won't be far wrong.

FUEL



The top teams get theirs free, but what if you don't? Allow another £¼M for fuel and lubricants if you have to pay.

TRAVELLING

16 races, in some far flung places . . . F1 isn't cheap. Consider that you start in Brazil, go to Japan, and are then off to Canada within another four races, plus that you end in Japan and Australia, and have to shift anything up to 30 team members round the globe... Even with most of them in steerage class and sharing rooms, flights, hotels and hire cars are going to account for at least £1M.

FREIGHT

You've also got to shift the equipment, and only the top 10 teams in the World Championship (assessed half-yearly) get to take two cars and some five tonnes of equipment free of charge under the FOCA arrangement for 'flyaway' races. If you're outside the top 10, or carry more than that, you pay. You have your big trucks for European races. All told, allow another £1M.

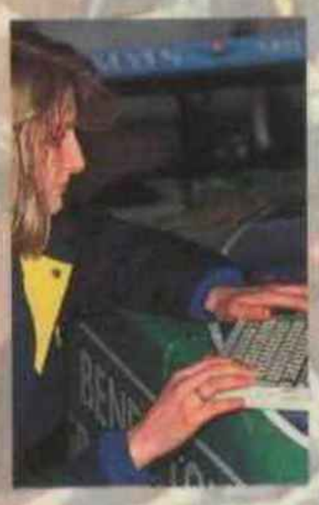
STAFF



Well, someone's got to run the team, design the cars, and clean the factory. The sky's the limit here, but most teams vary between 50 and 150 personnel. Start at £3M and keep counting.

TESTING

Research and development is the life-blood of any F1 team. Stand still and you wither. This really is an endless piece of string, that runs from the CAD-CAM office, through the wind tunnel, to the experimental shop and off to the test track. Start at £1M and watch the money go.



EQUIPMENT

Such is the hi-tech nature of F1 that you'll need state-of-the-art CAD-CAM equipment back at the factory, amortised over three to five years. Start at £1M.

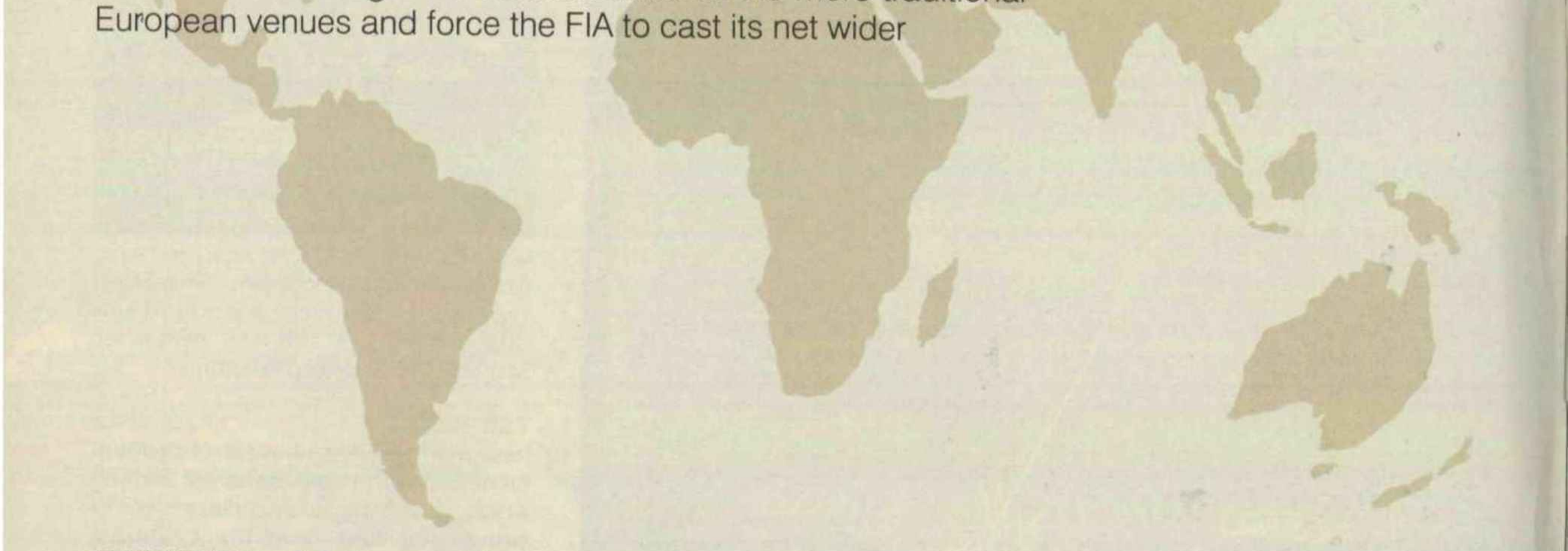
TOTAL

Say you have a reasonable team with FOCA rights but no engine, tyre or fuel deals, running a reasonable pair of drivers that together cost you £1M, and you could be looking at a minimum just to go racing of around £14.5M. Of course, if you really want to win you'd start by doubling that, at least. Start looking for those sponsor contact numbers . . .

DAVID TREMAYNE

Where is F1 going next?

Our map shows where the FIA Formula One World Championship currently goes – and where we think it might be going in the next decade as, among other things, factors such as tighter tobacco advertising laws threaten some of the more traditional European venues and force the FIA to cast its net wider



ARGENTINA F1 last went south of Sao Paulo back in 1981 when Nelson Piquet took his Brabham-Ford to a dominant victory with its trick hydraulic suspension. In its day the Argentinian GP was always a popular seasonal starter, and after its miscue this year the race now looks set to go ahead next March, probably as season opener in a double-header with Brazil.

AUSTRALIA Melbourne is due to take over from Adelaide in 1996 with a revised track set in Albert Park. Venue is currently being revitalised with a $45M spend, but protesters are having a field day.

BARBADOS Rumours for some time now have suggested plans to host a GP on an as-yet unidentified circuit, but full plans have yet to reach fruition.

CHINA A country on the move, China is keen to embrace Western concepts such as Grand Prix racing, and as well as its Macau-like street circuit at Zhuhai it has the bespoke, similarly-named race track which boasts the highest level of infrastructure.

INDIA Like Barbados, Calcutta has been mentioned on and off as a potential GP venue. India's time as a motor racing nation may not yet have arrived, but the interest is certainly beginning to grow rapidly at domestic level.

INDONESIA A GP at Jakarta's purpose-built facility has long been mooted, and was very close to reality for 1993. The track is excellent, with all modern conveniences, but right now the major sticking point appears to be money.

JAPAN Against most expectations the F1 circus really did go to the cramped little TI Circuit Aida this year for Mr Tanaka's Pacific Grand Prix. It remains to be seen whether we'll ever be 'on the buses' again, though, despite talks of five-year deals.

RUSSIA The idea of a Russian GP is as old as Methuselah, but it keeps coming round every now and then, and the time is probably more suitable now than it has been for the last decade. Moscow and McDonald's (who were in evidence in Canada), right-handers in Red Square?

SINGAPORE A smart street circuit in the great gateway to the Orient could make a lot of sense, not to mention a lot of money. Talks have been going on for years, but so far progress seems to have stalled.

SOUTH AFRICA Now getting back on to a stable political base after the first free elections and the switch to Black rule, South Africa is desperate to resume its sporting links with the outside world. Cyril Ramphosa of the ANC is known to be a great fan of racing and visited the last two South African GPs in 1992 and '93. And Nelson Mandella's daughter (married to South African AA director Prince Thumbumuzi-Dlamini) was present at the recent FIA meeting in Geneva . . .

UNITED STATES Washington's Brandy Station has been mooted for some while now as Bernie Ecclestone's 'secret weapon' in America, after attempts in Road Atlanta City and San Diego came to nought. Certainly Brandy Station owner James Lazer, who was involved with Phoenix, is building some sort of facility, and was in Canada for the recent GP, but whether this adds two and two the right way remains to be seen. Ideas of Indianapolis and F1 getting together round a common formula, as was once suggested, now seem totally far fetched. **DAVID TREMAYNE**

Auto Trader British Touring Car Championship

This should be a very easy preview to write – a win for Tarquini and Alfa Romeo. The Italian has ignored all the controversy surrounding his car and got on with the job in-hand to dominate the series in a manner similar to the Schnitzer BMWs early last season. The former Grand Prix driver won five of the first six races and the championship already looks a formality. However, this is the one track where the Alfa may be vulnerable for straightline speed is not its forte. Add to this the fact that this will be the first race with the new weight limits – the gap between the BMWs and the rest has been halved to 50 kilogrammes – and we could have a surprise result this weekend.

The quickest things down the straights are the Ford Mondeo and the Renault Laguna, and along with Tarquini, expect the lead to be disputed by Paul Radisich and Alain Menu. These two have diced together on numerous occasions and race well as a pair – hard but fair. Their team-mates, Andy Rouse and Tim Harvey, could also get amongst them, and both are due some luck.

These are the big three teams. However, the lighter BMW may be a little closer on this occasion as it débuts its new aerodynamic package – as do Renault, Ford and possibly Vauxhall. Expect Steve Soper and Jo Winkelhock to feature strongly in the early stages as their rear-wheel drive car still holds a distinct advantage off the line.

Also keep an eye out for Patrick Watts. The Kent man has always been highly rated by his colleagues and has worked wonders with the year-old Peugeot. His style is both spectacular and speedy, and the new 405 is expected to be ready for this weekend.

Nissan scored a dramatic 1-2 last season, but there seems little chance of this being repeated. And if the Toyotas of Will Hoy and Julian Bailey give us an action replay of last year's in-house roll, they will not be battling for the lead on this occasion.

British Formula Three Championship

This is probably the easiest preview I've ever had to write. Jan Magnussen has dominated this year's championship to such an extent that it is difficult to see anybody else winning a race, let alone challenging the Dane for the championship.

Magnussen's Dallara, after a dodgy start that saw him in the Copse tyre wall in first qualifying at the season-opener here in March, has been almost perfect. With everybody in Class A in a Dallara it should be a lot more even, but the diminutive youngster has continued Paul Stewart Racing's amazing run of success over the last three years and has to start as the clear favourite.

Magnussen's PSR team-mate, Dario Franchitti, and West Surrey Racing's Vincent Radermecker are the only other winners this year, and both are more than capable of threatening Magnussen, as are Alan Docking Racing's Gareth Rees, Intersport's Scott Lakin and Fortec Motorsport's young Frenchman, Jeremie Dufour, all their Dallaras powered by Mugen-Honda engines.

Vauxhall is pinning its hopes on Edenbridge Racing's Brazilian duo, Marcos Gueiros and Luiz Garcia Jnr and Fiat has Dino Morelli and Jamie Spence on its strength, whilst Marc Gene's Mitsubishi-engined Alan Docking-run Dallara has been coming good of late and the two West Surrey Racing/Racing for Spain Dallaras-Renault should have new, improved power units for the race.

The dark horse could be Italian championship leader and Monaco winner Giancarlo Fisichella. The RC Motorsport driver is still hoping to enter and if he can get enough time on the control Avons and is able to learn the new Silverstone layout quickly, then Magnussen might have a battle on his hands.

And Class B. Well, if you put Magnussen at 2-1 against for Class A, then Duncan Vercoe's odd should be around 1-100 on...

Formula Opel Euroseries

This preview rates with the Touring Cars as a difficult one. At the time of writing, the seven rounds held in the 1994 Euroseries had been won by six different drivers, whilst all three men that had won British races have also entered for the Silverstone event.

Brazil's Marco Campos, in his first season out of karts, leads the championship for the ultra-successful Draco Racing. Hot on his heels, though, are Dutchmen Tom Coronel and Donny Crevels, driving for van Amersfoort Racing and AR Motorsport respectively. Other '94 Euroseries race winners in the field are Alessandro Ferraresi (Bicar Racing) and Nicola Crocioni (Vergani Racing).

Also well in contention is Britain's Richard Westbrook, who has been ultra-consistent and is due a win soon for Anglo European Motorsport.

All the leading contenders are present from the home-based series for this, a single chassis formula powered by GM's two-litre, 16 valve engine. Ralph Firman and Owen McAuley represent Paul Stewart Racing, Jamie Davies is in action for Martin Donnelly Racing and Guy Smith upholds David Sears Motorsport's chances.

The result? Well, the Paul Stewart team is based down the road in Milton Keynes, so we'll go for Firman from Campos (Draco is always competitive) and Davies.

Porsche Supercup

Britain's reigning F3 champion Kelvin Burt had his first race of the year in the Porsche Supercup round which supported the Spanish GP in Barcelona. He came away impressed, and itching for another go.

"I've enjoyed it," he said. "You have to drive the 911 to the limit of the tyres. Enter a corner one mile-per-hour too quickly and you'll slide wide and lose a place. It was a bit physical on the first lap, but after that it settled down and the drivers were good, perhaps better than I'd anticipated."

The overall standard is indeed high. In addition to acknowledged Porsche specialists such as Uwe Alzen, the series is contested by all-rounders and veterans of the calibre of Jacques Laffite, Fabien Giroix, Jean-Pierre Jarier, Harald Huysman, Bernd Mayländer, Hubert Haupt and Mike Hezemans, not to mention currently underemployed single-seater stars such as Emmanuel Collard and, in Spain, Burt.

Kelvin recovered from a first lap assault in Barcelona, which dropped him from fourth to 14th, and finished only 1.084s behind winner Giroix.

In fifth place . . .

Dunlop Rover Turbo Cup

You're used to seeing the 216 GTi series in action over Grand Prix weekend. Now prepare yourselves for the new Turbo Cup, fought out by Rover's excellent new 220 Coupe model.

Racing veteran and former BTCC champion Chris Hodgetts led at the time of writing with one race win, showing consistency to add to his awesome pace. However, Alastair Lyall and Martin Short – next up in the standings – both have two wins to their credit.

Double Rover GTi champ Dave Loudoun is also in the field, as are quick youngsters Piers Johnson and Rob Schirle.

JAMIE'S PRESERVE?







Schoolboy kart racers Jamie Davies, Ralph Firman, Guy Smith and Richard Westbrook won't have had many spectators looking on as they did battle at the turn of the decade. However, that will not be the case on British Grand Prix morning at Silverstone this year, as all four will be amongst the front runners in the Formula Opel Euroseries race.

While Westbrook has been regularly contesting the European championship this season, his compatriots have been racing at home. And it's Davies who is leading the British Formula Vauxhall Championship at the mid-season point.

Aged 20 and hailing from Yeovil, Davies is spearheading Martin Donnelly Racing's 1994 attack: "It's all gone quite well so far this season," he reflects. "Winning the Vauxhall championship is what I'm looking for at the moment, but I'll also be looking to win the Grand Prix race - it'd be really nice in front of the home crowd."

It's all a long way from Davies's beginnings, which came when father Ron Davies - a leading club rally exponent in the mid 1980s with a Mk2 Escort BDA - decided that he couldn't afford to remain competitive against the then new Metro 6R4. From then on, the family cash was ploughed into young Jamie's karting career.

"My father runs Turnspeed Engineering, and we make all the Goodridge hoses on racing cars from Formula Ford to Formula One. We've made bits of Williams, McLaren and Ferrari. All the top teams - it all goes on their cars."

Working with his father during the week rather than living in his racing car doesn't seem to have been too much of a handicap for Jamie, whose karting career included many successes on the South Western scene, as well as victory in the 1989 British Junior and 1990 British Open Junior Championships.

Unlike his contemporaries, Davies's car racing debut came in a Clubmans Class B Mallock at Donington! "It was the first time I'd ever sat in a single-seater at all and I qualified it on grid two. I was catching the leader slightly but I spun twice and wiped the nosecone off - I think I managed sixth or seventh.

"The next race was on the Silverstone GP circuit. We were second in wet qualifying and won the race from start to finish."

An impressed Terry Nightingale, the owner of that Mallock, gave Davies a full season in the 1992 Formula Vauxhall Junior Championship. After two wins, he moved into Formula Vauxhall Lotus for 1993 with John Village Automotive, before switching to the Donnelly outfit last winter.

"I tested with them before last year when I was deciding what team to go with. The following year Jonathan Lewis (the former Team JLR supremo) was moving into the team; I'd known him for quite a long time and I thought 'Well, let's go for it.' It's seemed to pay off so far..."

Jamie notes his engineer Gavin Jones, mechanic on Piers Hunnisett's 1992 Vauxhall Lotus title-winning car, as one of his greatest assets. A very smooth driving style doesn't harm much either, and will prove a benefit on his hoped for graduation to Formula Three next year.

"I feel that driving a Vauxhall is about driving the car smooth. I could drive rough if I wanted to, but it's just that I'm purely concentrating on getting the car through the corners and getting good exits. I think that is the right nature to drive an F3 car too. It's about carrying the speed you've got through the corner - no sideways, none of that sort of style. In an F3 car you lose all your downforce and in a Vauxhall it just kills your tyres.

"I haven't heard any stories about what Martin (Donnelly)'s plans are for next year. If he is planning on going to F3 and he's got good engines and a good car I can't see any problems in moving on with him, but that's down to Martin!"

But that's jumping the gun. What about the Opel Euroseries race at the Grand Prix? Can Jamie beat the European regulars? "Yes, I think so. From what I've seen this year I think the British have got the edge. I'm looking forward to it and I'm hoping for a victory, but I'm sure a top three finish is on, definitely."

MARCUS SIMMONS

Jamie Davies (right) is giving Martin Donelly the results that he achieved himself as an up-and-coming young hotshoe.

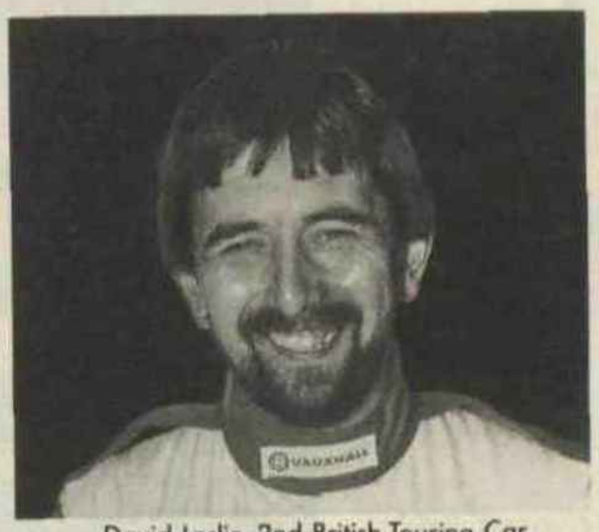
DIFFERENT DRIVERS.



John Cleland, 2nd, British Touring Car Manufacturers Championship 1993, Cavalier 16v



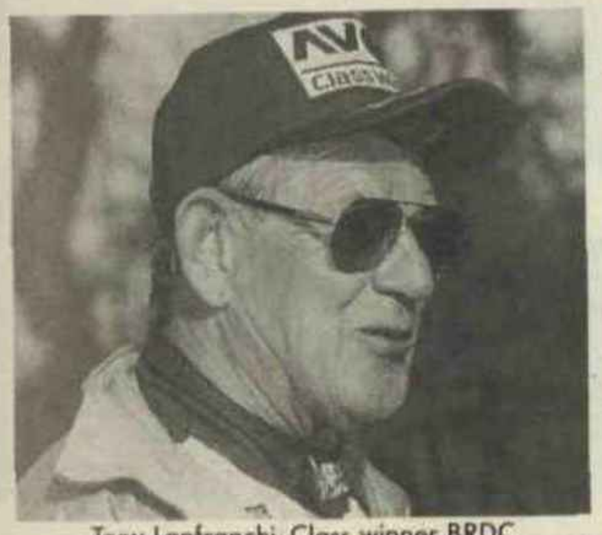
Jeff Allam, 2nd, British Touring Car Manufacturers Championship 1993, Cavalier 16v



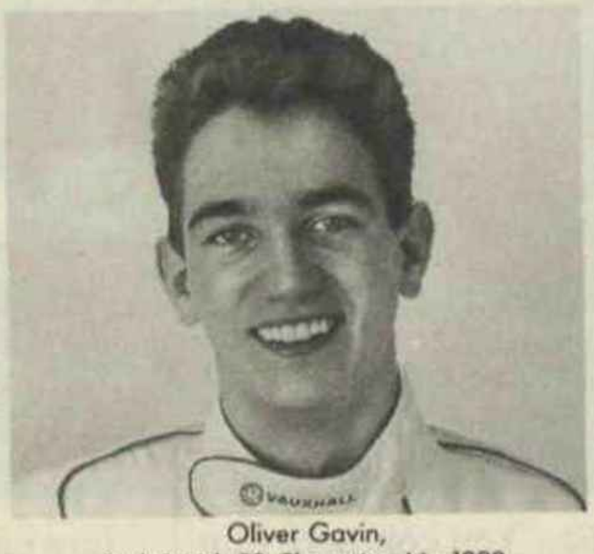
David Leslie, 2nd British Touring Car Manufacturers Championship 1993, Cavalier 16v



David Llewellin, British Formula 2 Rally Champion 1993, Astra GSi



Tony Lanfranchi, Class winner BRDC National Saloon Car Cup 1993, Astra GSi



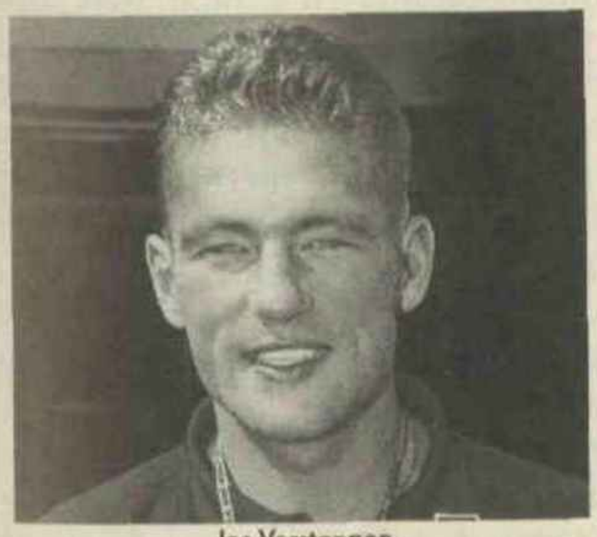
Oliver Gavin, 2nd, British F3 Championship 1993



Ni Amorin, Portuguese Touring Car Champion 1993, Astra GSi



Bruno Thiry, FIA World Cup F2 Rally Champion 1993, Astra GSi



Jos Verstappen, German F3 Champion 1993



Herman Roth, 2nd, Swiss Touring Car Championship 1993, Astra GSi



Massimiliano Angelelli, Italian F3 Champion 1992



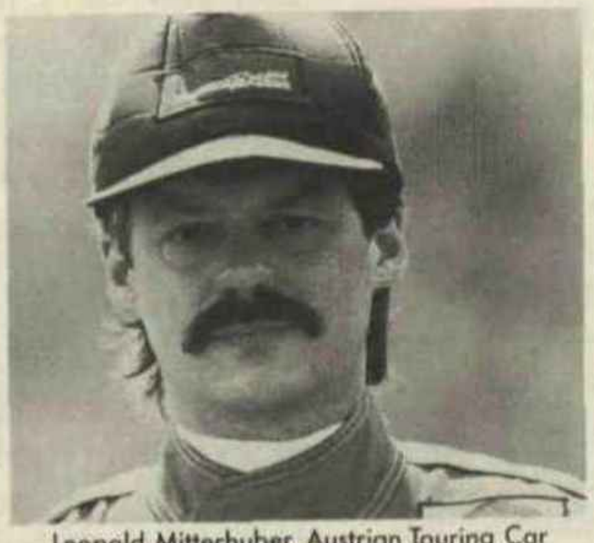
Pedro Lamy, German F3 Champion 1992



Ian Khan, 2nd, BTCC TOCA Challenge Cup 1993, Cavalier 16v



Ruedi Shurter, Swiss F3 Champion 1993



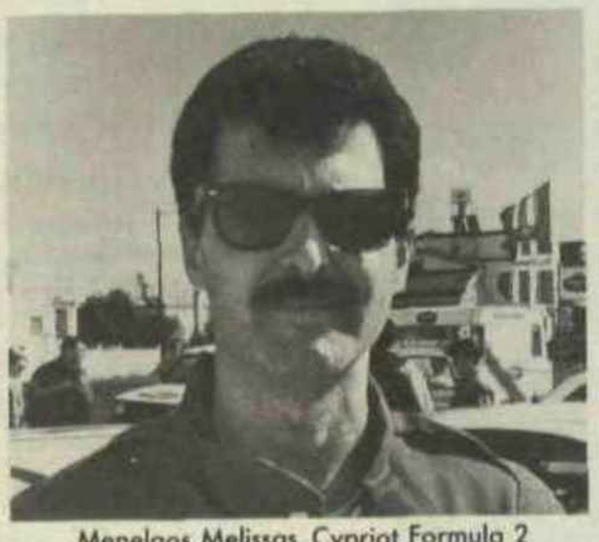
Leopold Mitterhuber, Austrian Touring Car Champion 1993, Astra GSi



Franck Lagorce, French F3 Champion 1992



Per Svan, Swedish Formula 2 Rally Champion 1993, Astra GSi



Menelaos Melissas, Cypriot Formula 2 Rally Champion 1993, Astra GSi



Richard Craven-Jones, Class winner BARC Production Saloon Championship 1993, Astra GSi



Henrik Lundgaard, Danish Rally Champion 1993, Astra GSi

Good TIMES



It's been a battle.

Gareth Rees' career up to now has not all been plain sailing. It's almost as if the Bath-born, Stoney Stratford-domiciled driver has been testing himself. One bad year, followed by one good (1990 Motorcraft FF1600 Champion and McLaren/*Autosport* Young Driver of the Year), one bad year, followed by one good (1992 Vauxhall Lotus Euroseries Champion), and then 1993, his first year in F3, which was 'character-building' in the extreme, words that Rees has come to hate. The pattern appears to be continuing. 1994 promises to be a better than average 365 days, even if the British Formula Three Championship seems to be heading across the North Sea to Denmark and into the hands of Jan Magnussen.

Rees, after a slow start, is beginning to string together the sort of results that could net him the runner's up spot and, if Magnussen was to falter in any way, the ultimate prize.

It wasn't a particularly good start to the year. "My deal was put together late and I didn't sign until the end of February," he recalls. "The cars then didn't arrive until two weeks after that, so we got testing quite late, in early to mid-March, and the first race was at the end of March."

The lateness of his 1994 deal with the much-respected Alan Docking Racing, after a difficult '93 season with Fortec Motorsport and the unloved Reynard 933 which was redeemed only by an end-of-season outing with German team WTS at Macau and Fuji, was partly down to politics and money, but it started him off on a bad footing: "You compare that with Paul Stewart Racing, who had their cars from 1993, Scott Lakin the same. We were probably a month behind, if not more, in terms of development. And in F3 that's critical. It's all down to the car - if the car isn't right, then you won't get the results."

At the beginning of June the results weren't coming his way. "I would have expected to have won races already," he admitted just before round eight at Thruxton. This was down, Rees feels, mainly to a lack of testing. "The ruling is that you can't test the week before a race, so that leaves only weeks without a race at the end of it."

And then there was a gap, between Brands (on May 8) and Thruxton (on May 30) and the team decamped to Snetterton. It seems to have been the turning point.

"We did two solid days and by the end of my second day I was two tenths quicker than the PSR cars. This year two tenths is a lot." The search for straightline speed, those extra vital mph, had been successful and Thruxton was a vast improvement. "It's nice that the speed came across from testing," he said after slotting his Dallara onto the front row, alongside Magnussen, "as that doesn't always apply. Pre-Thruxton I felt the car was on a knife-edge. Now I can lean on it, and it is a much more forgiving, confidence-inspiring car." Second at Thruxton was followed up by another front row start and second at Oulton Park, easily his best runs of the year, despite a provisional pole at the opening round at Silverstone and a good double-header at Brands Hatch.

"Brands was a difficult one because I think that maybe some of our problems were masked there. It's such a high wing circuit so you can whack loads of downforce on and it can mask some of the problems you've got in the chassis set-up."

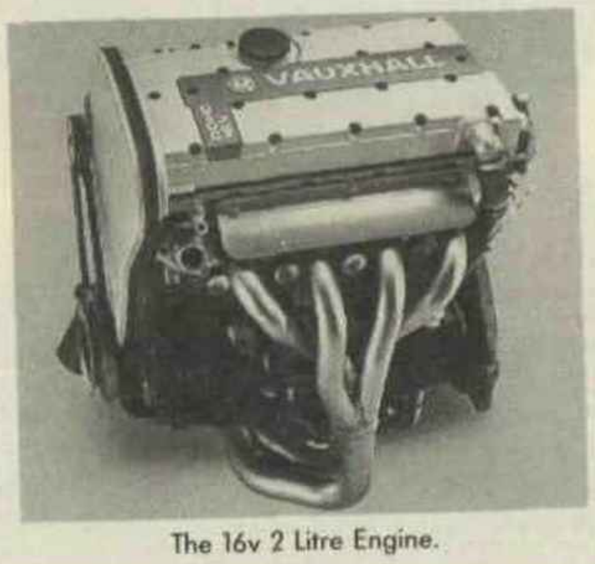
Having said that, Rees hasn't been a million miles away from the pace, even when he has been further down the grid than he would have liked. It's just that qualifying is crucial, as the Brands GP race showed when he was just a tenth off pole but had to be content with sixth on the grid. "The most important things in F3 are qualifying and the start. After that it tends to settle down, particularly this year more than last year, probably because it's a much higher standard of drivers out there."

This year's championship has strength in depth and this weekend's race will be no different. At the time of writing, Gareth was still searching for his maiden F3 victory. He is confident that the GP support could be the one...

STEWART WILLIAMS



SAME MECHANICS.



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VAUXHALL

A right rivetin' championship



Pop rivets. Yes folks, it's all boiled down to tiny cylinders of soft metal that can be hammered flat at both ends – 31 of them! Just one out of place and the balance of power in the *Auto Trader* British Touring Car Championship could swing dramatically – it's that close. And you thought it was a worldwide, multi-million pound, multi-coloured, bumper-to-bumper, paint-swapping extravaganza in which 10 manufacturers battled it out on a level playing field to prove the worth of their wares. Ha!

Unless you've been hiding under the stairs from the moment Hitler sauntered into Poland, or stuck in an A303 traffic jam on the way to Thruxton (by the way, you've missed the race and Tarquini won), you will have witnessed the furore surrounding Alfa Romeo's rear wing and adjustable front airdam-cum-splitter. Before Alfa Corse arrived on these shores, downforce was a dirty word in the BTCC, but now there is talk of running in dirty air. Previously, race car builders were happy to minimise a saloon's natural lift at speed, but when asked, Sergio Limone, Alfa's peerless designer and homologation expert, stated that the first thing he looked for in the '94 155TS Silverstone was 'downforce'.

Italian manufacturers have a long history of building homologation specials (ie. creating a specified number of cars with all the right facets to make it successful in competition), and its motor sport staff carry a lot of clout within the company. Apparently, Giorgio Pianta, the Fiat Group's motor sport supremo, made a couple of calls to the top brass of Italy's most influential industrial combine to get what he wanted – a bigger rear wing and an adjustable front spoiler. Believe you me, not every manufacturer/race car builder relationship works like this. They wish.

However, the success of the BTCC has been based on its ability to encourage new manufacturers to contest the series. This has been achieved by racing cars that look very similar to those used on the road, and by keeping the costs down so that competitiveness is not totally proportional to the size of your wallet.

But this is not how the likes of Alfa Romeo work. Instead, it blew the series wide open with the best funded and most professional team the cham-



pionship has ever seen. It also triggered the first major spat in the four years of the two-litre series' existence. The picnic table has been kicked over.

Protest has followed appeal has followed protest throughout this ruckus – Ford v Alfa. To be fair to Ford, other manufacturers have come out against the Alfa's aerodynamic aids, but they have been happy to let the Blue Oval put *its* money where *their* mouths are.

Mondeo-preparer and four-time BTCC Champion, Andy Rouse, has been like a dog with a bone during this affair. His input was fundamental to the creation of this two-litre, two-wheel drive formula. And perhaps because of this, he is more passionate (almost Italian-like!) than most. He clearly feels 'his' rules are now being mismanaged by the FIA, which has taken over the running of the formula now that it has become international, and is adamantly opposed to homologation specials, stating that they have always been destructive influences. He's right. His has been the clarion call for an adherence to the 'spirit of the regulations'.

For some, this is the bedrock of the championship; for others, it is merely a woolly phrase. And as far as Alfa is concerned, it has a piece of paper from the FIA that trumps it.

The governing body passed its 155 as legal at the start of the year, and this is good enough for the men from Milan. They have a point. How can a car be pukka one minute and dodgy the next? Basically, the problem lies with the FIA. Surprisingly, external pressure forced this august body into making a partial admission of culpability when it issued a limp-wristed 'rule clarification' late-April (reportedly at the behest of its President, Max Mosley). But there was never any chance of it totally holding its hands up. Instead, the ball was gently looped back to the national governing bodies. To its credit, the RAC MSA caught the ball and tried to ship it on . . .

Alfa stowed its boot-sourced spacer brackets for the rear wing away for good, but dug its heels in over the front splitter – it had compromised enough. The dramatically jacked-up rear wing had grabbed all the early headlines, but with a front-wheel drive car frontal downforce is much more important. Alfa had always stressed that its aerodynamic bolt-on goodies had little effect on the car's performance, but its stubbornness to remove the front splitter emphasised its true worth.

Its cars ran 'under appeal' for three races, but this, and the points gleaned from these outings, was lost when the RAC MSA's Eligibility Appeal Panel discovered 'materially different wording, layout and labelling of the technical instruction' between two bulletins handed out to dealers concerning the fitment (remember the pop rivets?) of the front splitter to road cars. The Alfas were chucked out of scrutineering at the May Oulton Park meeting and the team left the track in high dudgeon.

At this juncture the FIA clarified its original clarification after deciding its earlier effort was not terribly clarifying. Sigh. It *did* want the front spoiler pushed back, but could see how Alfa had interpreted it differently. Its points were returned and the 155s rejoined the fray at Donington.

Howsoever this was dressed up, it was clear that a bargain had been struck; the spoiler was to be allowed to run fully extended until July 1 – the last homologation date – but thereafter would have to be pushed right back. Alfa Corse acceded to this, so today we have the ironic situation that its splitter has receded as Renault and BMW have sprouted their's.

Of course, there is a theory that the melodrama of the front spoiler was never much more than a smokescreen for the Alfas' other go-faster bits. At the April Brands Hatch Indy meeting Giampiero Simoni charged through the field after a first corner mix-up, setting times regularly half a second quicker than the winning Tarquini despite being caught up in traffic, to pull back to seventh – with a damaged front spoiler! Has it all been much ado about nothing? We'll soon find out.

Enjoy the race! **PAUL FEARNLEY**



Edited by David Tremayne and Mark Skewis
Photography: LAT Photographic
Printed by St. Ives

GOODYEAR #1 in Racing



TIMETABLE

(Correct at time of going to press)

FRIDAY JULY 8

6.00	Gates open
9.30-10.15	F1 free practice
10.30-11.15	F1 free practice
11.15-12.20	Air displays
13.00-14.00	F1 qualifying
14.20-14.50	Porsche qualifying
15.05-15.35	F3 qualifying
15.50-16.20	FOpel qualifying
16.35-17.05	BTCC qualifying
17.20-17.45	Rover Turbo qualifying
18.00-18.30	F3 qualifying

SATURDAY JULY 9

6.00	Gates open
9.30-10.15	F1 free practice
10.30-11.15	F1 free practice
11.30-12.30	Air displays
13.00-14.00	F1 qualifying
14.20-14.50	Porsche qualifying
15.05	F3 race — 15 laps
16.10	Rover Turbo race — 12 laps
17.00-17.30	FOpel qualifying
17.45-18.15	BTCC qualifying

SUNDAY JULY 10

5.00	Gates open
9.30-10.00	F1 warm-up
10.25	Porsche Supercup race - 15 laps
11.45	FOpel Euroseries race — 15 laps
13.12-13.30	Red Arrows
14.00	British GP — 61 laps
16.30	BTCC race — 15 laps

DISABLED VIEWING

There are designated viewing areas for the disabled at various points around the outside of the circuit, and there are special toilet facilities at numerous locations all around the circuit.

To reserve a place in advance, contact the Silverstone booking office (0327 857273). They will need to see a photocopy of your Registration of Disability certificate.

ON THE DAY PRICES

Friday July 9: Trackside enclosures £17 (children £4); grandstands free; centre transfer (these do not guarantee access to a pit road walkabout on any of the three days) £11 (children £3).

Saturday July 10: Trackside enclosures £23 (children £4); grandstands £18 (children £18); centre transfer £13 (children £3).

Sunday July 11: trackside enclosures £57 (children £7); grandstands (including general admission) £115 (children £115 — check with circuit for availability as some are fully booked); centre transfer £17 (age immaterial).

CAR PARKING

As with all race meetings at Silverstone, there is no charge for parking adjacent to the circuit. Camping is not permitted within the designated car parks.

Please note that ticket holders will only be allowed one pass-out during the course of the day (although there will be no limit to the amount of beer-related passing out you can undertake during the evenings). You'll therefore find it far more convenient to take Thermos flasks, umbrellas, cameras, sandwiches and so on with you when you first enter. Throughout the day, pedestrian traffic will be denser in volume than it is on the M25 at four o'clock on a Friday afternoon. The less you have to join the crush, the better.

CAMPING FACILITIES

Silverstone no longer operates its own camp sites, but can recommend several nearby. Litchlake, opposite gates V6-V8, is run by Steve Tustain (0327 857955), and has on-site toilets, snack bar, shop and newsagent. Henwood Farm is opposite the circuit main entrance; call Phil Hinton (0327 857248) for details. This one includes toilets, snack bars . . . and a disco organised by the local rugby club. West Park is off the A413 in nearby Whittlebury, and features toilets, showers, bar and shop. Jeff Sargeant is the man to ring (0327 858092). Behind Copse Corner, down Winterhalls Lane, is the Windmill site, which has toilet facilities available. 'Phone Cecil Webb (0327 857269) for further information. Finally, Silverstone Recreation Association has a site for self-sufficient caravans toilet and shower facilities from 19.00. Full details from Mr King (0327 857098).

HOW TO GET THERE

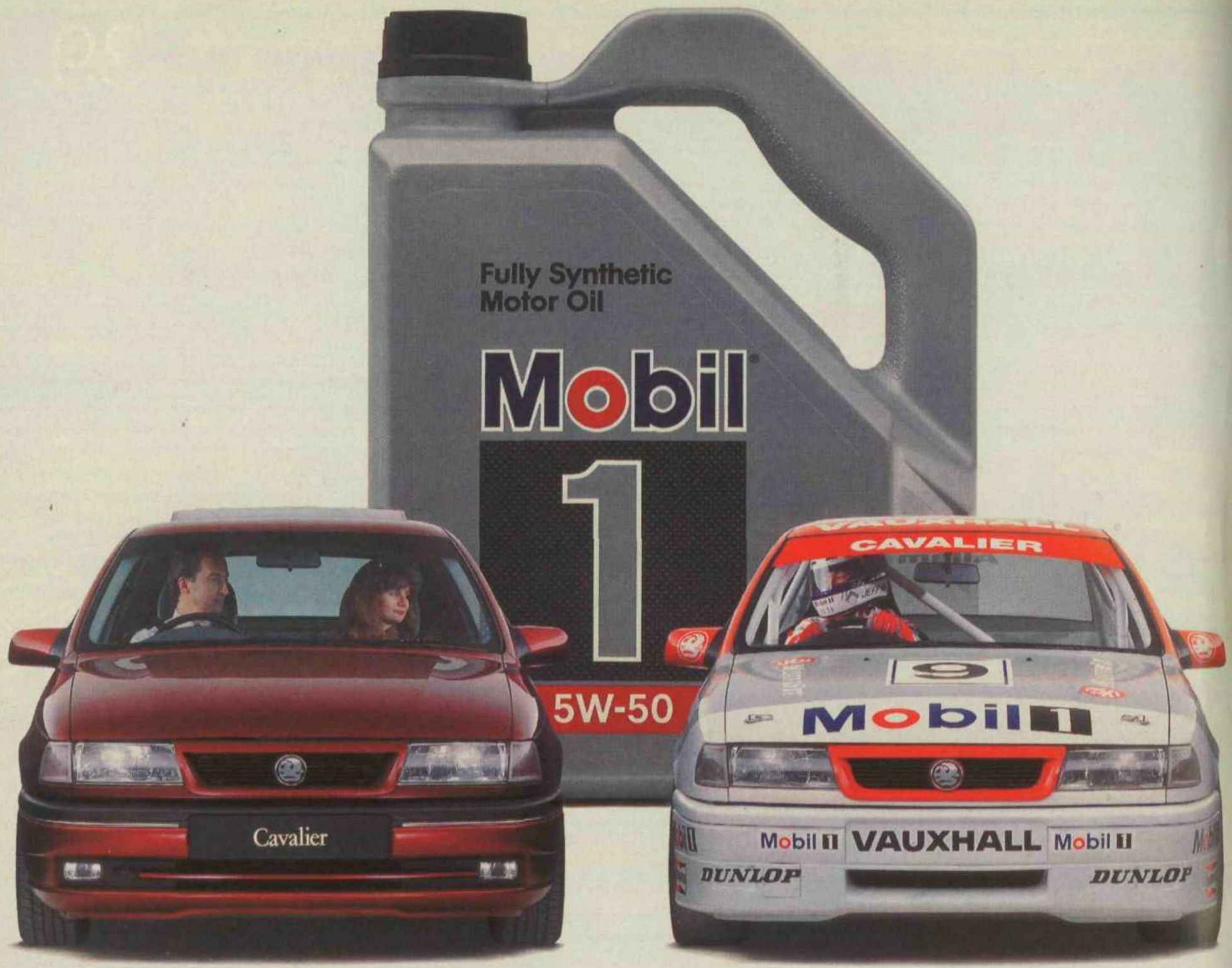
The conquest to get into, and out of, Silverstone is the annual price to you have to pay for your love of motor racing. Even for those camped nearby, ingress can be notoriously time-consuming, with pedestrian queues forming long before the gates open at 5.00 on raceday. Once the turnstiles creak open, there is a mad race between general enclosure ticket holders to annex the best viewing spots. It's like the start of the London Marathon . . . but without the directional unity.

We strongly recommend that you purchase your tickets in advance. For one thing, it's possible to obtain discounts by so doing. Those not already in possession of the relevant paperwork should contact the Silverstone booking office on 0327-857273.

The circuit is situated just off the A43, a fistful of miles to the west of Towcester. Come the Grand Prix weekend, all approach roads are traditionally verge-to-verge with traffic; keep an eye open for police diversions, designed to facilitate traffic flow.

Public transport facilities are available. Train services operate from Birmingham New Street-Northampton (via Coventry) and London Euston-Milton Keynes (via Watford Junction), with subsequent coach transfer to and from the circuit. These coaches will have priority access to the relevant car parks; full details from the booking office, on the aforementioned telephone number. There will also be a regular bus service from Northampton; contact Greyfriars bus station (0604 36681) for details.

Traditionally, the simplest means of access are at opposite ends of the price spectrum. If you can't cadge (or afford) a lift in a helicopter, it's worth loading up your rucksack, parking several miles away and completing the journey by pushbike. The latter approach demands a sturdy padlock and unshakeable faith in the British climate, however . . .



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