MARCH 2020

MOTOR SPORT

THE ORIGINAL RACING MAGAZINE

McRae EXCLUSIVE
15-year-old Max drives uncle Colin's greatest cars

SILVER ARROWS STRIKE BACK!

Merc's stunning second coming

PLUS: DRIVING THE 80s GROUP C HERO



INSIDE

F1 2020 PREVIEW

Lewis *vs* Max *vs* Leclerc

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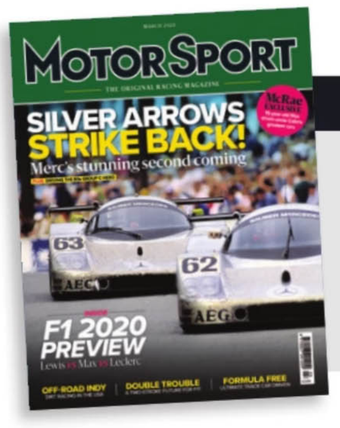
Tom Ingram

Team Toyota GB - KwikFit BTCC

WALERO

March

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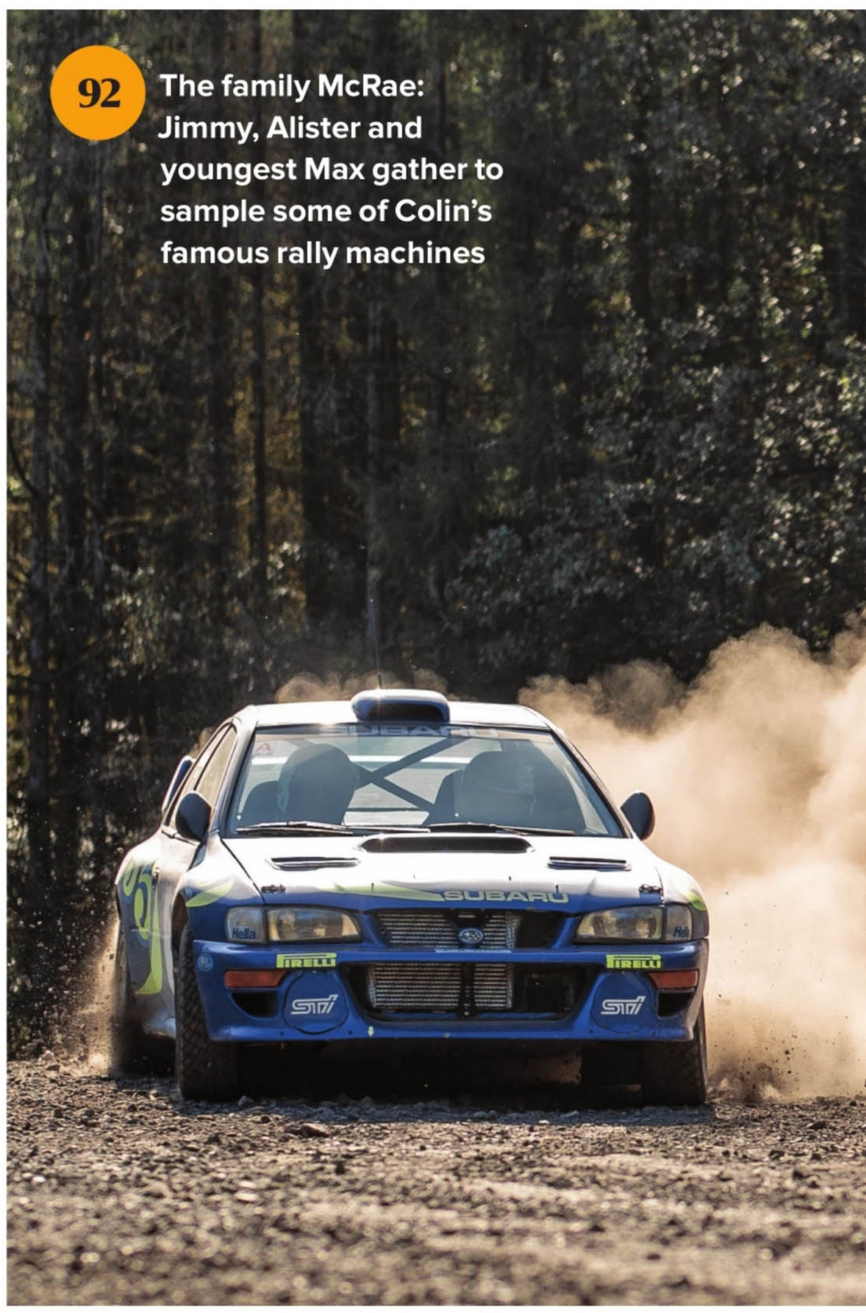
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MOTOR SPORT

THE EDITOR

"I'm ushered out past the vertiginous Red Bull trophy cabinet"

THE INTERVIEW HAS FINISHED AND ARGUABLY THE greatest race car designer of the modern era gets up and wanders over to the window of his office.

"Well, if we are finished, then I might erm, uh, just get on with some things," says Adrian Newey.

No one is going to disagree. So, while we pack up our things, Newey picks up a 2B pencil and, literally, goes back to the drawing board. It is a pretty big board - over a metre long - and it runs down the side of his neat office. Large scrolls of A2 paper are carefully stacked in one corner, rolled into tubes ready to be pored over later (I've read that he has two assistants charged with converting the sketches into digital form) in another department at Red Bull's sprawling Formula 1 operation. On one wall is a Tim Layzell artwork of Newey's Ford GT40. On the other wall a photograph of Donald Campbell and his Bluebird land-speed record car, which reached a speed of 403mph in 1964 and was the first car properly to use ground effects.



With his back to me, Newey, in jeans and trainers, quietly sketches, smoothly running the right-angle ruler across the board. *The New Yorker* magazine once referred to Newey as the Michelangelo of racing design, in which case here in his office in Milton Keynes, I feel privileged to watch an artist at work. It is an incredible moment, but all too soon I am ushered out, past Christian Horner in the glass-walled office next door, past the vertiginous Red Bull trophy cabinet on the way outside.

An hour earlier, Ed Foster and I had sat down to record the first in a series of new podcasts, which will feature some of the greatest engineers this country - or indeed any other - has known. It will focus not just on their careers and their work, but also offer insights into the drivers that they worked with. Each podcast, which will be coming soon to our website, will feature one engineer and the programme includes the likes of Patrick Head, Frank Dernie and Gordon Murray. But somehow it was fitting that the first one we recorded (with the ever cheerful and professional Alan Hyde at the sound controls) was Newey.

His record is remarkable. Starting out with Fittipaldi Automotive in the 1980s, he moved to March and then Williams, before heading to Ron Dennis's McLaren and ultimately Red Bull. Newey-designed cars have won 10 world constructors' championships and more than 150 grands prix, he remains the only designer to have won the world title with three different teams and along the way he has worked with some of the greatest names in F1 including Ayrton Senna, Damon Hill, Mika Häkkinen, Nigel Mansell and latterly Max Verstappen. His cars have also won two CART championships, he has spannered for Mario Andretti, and was mates with Paul Newman and George Harrison. In 2011, he was awarded an OBE.

Today, success has helped him move from pitlane to more elevated roles within the steel and glass HQs of massive organisations, responsible for hundreds of personnel. He is also by necessity wrestling with thorny political issues from green technology in racing to the new 2021 regulations.

But for me, one of the most interesting things about his remarkable career is that it has spanned a period during which Formula 1 has changed fundamentally, and in virtually every area imaginable. When he started out teams were a few dozen men. The HQ at Fittipaldi was "a small factory unit, a couple of Portakabin offices." He remembers returning from the pub where the whole team repaired every Friday for lunch and looking for Harvey Postlethwaite, the technical director who would go on to make his mark at Ferrari.

"I found him at his drawing board concentrating hard, head close to the board," says Newey. "Then I went closer and saw he was fast asleep." You certainly couldn't imagine anyone at Milton Keynes doing that. Later, he jokes, he was "junior aerodynamicist and because I was the only one I was also the senior aerodynamicist" and in his brilliant book, *How to Build a Car*, he describes vividly the atmosphere of those days "teeming with early 1980s chaos and run on a diet of cigarettes, coffee and beige polyester."

Of course, the fact that teams were small meant that by necessity Newey gained experience across all the various engineering disciplines from aero to design and hands-on race engineering. Such a 360-degree vision of the operation is impossible for young engineers today, who often specialise not just in one department but one niche of one department.

I think it's fair to say that it is not just Newey's reliance on a drawing board and pencil that mark him out as being from a different time. And it seems a great shame that as F1 evolves further we may not see the likes of Newey again.



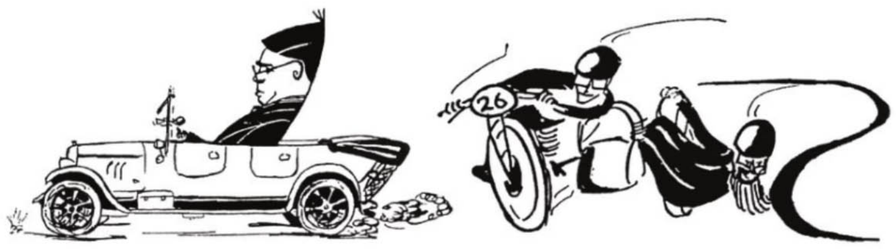
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NEXT ISSUE: OUR APRIL ISSUE IS ON SALE FROM MARCH 4

MOTOR SPORT

IN THE SPIRIT OF BOD AND JENKS



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Details matter.



Kenny Acheson was back in a Mercedes-powered Sauber for our cover feature, yet it wasn't the exact car he raced in period. However, the bodywork on the chassis he drove for us was taken from the Le Mans fleet. How do we know? Well, he raced chassis 88-C9-04 at Le Mans and took it to second in 1989. The scrawl '04B' is still legible after 30 years, suggesting Acheson peered over this exact panel along the Mulsanne.

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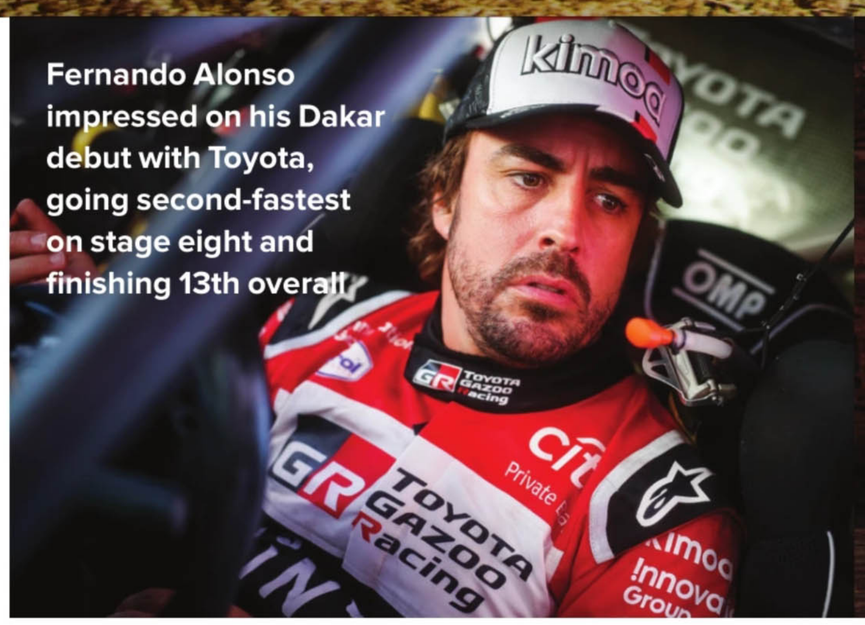
Model shown is a Fiesta ST-3 3-Door 1.5 200PS Manual Petrol with optional Full LED Headlamps.
Fuel economy mpg (l/100km): Combined 40.4 (7.0). *CO_2 emissions 136g/km.

Figures shown are for comparability purposes; only compare fuel consumption and CO_2 figures with other cars tested to the same technical procedures. These figures may not reflect real life driving results, which will depend upon a number of factors including the accessories fitted (post-registration), variations in weather, driving styles and vehicle load. *There is a new test used for fuel consumption and CO_2 figures. The CO_2 figures shown, however, are based on the outgoing test cycle and will be used to calculate vehicle tax on first registration.

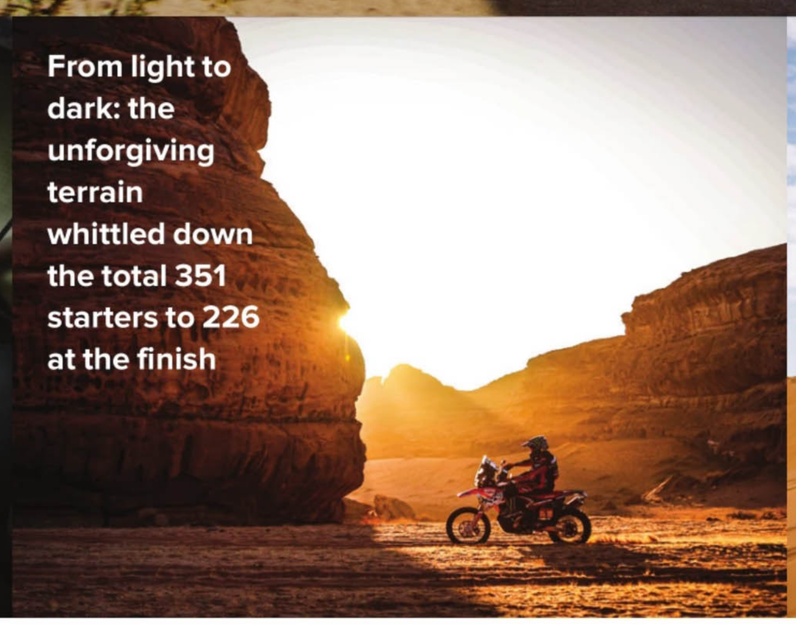
Sainz dominates Saudi dunes

January's Dakar Rally featured a host of new entries, and a new route through Saudi Arabia. However, a familiar name in Carlos Sainz Sr won, claiming his fourth event victory

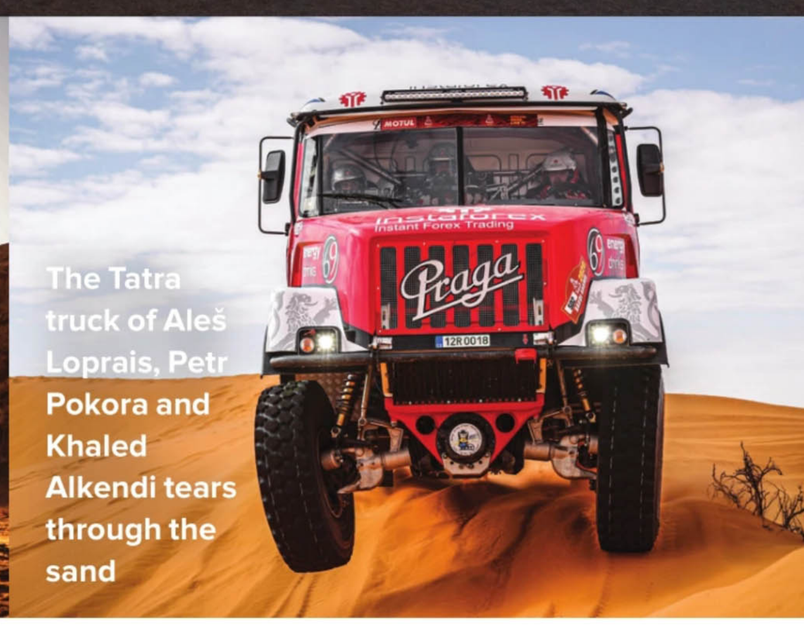
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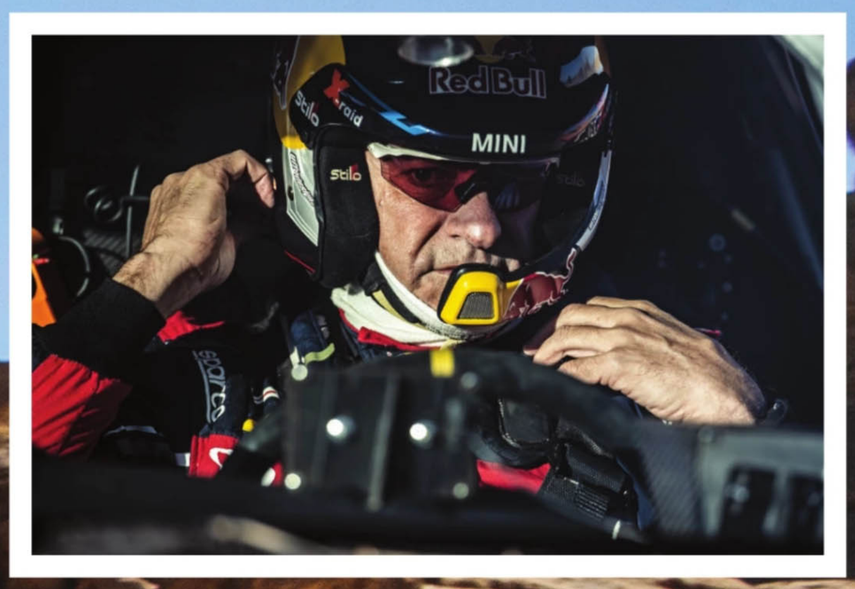
Fernando Alonso impressed on his Dakar debut with Toyota, going second-fastest on stage eight and finishing 13th overall



From light to dark: the unforgiving terrain whittled down the total 351 starters to 226 at the finish



The Tatra truck of Aleš Loprais, Petr Pokora and Khaled Alkendi tears through the sand



Sainz took four stage wins to beat Nasser Al-Attiyah by 6min 21sec at the finish



Saudi Arabia provided some stunning landscapes



Alonso lost time with a big roll down a dune on stage 10



Chills in the desert: Honda rider Kevin Benavides warms his hands on the exhaust



Leonora Surtees runs Buckmore Park. Below, 1964 F1 champion John Surtees

Bucking the trend

The daughter of 1964 Formula 1 world champion John Surtees, Leonora, says normalising women working in motor sport is the way toward boosting female participation.

Several projects exist that primarily aim to support and increase the number of women working in motor sport, but Leonora, who is the managing director of Buckmore Park, says an overbearing approach is not the answer.

"I think it's more about normalising women in the industry and getting rid of those barriers that are maybe in the heads of those girls who might not be considering it for a career," she explained.

"It's about the industry allowing girls to see that they have the opportunity to be whatever they want in motor sport, but equally not forcing it down their throats.

"There's work to do in the industry. They're only going to burst through those barriers by saying 'why can't I?'."

Buckmore Park is preparing for its 2020 karting season and aims to offer a number of routes into motor racing at the grass roots level.

A headline 24-hour race will again return to the calendar after a successful test event last year. It achieved half-a-million views online and will once again be live-streamed. The once-around-the-clock enduro has already sold out, well ahead of its April date.



The Cadillac DPi of Kamui Kobayashi, Renger van der Zande, Ryan Briscoe and Scott Dixon won the 2019 Daytona 24 Hours. Could the cars now be headed for Le Mans?

IMSA teams could join Le Mans

THE IMSA SPORTSCAR CHAMPIONSHIP and the World Endurance Championship have taken their biggest step towards one unified global formula, after announcing a convergence of rules during the Daytona 24 Hours last month.

IMSA had been on the path to its upcoming DPi 2.0 platform to replace its existing top-tier class, but it has now been renamed LMDh and will incorporate a spec hybrid system. The LM Hypercar regulations allow for both hybrid and non-hybrids.

The LMDh cars will be eligible to race in the WEC from September 2021 and will be able to compete at Le Mans 24 in 2022. It is unclear if the WEC's LM Hypercar machines will in-turn be able to race in IMSA events.

IMSA wants its LMDh cars to match the pace of the LM Hypercars and a Balance of Performance equalisation system is expected to be used, with more details set to be unveiled at March's Super Sebring round.

Convergence is the culmination of years of talks between Le Mans organiser, the Automobile Club l'Ouest, and IMSA.

"A manufacturer will soon be able to compete in the top category of two championships, the WEC and the IMSA," said ACO head Pierre Fillon. The brands racing at Daytona appeared in favour of the move.

WRC, LAT, RFMARTIN

For sale: Lancia's greatest hits

WHAT IS LIKELY TO BE THE most impressive and significant collection of racing Lancias ever assembled is being offered for sale for the first time this year.

The six-car collection reads like a greatest hits album for the famous Italian marque, with some of its most famous race, rally and endurance offerings being represented – all bedecked in the glorious Martini livery.

The collection is the work of regular historic racer and car enthusiast John Campion, who has accrued it over several years. It is being sold privately, rather than auctioned, and is offered as a single lot for a combined asking price of $7.5 million.

Headlining the collection is a 1983 LC2 Group C car that contested the World Sports Car Championship during one of its most evocative eras, and was a factory entrant during that year's Le Mans 24 Hours. Other race cars include the LC1 Group V1 sports car which Teo Fabi, Michele Alboreto and Riccardo Patrese took to victory in the 1982 Nürburgring 1000km. Completing the racers is the Beta Montecarlo Turbo Group V that won the World Sportscar Championship title for manufacturers in 1980 and 1981 before returning the brand to Le Mans in 1991.

The rally contingent is just as illustrious, featuring the Delta HF Integrale Group A machine that Miki Biasion took to two World Rally Championship victories, which has been fully restored back to its 1988 Rally Portugal-winning condition. The 037 Rally Evo 2 Group B car is one of just 20 made and had been driven by talents such as Markku Alén, as had the S4 Corsa Group B machine.

The full collection, all of which has been certified by the Lancia factory, was shown in public during the recent Palm Beach Cavallino Classic event. The sale is being handled by London-based specialist Girardo & Co. For more information on the cars' histories, see *girardo.com*



Nürburgring 1000kms-winning LC1 is all original



Group B Delta counts Biasion and Alén as past drivers



Montecarlo Turbo boasts a 460bhp Abarth-tuned engine

Lancia 037 Group B
WRC debut on 1984 Rally Sanremo

Lancia Delta S4 Group B
Victory in 1986 Rally 100 Miglia

Lancia Delta HF Integrale 8V Group A
1988 WRC Rally Portugal winner

Lancia Beta Montecarlo Turbo
Double World Endurance winner

Lancia LC2 Group C
Took pole, then second in 1983 Kyalami 1000kms

Lancia LC1 Group VI
Won the 1982 Nürburgring 1000km race

Following in Grand Prix's tyre tracks...



Grand Prix leads the way in motor sport's Oscars past

FORD V FERRARI'S NOMINATION AT the Academy Awards for Best Picture is a first for a dedicated motor sport film, after it earned four nominations at the prestigious event.

James Mangold's film, known as *Le Mans '66* in territories such as the UK, tells the story of Ford's attempt to win the Le Mans 24 Hours in retaliation to a failed attempt to buy Ferrari in 1963, with Christian Bale playing Ken Miles and Matt Damon taking on the role of Carroll Shelby.

The film encompassed the 1964-66 Le Mans races and the development of the Ford GT40, while also touching on the death of Miles in a testing accident in 1966 at Riverside International Speedway.

The film proved a hit with critics and moviegoers, earning over £150million at the box office, and was praised for its lead actors' performances and cinematography.

While the results were announced on February 9, after *Motor Sport* went to print, even we recognise it is unlikely to have sealed the Best Picture award, against opposition including *The Irishman*, *Jojo Rabbit*, *Joker* and *Little Women*.

However, *Ford v Ferrari* was also nominated at the Academy Awards for film editing, sound mixing and sound editing - areas it may stand a chance. Motor racing has some precedent in Oscar categories, as 1966's *Grand Prix* won three Oscars in the same categories, while *Days of Thunder* was a contender for best sound but ultimately lost out to *Dances with Wolves* in 1991.

"Motor racing has some precedent in Oscar categories"

Ford v Ferrari starred Christian Bale (in car) as Ken Miles and Matt Damon (to his right) as Carroll Shelby

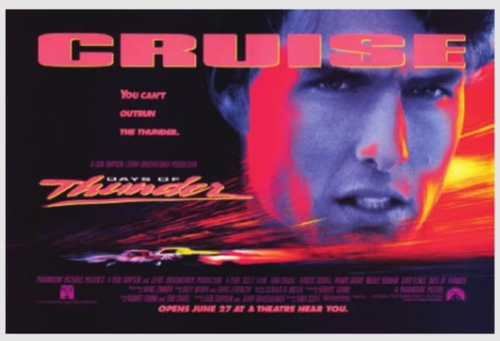
THE MOTOR RACNG FILMS THAT THE CRITICS RECOGNISED



1966 Grand Prix
The standard bearer for motor racing films, *Grand Prix* earned three Oscars in 1966.



1971 Le Mans
Le Mans was overlooked at the Oscars, but got a Golden Globe nomination for best original score.



1990 Days of Thunder
Starring Tom Cruise, *Days of Thunder* earned an Oscar nomination for its sound.



2010 Senna
Senna was recognised at the BAFTAs by winning best documentary and best editing.



2013 Rush
Like *Senna*, *Rush* found accolades at the BAFTAs. It won best editing.

ALAMY, GETTY, LAT

Goodwood revives Rally sprint for members

GOODWOOD WILL ADD NEW POPS AND bangs to its popular Members' Meeting in March by introducing a rally sprint event, featuring Group B, Group A and WRC cars from the past 40 years.

The format - best remembered from the BBC *Grandstand* TV show featuring Murray Walker on commentary - will bring a new dimension to Goodwood's season opener, which this year will be held on March 28-29. The one-at-a-time rally sprint will be run on a specially laid out track, with the start situated on the outside of the motor circuit. Cars will pass through the access tunnel, for added audio effect, then run on a course that takes in Woodcote corner, the chicane, the start/finish straight and even the pitlane.


Goodwood's rally sprint will include monstrous Group B cars

The rally sprint, which will be a timed event, will first run into the night on the Saturday evening, as a nostalgic nod to RAC Rallies past, and will be repeated during the day on Sunday.

Around 25 star cars and drivers from rallying's golden eras will take part, including 1984 World Rally champion Stig Blomqvist and father-and-son British Rally champions Jimmy and Alister McRae.

The rally sprint will join the usual packed schedule of races and demonstrations, which this year will celebrate Tom Walkinshaw Racing's 1980s Group C Jaguars and F1 cars from 'The 72 years', led by the Lotus 72 and its period rivals.

W Series in F1 tie up



AFTER A TRAILBLAZING DEBUT season the team behind W Series, the all-female championship, had to find new momentum.

That arrived last month when it was announced that this year's series, which begins in May in Russia, will feature two non-European races for the first time when it will act as a support for both the Mexican and US grands prix.

Racing on a Formula 1 weekend is likely to enhance W Series' standing around the world and significantly boost its visibility - especially as the races in Austin and Mexico City are usually among F1's best-attended races.

W Series CEO Catherine Bond Muir said: "We are delighted that, in only our second season, our championship has been welcomed by F1. Interest in and enthusiasm for W Series was enormous in our first season and the addition of two all-new races on the F1 platform will only increase that."

The series aims to raise the profile of women in motor sport, with the ultimate goal of steering a female driver onto the Formula 1 grid. W Series also now has superlicence points. The champion will earn 15 points - putting W Series in line with series such as Indy Lights and the World Touring Car Cup.



New audiences? W Series wants to harness F1's profile

Sold faster than a speeding Bullitt


Steve McQueen made the car famous with his San Francisco car chase

THE CELEBRATED HIGHLAND GREEN Mustang driven by Steve McQueen in the movie *Bullitt* was always going to sell well, so the fact that it set a new record for any Mustang is perhaps not surprising.

The sale price of $3.7 million (including fees) at the Mecum auction in Florida in January beat the $2.2 million paid last year for a 1967 Shelby GT500 'Super Snake'.

The car had been in the family of Sean Kiernan for 40 years having been bought by his father Robert for $3500 in response to a classified advertisement in *Road & Track*. It was used as a daily drive for many years, before being put in storage. Three telephone bidders battled for the car, with the winning bidder opting to remain anonymous.

"When the auctioneer asked, 'Who will give me $3500?', everybody in the room raised their hand. Everybody had a chance to bid on the car," said Kiernan. "That's what I'll always remember."

Bratches to leave F1

FORMULA 1 COMMERCIAL BOSS SEAN Bratches has left his role to spend more time with his family in a move that comes on the eve of a season that could define Liberty Media's ownership of F1.

The irony of Bratches' exit is that it was he who played a key role in F1's seemingly endless expansion, which has led to claims that this year's packed 22-race calendar will harm personal lives.

Such expansion was part of Bratches' brief to increase revenue, with race-hosting an obvious source of income. One of the ex-ESPN man's last acts was to visit Saudi Arabia, continuing talks over a potential new grand prix for 2023. Bratches is not expected to be directly replaced.

F1 chairman and CEO Chase Carey talked of Bernie Ecclestone's final decade in F1 as a missed opportunity to grow its fanbase. Improving that fell to Bratches, but there were missteps such as the botched launch of F1 TV, alongside promising moves such as the Netflix *Drive to Survive* series.

There has also been speculation Carey and motor sport boss Ross Brawn could also exit once the journey to the new era of 2021 has been completed.


Sean Bratches had been in his F1 role since 2017

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MARK HUGHES

"An opposed-piston two-stroke was considered for a GP car in the 1920s"

Pat Symonds recently dropped the bombshell that Formula 1 is seriously looking at two-strokes for its next engine formula, post-2025.

Forget the smoky old Saabs and DKWs that were effectively regulated out of the road car market in the late '60s/early '70s by emission and economy requirements. For one thing, these would be opposed-piston two-strokes with the combustion chamber between them, meaning the oil would not be part of the same mixture as the fuel, as was the case with those old engines where the combustion chamber was around the crankshaft, and they would not be throwing any more unburnt fuel out of the exhaust than a four-stroke. For another, modern developments in forced induction and computer-controlled ignition and timing are quite capable of curing the residual downsides of the two-stroke and potentially leaving F1 to enjoy some very real upsides.

Such an engine would be inherently more efficient than a four-stroke, as Symonds notes: "It's reasonably obvious that if you are going to pump that piston up and down, you might as well get work out of it every time the piston comes down rather than every other time the piston comes down."

Variable geometry turbines and software-controlled ignition are just two of the more obvious current technologies perfectly suited to maximising the potential of the two-stroke. The workings of such an engine lend themselves to cylinders of much bigger bore:stroke ratios than currently, giving very low piston speeds for a given rpm.

Already, working prototypes in the automotive industry are achieving well in excess of 50 per cent thermal efficiency – which is where current hybrid F1 four-stroke engines are, but helped by the energy recapture from the ERS-K and ERS-H systems. It's not too much of a leap to imagine in excess of 60 per cent from an F1 forced induction, opposed-piston two-stroke with all the energy-recapture technology of current engines. That would be a remarkable achievement, but it goes beyond that. Because the two-stroke is inherently more powerful for a given capacity, the engines could be downsized – thus these massive thermal efficiencies would be applied to a smaller engine so the actual economy gains would be immense.

Furthermore, because the two-stroke has no cylinder head it is physically much smaller for a given capacity. Smaller, lighter engines requiring nowhere near as much fuel would address one of the major failings of current cars, which is that they are just too big and heavy. Lighter, more agile cars would not only be more raceable, but would give the tyres an easier time, making it more feasible for the tyre manufacturer to come up with something that could be raced hard for the whole distance.

Because of the way the exhaust pulses work, the best two-stroke power efficiencies are achieved with three cylinders (or multiples of three). The exhaust note of a small, high-revving, three-cylinder would be out of this world, unlike any sound previously associated with F1. Imagine a 20,000rpm, turbo/supercharged, 1-litre three-cylinder of 1000 horsepower.

"Imagine a 20,000rpm supercharged 1-litre three-cylinder of 1000bhp"

The potential for development of such a new combination of technology would be immense and so therefore would be the potential development cost. But much of it would also be relevant to automotive industry and so one can imagine the tricky discussions that might ensue about which R&D car manufacturer spend was for automotive and which was for the F1 programme. But that's surely a solvable problem.

Until the planet's electricity generation is fully weaned off fossil fuel and the problems solved of the massive increase in electrical consumption that would result in all road cars being electric, the all-electric car is not the full answer. Two-strokes look set to have a real relevance to the automotive industry. Symonds believes than an F1 two-stroke car, running on synthetic fuel, would actually be greener than a Formula E car.

As a further reminder that there's nothing new under the sun, the first time an opposed-piston two-stroke engine was considered for a Grand Prix car was in the 1920s. In 1924 Fiat was working on such an engine: six cylinders, 1.5-litres, supercharged, with 12 pistons sharing six communal combustion chambers, with two cranks geared together (the engine would have been mounted vertically!). One piston in each cylinder would alternately expose/seal the inlet port and the other would do the same with the exhaust port. The ports would be placed in a way that would see the inlet ports open (with high forced induction-aided pressure) just after the exhaust, helping scavenge the chamber. Fiat was forced to abandon the project because of problems with piston crown cooling. Because the inlet ports could open only for about half the time of a four-stroke and a piston was always exposed to exhaust heat, it would overcome the cooling of the exhaust pistons (which were oil-cooled). But that was with the materials technology and understanding of almost a century ago. It's surely time we revisited the idea.

Since he began covering grand prix racing in 2000, Mark Hughes has forged a reputation as the finest Formula 1 analyst of his generation

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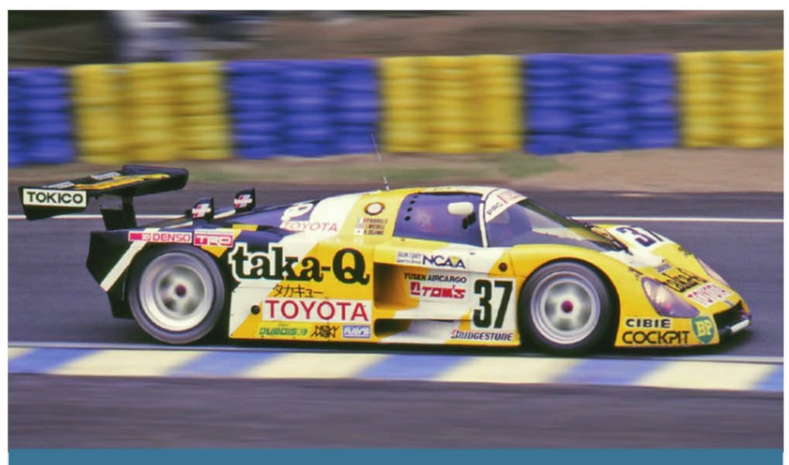


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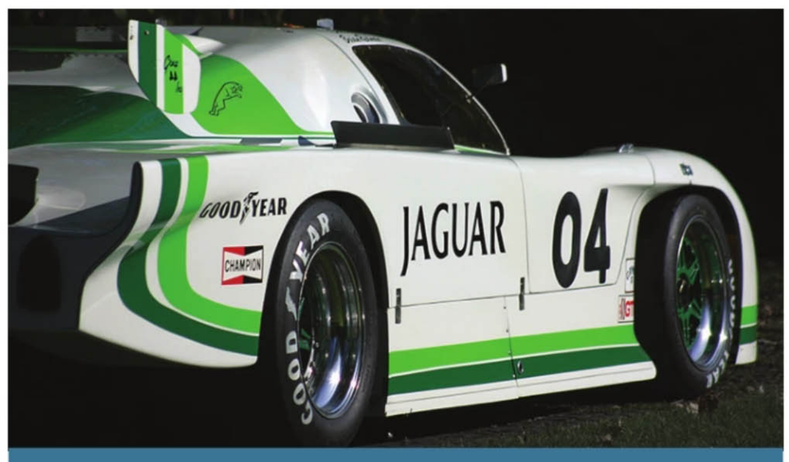


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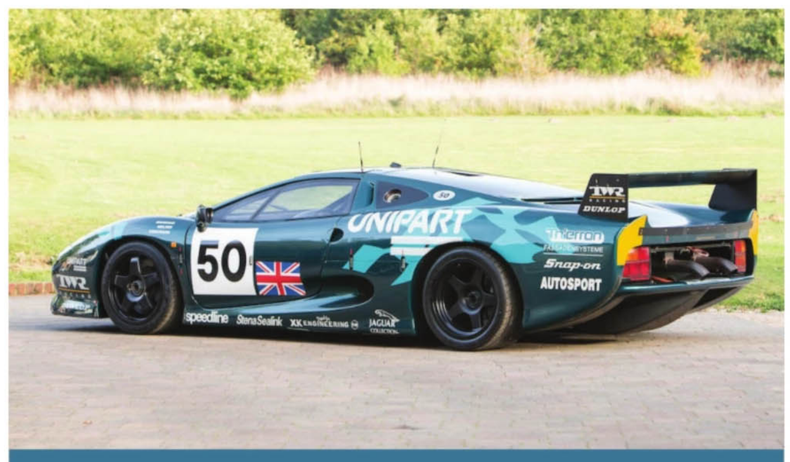


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MAT OXLEY

"Valentino Rossi may not have won since 2017, but he's a giant of the sport"

On March 8th Valentino Rossi will commence his 25th season as a grand prix rider and his 21st as a competitor in the premier MotoGP category. This is a startling achievement in a sport that isn't usually kind to its contenders.

Rossi may not have won a race since 2017, but he is still a giant of the sport. Indeed he towers over the history of motorcycle racing like no other. There have been 940 grands prix since the start of the inaugural 1949 world championship season and Rossi has contested 402 of those.

He made his grand prix debut in Malaysia on March 31st 1996, at the age of 17 years and six weeks. This was before the Sepang circuit was built. From 1991 to 1997 the Malaysian grand prix was staged at the little Shah Alam circuit, just outside Kuala Lumpur.

Shah Alam was carved out of the jungle, with monkeys hanging from trees at the side of the track and snakes occasionally slithering across the asphalt.

At that time Rossi was just another grand prix rookie, who had guaranteed himself a place in the 1996 125cc world championship by finishing in the top three of the 1995 125cc European championship. He didn't win that series, he was beaten into second by Lucio Cecchinello, now owner of the LCR Honda team, which currently runs Cal Crutchlow and Takaaki Nakagami in MotoGP.

In 1996 Rossi was the junior team-mate in Scuderia Carrizosa, owned by urbane paddock svengali Giampiero Sacchi. He rode an over-the-counter Aprilia RS125, thanks to his father's friendship with Aprilia race boss Carlo Pernat.

"Valentino must say many, many thanks to his father for his help," says Pernat. "Graziano called me on the phone every day for two weeks! He broke my balls to help his son!"

Cunning has always been one of Rossi's greatest strengths. During the 1995 season, when many European championship rounds were staged at grands prix, he struck up a friendship with reigning 125cc world champion Haruchika Aoki.

"Valentino asked me for advice and we became very good friends," says Aoki, who won the 125 world title in 1995 and 1996. "We became like brothers - I stayed at his house in Italy and he stayed at mine in Japan. At the races I was like a teacher - we would walk the tracks, so I could show him braking points and lines. He sometimes followed me in practice, learning how to get the lap time."

Aoki was like a god to the Italian teenager. "Now it's the other way around!" Aoki laughs.

Rossi qualified 12th fastest at Shah Alam, 0.95 seconds behind polesitter and 1994 125 world champion, Kazuto Sakata.

He went better in the race, a methodology that's been a hallmark of his career. He gradually worked his way forward into a gang of nine riders battling for a podium result. Within this group was one of the most successful small-capacity riders of all time, Jorge Martinez, winner of four 80cc and 125cc world titles. Perhaps the young rookie should've held back and learned from the maestro, but the mind of an impetuous teenage racer doesn't work like that. Rossi only had eyes for the podium and was a fraction ahead of Martinez when things went awry in the final laps.

"Martinez came to see me with a lot of anger. He wanted to kill me"

Martinez still remembers the moment. "Four laps from the finish I was fighting for the podium with a group of riders, including Valentino. I was waiting for the last two laps, when I would start pushing for the result. Then, in the middle of a slow corner, Valentino braked, I touched him and crashed. I was very angry!"

Inevitably, Rossi's version of events is slightly different. "Another rider had a problem right in front of me, so I had to close the throttle; that's why Martinez hit me. After the race he came to see me in my box with a lot of anger. He wanted to kill me, so from then our relationship was a bit difficult."

In fact Martinez - a veteran rider/team owner by then - could have been team-mates with Rossi in 1996. "Valentino's father came to see me at the end of 1995, so we could talk about Valentino riding for my team," adds the Spaniard. "In the end, we decided, no, because my mentality was to use only Spanish riders. Now I think I made a bad decision!"

Rossi crossed the finish line at Shah Alam in sixth place, an impressive debut. But his next two outings were sobering: 11th at Sentul, Indonesia, and again at Suzuka. The championship's move to Europe and more familiar ground changed everything for Rossi.

He finished fourth at Jerez and Mugello, just a few hundredths of a second off the podium on both occasions.

Those results convinced him that he had what it takes, but they also over-excited him. He crashed out of the next two races at Circuit Paul Ricard and Assen, trying too hard to make his first appearance on a grand prix podium. Mid-season engine upgrades for his Aprilia - thanks to Pernat's influence - made the difference. He scored his first podium at Austria's A1-Ring (now Red Bull Ring) on August 4th, 1996 and then his first victory at Brno in the Czech Republic on August 18th. The man he beat in a vicious last-lap duel was 33-year-old Martinez.

Mat Oxley has covered motorcycle racing for many years – and also has the distinction of being an Isle of Man TT winner

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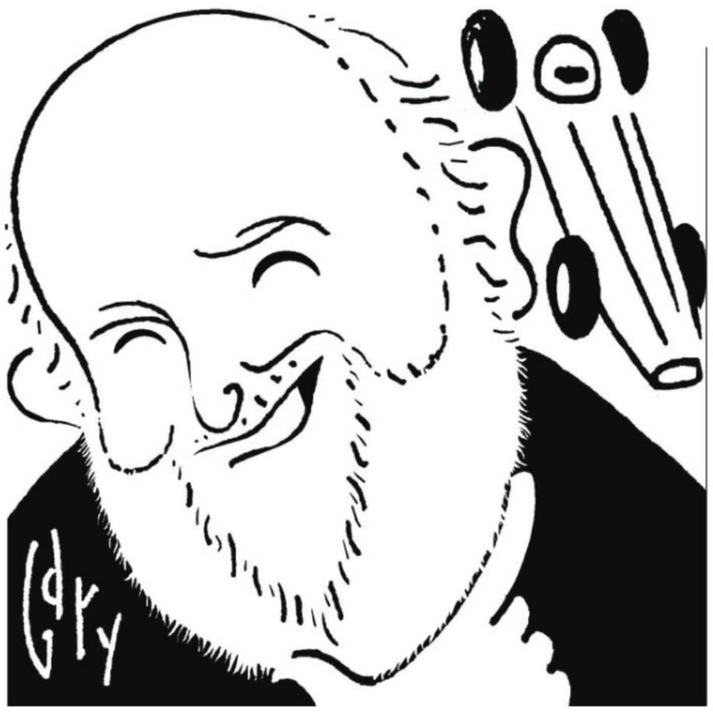
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DOUG NYE

"Tyrrell's total work force, including office staff, was just 19 people... Nineteen!"

MY OLD FRIEND SIMON Taylor has recently earned thoroughly well-merited praise for his lovely book on the HWM team and its cars. H W Motors still survives as a business in New Zealand Avenue, Walton-on-Thames. It was founded there as a partnership between keen racer George Abecassis and lanky engineer John Heath. Immediately after WW2 they mitigated the boredom of grey, cheerless (and flat broke) Britain by going racing, on a shoestring. George ran his Alta sports and Grand Prix cars while John Heath built first a special, and then whole teams of Formula 2 and sports cars. HWM shone particularly brightly in Europe and during a period in which the hugely over-publicised BRM Formula 1 project stumbled and stuttered, the initials HWM earned high regard and profound respect, everywhere from Rouen-les-Essarts to San Remo, Naples to the Nürburgring, Lake Garda to Goodwood...

John Heath sadly ran out of luck driving his HWM-Jaguar sports car in the 1956 Mille Miglia. On a rain-slick road near Ravenna he slithered into a ditch; his car 'HWM 1' tripped and overturned, damaging his lungs. Three days later he died, aged only 41.

In later years I got to know Abecassis quite well, 'Gorgeous George', seldom without a cigarette in a holder, always immaculate, wry, languid - an old-school motor racing hero. He wasn't one to bray about his racing career, but when asked a straight question he would usually respond with a detailed and often hilarious answer. He had burst onto the British motor racing scene most notably in 1937 with an Alta single-seater. Cleverly, he fitted it with twin rear wheels for the August 1938 Crystal Palace meeting, and won ahead of all the ERAs. Postwar, in addition to his HWM activities, he also became a works driver for Aston Martin.

One time he related quite sadly how he had crashed his Aston at Goodwood but escaped unhurt and walked back to the pits, confidently expecting to be greeted by fellow team members relieved to see him unscathed. Imagine his dismay when the first person he encountered was racing director John Wyer, 'Deathray' at his most daunting, who "... promptly gave me the most fearful bollocking for just crashing one of his cars". George continued: "When I could get a word in edgeways I just said to him 'Bloody hell, John, that's a bit strong - when I crashed my Stirling bomber they gave me the f***ing DFC!".

Now there was a racing driver with life experience. In fact he was fairly unusual in having been a wartime PoW who survived and resumed racing postwar. I asked him once about the risks of racing through the late 1940s/early '50s on road circuits still flanked by trees, ditches, power poles, walls, barbed wire fences - and worse. And he gazed at me tolerantly, removed his cigarette holder from between his lips, and said "Dear boy - you must remember that for the first time in six years no-one was shooting at us...".

"Dear boy, for the first time in six years no-one was shooting at us!"

This sprang to my mind just before Christmas when I was at a lunch in his Buckinghamshire home with Jackie Stewart, his wife Helen, son Paul and four of his former Team Tyrrell mechanics. They were chief mechanic Roger Hill, the veteran Roland Law (94 going on 74!), Roy Topp and Robin Coleman. Their reminiscences, stories and life experience were just wonderful.

Two of the Stewarts' most prized 'family Formula 1 cars' are Tyrrell '003' - in which Jackie won no fewer than eight World Championship Grand Prix races 1971-72, and '006/2' in which he won four more, plus the non-Championship International Trophy at Silverstone, in 1973.

We spent most of that day with the cars, recalling good times, and bad, and how it was back then when Tyrrell was such a dominant team - and its total work force, including office staff, was just 19 people... Nineteen to achieve so very much.

But what I really enjoyed that day was to witness the mutual respect and affection still shared between the triple World Champion and the blokes who made that possible. What really warmed my heart was the very British manner in which that regard was manifested. I mentioned the 1971 Austrian GP, from which '003' subsided in a cloud of smoke'. "Aye" - beamed Jackie - "If I'd had proper mechanics that wouldn't have happened". Their response? "If we'd had a decent driver who watched his instruments it certainly wouldn't have happened...". And so on - so much more of the same. The ribbing was merciless.

It's a national characteristic that the more a Brit admires a friend the more he's likely to insult him. And thinking back on 'Abby' and his experience as a prisoner, I'm minded of the story about the Coalition PoWs released from Iraqi detention at the end of the first Gulf War in 1991. On their flight out of the country, American fighter jets formated on their airliner, the pilots taking it in turn to fist-pump and salute their countrymen waving stars-and-stripes flags at the airliner's windows.

Then some RAF jets closed on the liner, and some of the liberated British prisoners waved. And their compatriot pilots waved back - with a half-closed hand, oscillating vertically... Somehow that makes one very proud to be British. Are we odd?

Doug Nye is the UK's leading motor racing historian and has been writing authoritatively about the sport since the 1960s



ANDREW FRANKEL

"Aston Martin's straits have been dire ever since it sold a part of itself to the public"

ONE OF THE PERENNIAL dangers of writing a monthly column is that they need to be filed weeks in advance and you therefore risk being overtaken by events and your words looking at best obsolete, at worst really quite stupid.

So if by the time you've read this Aston Martin has been bought in large part by Lawrence Stroll, Geely or some other mystery buyer and its current travails are already forgotten, you have my apologies. If not, the company will still be in straits that have been dire ever since it decided to sell a chunk of itself to the public for a sum of money that must now look wildly ambitious.

For myself I think the company will survive; there have been many occasions when it has found itself in hotter water, and it has always emerged, towelled itself down and carried on. I remember the late Victor Gauntlett telling me that twice during his chairmanship he went to work on what he believed to be the company's last day. Even so there is no doubting the importance of the forthcoming DBX SUV – more in a minute.

For now however, join me back in 1994 when another new Aston is about to be launched, and this one really is make or break for the company. It may sound an odd thing to say about the DB7 given that Aston Martin had already been bought by Ford, but there were plenty of Dearborn executives who'd have been happy to call time on what they saw as a needless distraction, when Ford had more than enough troubles of its own.

Aston Martin's bigger problem was that it had lost all its engineering capacity in the hand-to-mouth days before Ford arrived, which meant out-sourcing the DB7 in its entirety, to Tom Walkinshaw's TWR. And how, with very little money, TWR managed to turn the Jaguar XJS into the Aston Martin DB7 with hardly anyone outside the industry either knowing or caring, is one of the greatest achievements to take place in that industry over the 30-something years I've been commenting upon it.

Make no mistake, if the DB7 had not worked, Ford would have shut the company down. And I don't say this with the benefit of hindsight having finally got the key players to spill the beans many years later. At the time the opening paragraph of *Autocar's* 1994 road test said, 'the fragile future of Britain's most distinguished marque is in the hands of this car,' a view I support, not least because it was me who wrote it. I concluded by observing that if it failed, 'the gates of Newport Pagnell could just shut for good.' It didn't, and my only sadness in re-reading the story is seeing once more the beautiful prototype we photographed now knowing it only had hours to live. Later that same day it erupted into a ball of flame at over 150mph on a private track while maximum speed testing.

Another reason I feel more bullish than most is that I've already driven the DBX. Not far, not that fast and in horrid weather, but enough to make me confident that Aston Martin has created at least an entirely competitive car and possibly one of the best of its kind you can buy. You'll know already that it's great-looking, which in a class that includes Bentley's Bentayga and Rolls-Royce's Cullinan, is a larger than usual advantage, to which I can add that it's extremely fast, sounds great and has an exceptionally spacious cabin.

What I liked most about the DBX, however, was the way it rode and steered. Too many large SUVs have chassis that are nowhere near the standards of the best big saloons, but the Aston has beautifully judged ride quality that provides the body control that is essential in such cars with excellent bump absorption capability. But it was the steering I liked best, which is a highly unusual thing to say about an SUV weighing over two tonnes. Others like the Lamborghini Urus may be more powerful and a touch faster, but my strong suspicion is that for those who need a full-sized SUV but want it to be a rewarding to drive as possible, it will be the DBX to which they should turn.

Returning to Tom Walkinshaw for a minute, I wonder why no-one has written a decent biography of one of the sport's most extraordinary characters? I know people who think he is a hero, others who consider him something closer to a villain. The stories of what his teams got up to on his behalf abound: many are hilarious, others breath-taking in their audacity. Some may even be true.

So many people must have so many great tales to tell about Tom the racing driver (he was bloody good), Tom the team principal of Group C and Formula 1 concerns and Tom the businessman, yet no one has yet compiled them between two hard covers. Why not?

"Some think Tom is a hero, others that he is closer to a villain"

I asked this question on social media the other day and got no answers at all, but a deluge of respondents saying that were such a book to be written they'd be first in line to buy a copy. I may even have said that I'd consider writing it.

And I would, but only if enough people from all sides who knew Tom were prepared to sit down and go on the record with their recollections of the man, and only if his family were happy for it to be done. But if not me, I hope someone else takes it on: so few great motor racing stories remain untold, and the life of Tom Walkinshaw is undoubtedly one of them.

A former editor of *Motor Sport*, Andrew splits his time between testing the latest road cars and racing (mostly) historic machinery
Follow Andrew on Twitter @Andrew_Frankel

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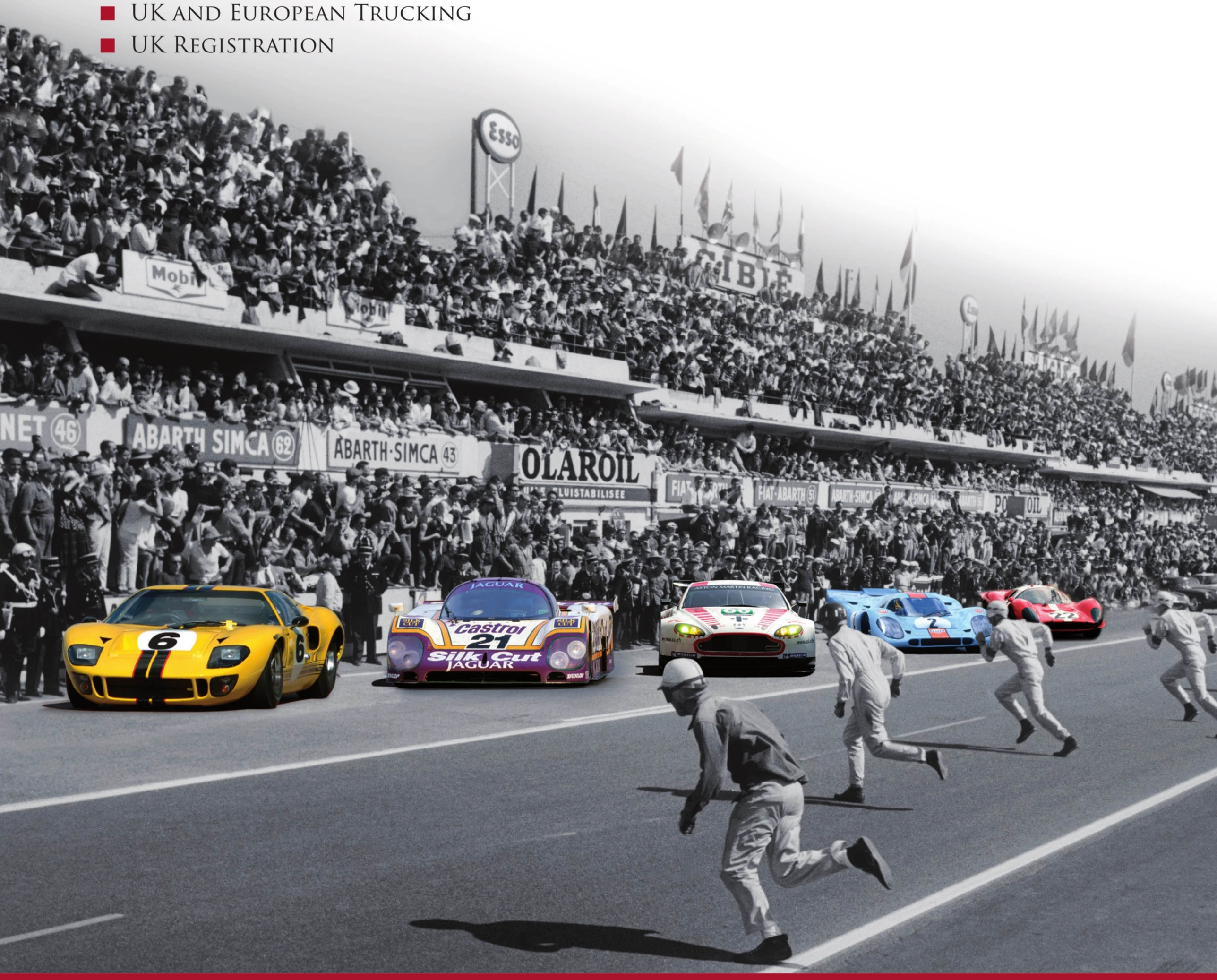
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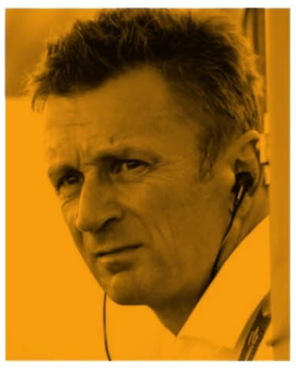
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Santiago ePrix

Heat on the Santiago streets

A revised layout, high temperatures and plenty of twists and turns, **Allan McNish** explains how his Formula E team coped with Chile's challenges

McNISH ON FORMULA E
IN ASSOCIATION WITH Audi Sport

One of the greatest challenges in Santiago back in January was the temperature. Reaching 35°C on race day, we had to keep the cars and batteries cool – and not lose ours.

To prepare, we get a scanned circuit map that we plug into our on-site driver-in-the-loop simulator back at base in Neuberg.

The technology is incredible and vital, but especially in Formula E where the tracks are mostly so challenging because of their temporary city street circuit nature.

We knew that there were things like resurfacing and a different layout at the Parque O'Higgins track. You try to understand what you're going to find when you get to the venue, but in reality, it's only when you get out on the circuit that you understand whether your predictions and preparations are in-line. If it isn't – as was the case for us to some extent in Diriyah on the first race day – then you've got an uphill challenge trying to get your way out of it due to the unique one-day schedule.

We arrived in Chile knowing it was not going to be as hot as last year, which was the hottest on record in the city, but it was still going to be roasting, and a race of managing tyre temperatures from the start, partly because of the new layout. The first sector has got some long corners that put a lot of energy into the tyre, but the chicane on the back stretch had been removed. This meant a long, loaded section, then lateral combination braking into Turn Nine, which puts major energy through the car.

You're thinking about all that right from the start, while trying to predict where the battery temperature is going to be, because that is fundamental for the package in terms of thermal management.

You also need to ensure there's enough regeneration to keep energy and performance levels up. It's a delicate balancing act and a fascinating challenge to test engineer and driver.

I think we actually hit it quite well. We were in very good shape in the race and the Audi e-tron FE06 was very efficient. That allowed Lucas (di Grassi) to come through from the back after an incident in qualifying when he was distracted by avoiding Oliver Rowland's crash.

"There were penalties, and the elbows were pretty damn sharp"

In terms of race management, it was an evolving task, because it depended on the performance of everybody else as well. So ultimately, you have got your lap predictions in the race, but it could quite easily have extended as we race to 45-minutes plus one lap.

If the pace of winner Maximilian Günther had kept up, then everybody would have been struggling for energy at the end of the race. It was really quite a sensitive one, but I think the focus on energy made it a really spectacular race. Everybody was dancing on the knife-edge of pretty much everything, plus there was quite a few people out of position because of the qualifying groups, and the way that the track grip evolved through qualifying, too.

The fact that those drivers were coming through the field meant that there was some very robust driving during the race. Some got their wrists slapped for it. There was also some bloody good overtaking as well and it was one that I enjoyed reviewing after travelling back home.

I think some of the moves and the penalty process may be reviewed again. I understand letting them race, but there were a few penalties after the event and the elbows were pretty damned sharp in stages.

Although the stewards can also initially warn drivers for overly aggressive moves, there were situations that actually didn't require a warning – as they were beyond a warning in my opinion. There were some that I looked at and winced a little bit, thinking I wouldn't like to be on the receiving end!

We want to have open racing, but at the



Energy management proved key in the Santiago race, which was won by BMW's Max Günther



McNish believes Formula E should crack down further on aggressive driving

same time, we don't want stock-car-style racing.

Daniel (Abt) had a more difficult weekend than Lucas. He got slightly caught up behind Robin Frijns' spin at Turn Two in qualifying. Ultimately it cost two- or three-tenths, which would have put him just on the edge of superpole. Then he received a penalty after the race for causing a collision, which pushed him out of the points and was a real shame.

But in terms of the championship, we are optimistic. Lucas is P5 in the standings, 14 points off the top, and we're 28 points away in the teams' championship, which is significantly better than where we have been in the last two years at this stage.

The way the championship is designed, and how the qualifying groups are structured, it plays out so a lot of drivers are in the mix throughout the season.

But I'm not totally content with how we come away from South America. We could have left with more than we got, but knowing the performance we've got in the car and the drivers, I think it gives us a reason to go to Mexico - somewhere that's always been a good circuit for us - with confidence.

If it is even half as dramatic as it was in 2019 when Lucas won it on the line after passing an energy sapped Pascal Wehrlein then you won't want to miss any of the action.

Allan McNish is the Team Principal of Audi Sport ABT Schaeffler Formula E Team as well as being a three-time Le Mans winner.



Günther took his first Formula E victory in Chile, beating António Félix da Costa (DS) and Mitch Evans (Jaguar)

What's in a badge?

Alpine is being super-subtle over its A110 upgrades, says **Andrew Frankel**



THE THING I LIKE MOST ABOUT the new Alpine A110S is not the way it goes, stops or steers, although it is predictably fabulous in all these regards. It is that unless you happen to be a connoisseur of the A110 and, in particular, the design of its wheels, you'll never know it's an 'S' you're looking at.

It would have been so tempting to graft a lip onto the back of the engine cover, or deepen its chin spoiler. A simple pair of pipes would have been a sure but subtle way of saying 'this is the quick one'. Or a badge? One little 'S' grafted on the fuel filler cover where the Alpine emblem usually resides? But no, if you don't spot the bigger wheels, the orange brake calipers, or the 4mm drop in ride height, you're never going to know.

And for that, I commend Alpine to the skies. Commercially I think it's an entirely crazy approach, because even the purists who buy Alpines could be forgiven for wanting to signal to the outside world that theirs is the top dog, but three cheers for ignoring that distasteful reality. And welcome to the Alpine A110S.

You might think, given how quiet Alpine is being on the subject of this car, that there's not much to shout about. *Au contraire*: the S is more changed beneath the skin than its exterior appearance would suggest. And the real question is whether those changes are, net, for the good or if they have somehow upset the exquisite but always delicate balance of the standard A110.

There is, of course, more power from the 1.8-litre four-cylinder motor. Forty horsepower may not sound like much these days, but it has to be seen in the context of the car's extreme light weight: increasing the output of an 1100kg car from 248 to 288bhp is going to have a telling effect on its performance, even if there is no commensurate increase in torque as that would push the seven-speed double-clutch gearbox past its certification limit.

But the real focus has been directed at the chassis, the intention being to create a far more taut and objectively capable car. To that end spring rates have gone up by 50 per cent, the anti-roll bars doubled in stiffness. The dampers have had to be firmed up as a result while tyre width goes up a section front and rear. Bigger brakes are fitted, too. One rather telling omission is that this car, which is more closely aimed at the track-day market, still does not come with a limited-slip differential, even as an option. That surprised me.

The odd bit of stitching and suede-alike upholstery aside, the interior is no different at all, so it's very much business as usual inside. The navigation and digital radio are as useless as ever, but if you want to fill your mind with weapons-grade trivia about the inner workings of your powertrain, the trip computer is a data-geek's wet dream.

It doesn't sound any different to these ears, but you'll barely be out of your parking space before realising that this car is not the same as a stock A110. Not by a distance. The suspension is now decidedly firm. I'd stop short of calling it harsh, but the car feels tied down on its springs in a way a normal 110 simply does not. This removes one of the key charms of the original and, I'm afraid,



The interior of the S remains the same, complete with disappointing sat-nav



Only the orange calipers in the larger wheels give away the extra power and stiffer suspension of the new 110S

"There's more precision, yet the key charms of the A110's handling have been largely preserved"

to some small but significant extent, makes the 'S' feel far more like any other sports car. It no longer breathes with the road, and on the poorly surfaced streets near where I live, lumps and bumps rattle their way through the cockpit in a manner I never experienced in three months living with an A110.

But there is an upside to this. I'm actually not that interested in the additional power: the A110 never felt underpowered to me, and the A110S doesn't feel overpowered either: both feel about right for the level of grip available. But the S does feel more composed and clearly quicker point to point. There is more precision, yet the key charms of the A110's handling have been largely preserved. The steering is still as communicative as you'll find in a car with electrical assistance, the brakes remain perfectly weighted with first-rate feel. And that mid-corner agility, something you only find in very light cars with their major masses centralised and properly located and tuned suspension, survives intact. I was surprised too, given its additional stiffness that its startling cross country pace in wet weather has been preserved, too. I drove it in everything from dry to quite filthy conditions and it remained entirely unperturbed.

Make no mistake, if there were no standard A110 with which to compare it, I'd be raving about this car, but the truth is that right at the poles of the ability spectrum it loses more than it gains. I miss that other-worldly compliance the most, for to me it is the key to the Alpine character and provides something no other car, not even a modern Lotus, has today. But I also felt less inclined to go prodding around the limits of its adhesion, partly because those limits are quite a lot higher, but also because I sensed the ridiculous playfulness of the A110 has been traded for greater poise and grip.

This, then, is a really good car, one whose upgrades stretch far beyond what its almost unchanged appearance suggests. But I'd really only recommend it to those planning on using it extensively on track, and I wonder how many people who are that way inclined will be attracted to the Alpine proposition in the first place. For those who see the A110 as a road car first and foremost, the standard car is not only over £6000 cheaper, for my money it's a better car, too.

ALPINE 110S



- **Price** £56,810
- **Engine** 1.8 litres, 4 cylinders, turbocharged
- **Power** 288bhp at 6400rpm
- **Weight** 1114kg
- **Power to weight** 259bhp per tonne
- **Transmission** seven-speed double clutch, rear-wheel drive
- **0-60mph** 4.4sec
- **Top speed** 161mph
- **Economy** 43.0 mpg
- **CO_2** 164 g/km
- **Verdict** Sometimes less is more...

Already upstaged?

The Boxster GTS could steal the new Spyder's spotlight

THIS WAS GOING TO BE A VERY straightforward assessment of a car that is a Porsche Cayman GT4 with its roof replaced by a slightly impractical fabric hood that requires you to stop the car and get out before it can be folded away. And I'd probably have said it was worth it for being the only member of the Boxster/Cayman clan with six cylinders.

But no longer. Porsche has binned its unlovely flat four from all but its cheapest models and made a new GTS with a slightly detuned version of the GT4/Spyder four-litre flat six. Filled with goodies, the Boxster's roof is automatic, the car is 15kg lighter than the Spyder, trades just one tenth off the 0-62mph time and costs £7500 less.

It does appear to have weakened the case for the Spyder. It's still mesmerising to drive, although I'd prefer a Cayman GT4 because cars with this level of performance are almost always better as coupés, but the Spyder is structurally superb and on difficult roads gives little away to its closed compadre. With front suspension derived from the 911 GT3, it will probably flow a little better and be a touch quicker point to point than the GTS. And it looks meaner.

Subtlety of appearance is another point for the GTS. The Spyder is a fine car, but I have a suspicion that, all round, the GTS may be the one to have.



Mesmerising to drive, but the lure of the new Boxster is strong

PORSCHE 718 SPYDER

- **Price** £73,405
- **Engine** 4.0-litres, 6 cylinders
- **Power** 414bhp at 7800rpm
- **Weight** 1495kg
- **Power to weight** 118bhp per tonne
- **Transmission** six-speed manual, rear-wheel drive
- **0-60mph** 4.4sec **Top speed** 187mph
- **Economy** 25.7mpg **CO_2** 249g/km
- **Verdict** Consider the Boxster instead

Golf roots paying off

An SUV version of the Golf R with few compromises



IF YOU ARE A REMOTELY REGULAR reader of these pages, you'll know I'm not a great admirer of so-called crossover SUVs. And turning a crossover SUV into a fast crossover SUV no more addresses its issues than electing a leader of the Labour Party who holds exactly the same views as the former leader of the Labour Party, but is a bit lighter on his or her feet.

But I must report as I find, and I find that the hot VW crossover that rejoices in the title T-Roc R, is actually not merely very capable, it's actually quite likeable, too. It feels light and compact, its 296bhp, two-litre engine is not only powerful but sonorous also, its double-clutch gearbox is excellent and its handling a model of engaging propriety that every other maker of cars in this class would be well advised to study.

Then again, how surprised should we really be? What you're actually looking at is a re-skinned and slightly elevated VW Golf R which is now, and has been for some considerable time, the best fast hatchback you can buy. But I still admire the team that turned it into the T-Roc R for keeping the weight gain to just 50kg.

Less impressive is that many of the soft-touch materials that come in even a mid-range Golf have been replaced by hard, scratchy plastic. For a car costing nearly £40,000, it's not good enough. But the rest is fine, just still not as good as the Golf R.

VOLKSWAGEN T-ROC R

- **Price** £38,450
- **Engine** 2.0-litres, 4 cylinders
- **Power** 296bhp at 5300rpm
- **Weight** 1575kg
- **Power to weight** 188bhp per tonne
- **Transmission** seven-speed double clutch, four-wheel drive
- **0-60mph** 4.8sec **Top speed** 155mph
- **Economy** 33.6mpg **CO_2** 176g/km
- **Verdict** Quality aside, a driveable SUV

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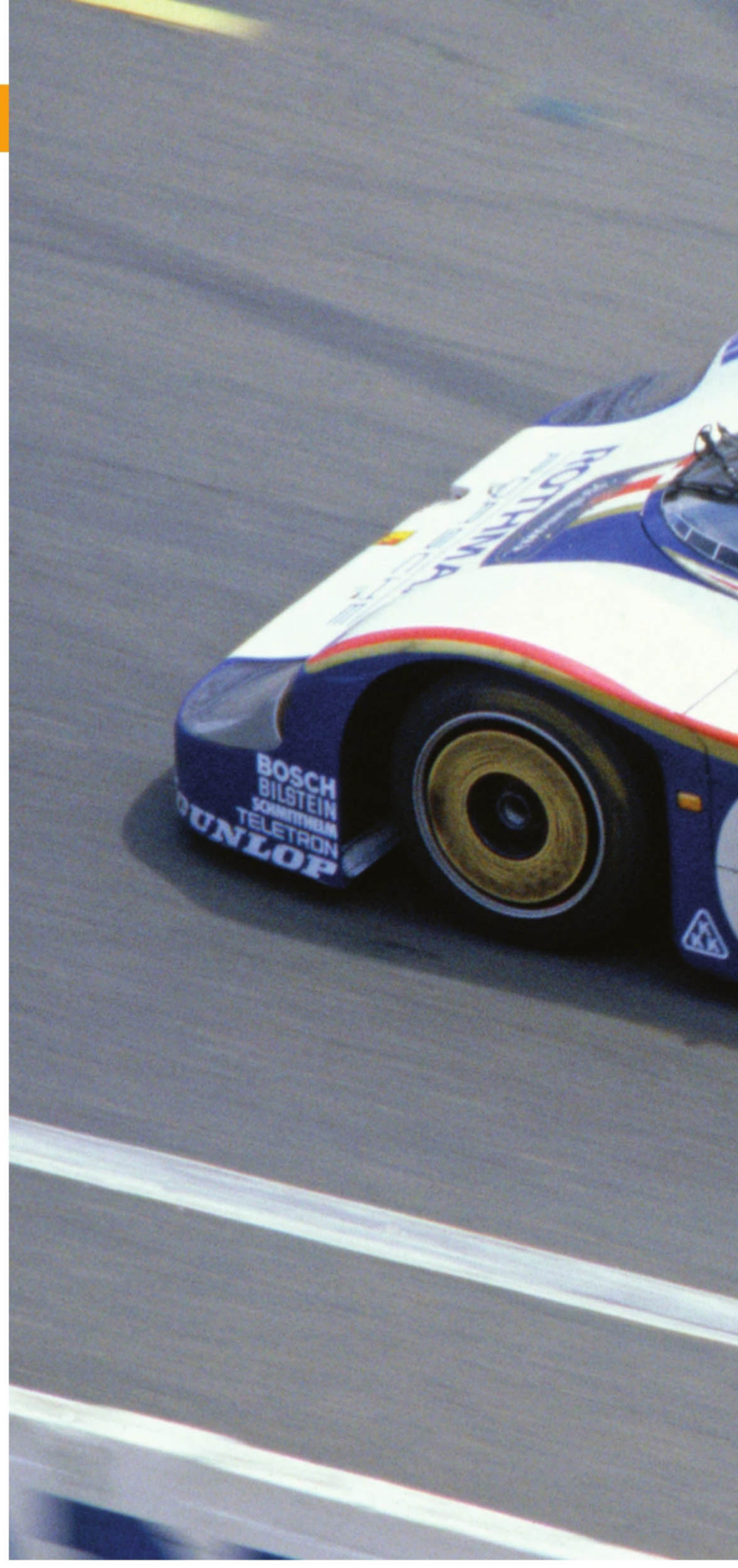
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An ode to the Porsche 956

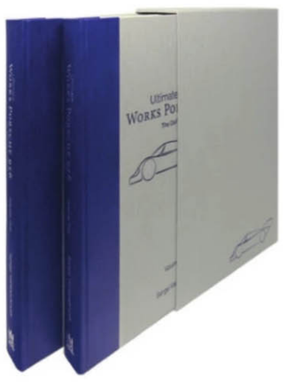
A new, definitive work sets a benchmark for a legendary racing car, says **Damien Smith**



SERGE VANBOCKRYCK IS JUST THE man you need at Le Mans when it's 2am. Corvette Racing's long-time PR co-ordinator is great company - and it doesn't hurt that he's quick to offer good, strong coffee in the team's suite directly above its pit. Naturally, conversation tends to centre around the race playing out around us, but in the wee small hours it rarely takes long to be diverted by stories of past Le Mans. The Belgian, a former journalist for whom sports car racing has always been his *choix du jour*, has always professed to an unnatural obsession with Porsche's 956/962, the model variants that dominated the glorious Group C era of the 1980s. We knew he was working on a book, but in all honesty I was starting to wonder whether Serge would ever finish it, never mind get it published. But finally here it is - or at least half of it.

This eye-wateringly priced two-volume slip-cased heavyweight (limited to 956 copies) is the latest addition to the Porter Press 'Ultimate' series. More than 300,000 words over 800 pages... and it's only part of the story, focusing just on the 956, and then only the Rothmans-backed factory entries. More is promised on the 962 years - so you could say Serge really does like these cars.

He knows his stuff, too. 'Definitive' is a word bandied about out all too often in our world, but it's hard to argue in this case. Volume one offers context with an overview of Porsche's racing history up to the 956's 1982 debut, and it's in-depth enough to be a strong standalone book in its own right. Eventually the 956 story begins, with conception, design and build, before the racing history and almost constant development are tackled.



Works Porsche 956 – the Definitive History
Serge Vanbockryk
Published by Porter Press International, £450
ISBN 978-1-907085-98-7

Volume two takes the 'works' race story up to 1985, the transition season when the heavily revised 962 supplanted the 956. Then there are driver profiles of the 11 factory drivers, plus legendary architect Norbert Singer and race engineer Roland Kussmaul, followed by minutely detailed chassis histories and an interesting coda on Rothmans sponsorship and the tobacco company's motor sport TV work by commentator Mark Cole. The photography is fantastic, many previously unseen, and the production qualities are top notch - just as you'd demand. And pleasingly, Serge's signature brand of droll humour translates nicely to make the narrative easy and engaging.

The level of research, conducted over 30 years, is profound and the detail surrounding the conception of the 956 is particularly diverting. How the 956 found its shape in the wind tunnel, using 1:5-scale models, is classic, expert, old-school craftsmanship. Today, its contours and profile would be defined (and confined) by CFD. Back in August 1981, 87 different model variants coded CA were created and tested in just five days.



The 956 shone brightest at Le Mans in 1982, where it secured a podium clean sweep

As photos show, the first featured a catamaran-style nose section that is strikingly similar to the LMP1 cars of our modern era, before Singer and his team reverted to convention. It shows contemporary Formula 1 design influenced Porsche as it embarked on its maiden ground-effects racing car.

The analogue CA experiments set the direction, and over the months further scale models would hone the form of the 956. But, as a spread of simple profile illustrations neatly documents, final perfection is a state always out of reach, even with the greatest racing cars. The drawings show how the 956 shape-shifted throughout its active life, via windtunnel models dating from CB-78 on 16 September 1981, to CT-30 on 21 July 1983. Jurgen Barth, the first to drive a 956 and the man responsible for selling the many



MOTORSPORT IMAGES

"Stefan Bellof was youthful, impulsive and seemingly incapable of harnessing his natural speed"

customer cars that made the model ubiquitous, admits in his foreword to being "amazed" at the author's level of detail. But that only echoes the unrelenting commitment. It's what this car deserves.

The race histories are similarly dense, thanks to primary and secondary sources. Much is familiar, but nuggets of detail elevate the reports. Take the account of Stefan Bellof's fabled performance around the Nürburgring Nordschleife in 1983, when he set *that* lap in 6min 11.3sec, then spectacularly binned it in the race after losing control at Pflanzgarten. Team-mate Derek Bell's lasting annoyance, not only at Bellof but also at the team's indulgence of the young *wunderkind*, is well known.

"Stefan was youthful, impulsive and seemingly incapable of harnessing his natural speed," says a still brittle Bell. "We should have won this race rather than Jacky [Ickx] and Jochen [Mass]. Stefan threw it away.

"He emerged from the wreck all smiles, and laughed it off. What really annoyed me then, and, in many ways, it irritates me still, is that nobody in the Porsche management batted an eyelid. Nether Peter Falk nor Professor [Helmuth] Bott showed even any flicker of emotion."

But the author then quotes from Falk's autobiography to counter Bell's view that Bellof had the management under a spell. "He was the first one who arrived with a manager and lawyer at Mr Bott's to negotiate his contract," Falk wrote. "This had irritated the good Bott no end, as before it had always been between just him and the drivers, casually and in confidence. What I didn't like about Bellof [was] that he didn't care about rules. When we asked him to test at Weissach he arrived in his 928 and was proud he arrived five minutes faster than the time before."

Little is as simple as it might at first seem. That's why, when you care as much as Serge Vanbockryk, you do your homework – even if it takes three decades.

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With a World Rally Championship career spanning from 1989 to just last year, Marcus Grönholm has started 153 world rallies, and won 30 of them

LUNCH WITH

Marcus Grönholm

He was on the cusp of giving up on a rallying career when the factory teams suddenly came calling. Against the odds, he would be a world champion within 18 months. By **Simon Arron**

IT IS JUST POSSIBLE THAT MARCUS Grönholm hasn't fully grasped the concept of a *Motor Sport* lunch. The 2019 Wales Rally GB is just beginning to get into its stride when we convene in Llandudno and the Finn arrives clutching a half-eaten chicken sandwich, given to him by Colin McRae's former co-driver Nicky Grist.

"He didn't realise I had meetings and interviews," Grönholm says, "and thought I'd be going out with him to watch some of the stages, so he made me a packed lunch..."

The Finn's schedule is too tight to permit a culinary tour of suburban North Wales, but his former employer M-Sport has kindly agreed to provide us with a table in the Ford hospitality area adjacent to the Rally GB service park, where Marcus selects a small salad, gnocchi in cheese sauce and a glass of orange juice, followed by what he estimates to be his 11th coffee of the day.

With the lunch protocol firmly established, we settle down to discuss one of the more unusual rallying careers of recent times, that of a driver who did not land a works contract until he was already into his 30s, and then went on to win the World Rally Championship title at his very first attempt... even though he hadn't been pencilled in for a full programme of events. It's quite a story, and quite a turnaround from when Grönholm nearly quit.

LUNCH WITH *Marcus Grönholm*

It was no surprise that Grönholm should develop an early taste for motor sport. Born in Kauniainen, a town in southern Finland where his family was among about 40 per cent of the local population to adopt Swedish as their mother tongue, his interest in rallying was triggered by his father Ulf, who in 1977 and 1978 won domestic championship titles at the wheel of Opel Kadett GT/Es.

"Initially," he says, "I had no particular ambition to go rallying because my first real love was motocross. I started competing when I was about 10 and continued for several years, until I destroyed my knee - actually both my knees. The last accident I had, aged 17, was so bad that I simply had to stop. I had reached quite a good level in Finland and made one world championship start, also on home soil, but then, bang... finito! At the same time my cousin Sebastian Lindholm was competing in rallies and would become Finnish champion [eight titles between 1990 and 2006]. I was following his progress and it was his influence that made me think about having a go at that sport instead."

The fact his father died at the wheel was not, he says, a deterrent. Grönholm Sr was killed while practising for the 1981 Hankiralli, an event he had won the previous season in his Fiat 131 Abarth. "That didn't put me off," he says. "My mother was perhaps not all that happy, but if I wanted to do it then she wasn't really against it. My father's accident didn't happen on a rally but while he was testing on an open road, which was what everybody did at that time. The fact I wouldn't be involved in anything like that maybe made it easier for her - and once I'd started I soon realised there would be no going back. I didn't have a driving licence when I had to give up motocross, but I passed my test when I was 19 and then started competing at a really low level, in the junior rally classes, before moving up step by step."

His natural aptitude was swiftly apparent and in his third full season, 1989, he made an encouraging if somewhat unobtrusive start to his WRC career, taking his Group N Lancia Delta Integrale to 23rd overall and fifth in class on the 1000 Lakes Rally. Two years later he would claim his first class title in the Finnish championship, at the wheel of a GpN Toyota Celica GT-4. Sticking with Toyota throughout the decade, he became outright Finnish champion for the first of four times in 1994 as the Grönholm-Lindholm family axis dominated the sport domestically.



Grönholm's early career was spent in Toyotas; here he is in action on Rally Finland in 1997

"I contested the national championship for year after year," he says, "but sometimes I was able to venture farther afield - like in 1994, when I did the Scottish Rally and was fighting for victory with [future employer] Malcolm Wilson. I think I finished second or third in the end [he was third], but it felt as though I did many, many years in Finland - there were a few WRC outings, but I never really had the budget to do more. But I was given a few opportunities on the 1000 Lakes, when Toyota loaned me a factory car [he was second in 1995, when it wasn't a WRC round, and fourth in 1996], but I was always fighting for support. I got some good results - fourth in Argentina with my own car in 1997, for instance - but nobody really seemed interested in taking me on.

"Late in 1996 I'd decided to give rallying a real go and leased our family's farm to another cousin - Sebastian Lindholm's brother, who runs it to this day. In my mind I was going to give myself two years to make it to the top - and if I hadn't done that by the end of 1998, I planned to abandon the attempt. That was my thinking. I'd probably have gone back to the farm and concentrated purely on rallying in Finland, but 1998 proved to be my breakthrough season, when it began to seem as though something might finally happen for me."

"The fact his own father died at the wheel wasn't a deterrent"

The trigger was the Rally Finland [né 1000 Lakes]. He finished only seventh, but a string of fastest stage times captured the wider world's attention. "Suddenly I had about four factory teams offering me drives for the following season," he says. "It was strange that it happened like that, so much interest and all so sudden." Already past his 30th birthday, he eventually decided to sign a deal with championship returnee Peugeot, which was developing its new 206 WRC for 1999.

"I think my first reaction was relief," he says. "I was happy to have a contract that meant I no longer had to find money to compete - I was at last able to focus purely on driving and somebody was paying me to do it. Wow. That was a first for me. Previously I'd relied on help from local sponsors, Toyota Finland and also Toyota Team Europe, which helped me with the car and parts, but in the back of my mind I always knew that if I crashed my season might be finished. After lengthy contemplation, I felt Peugeot was the best option because it would allow me to build up to the challenge gradually.

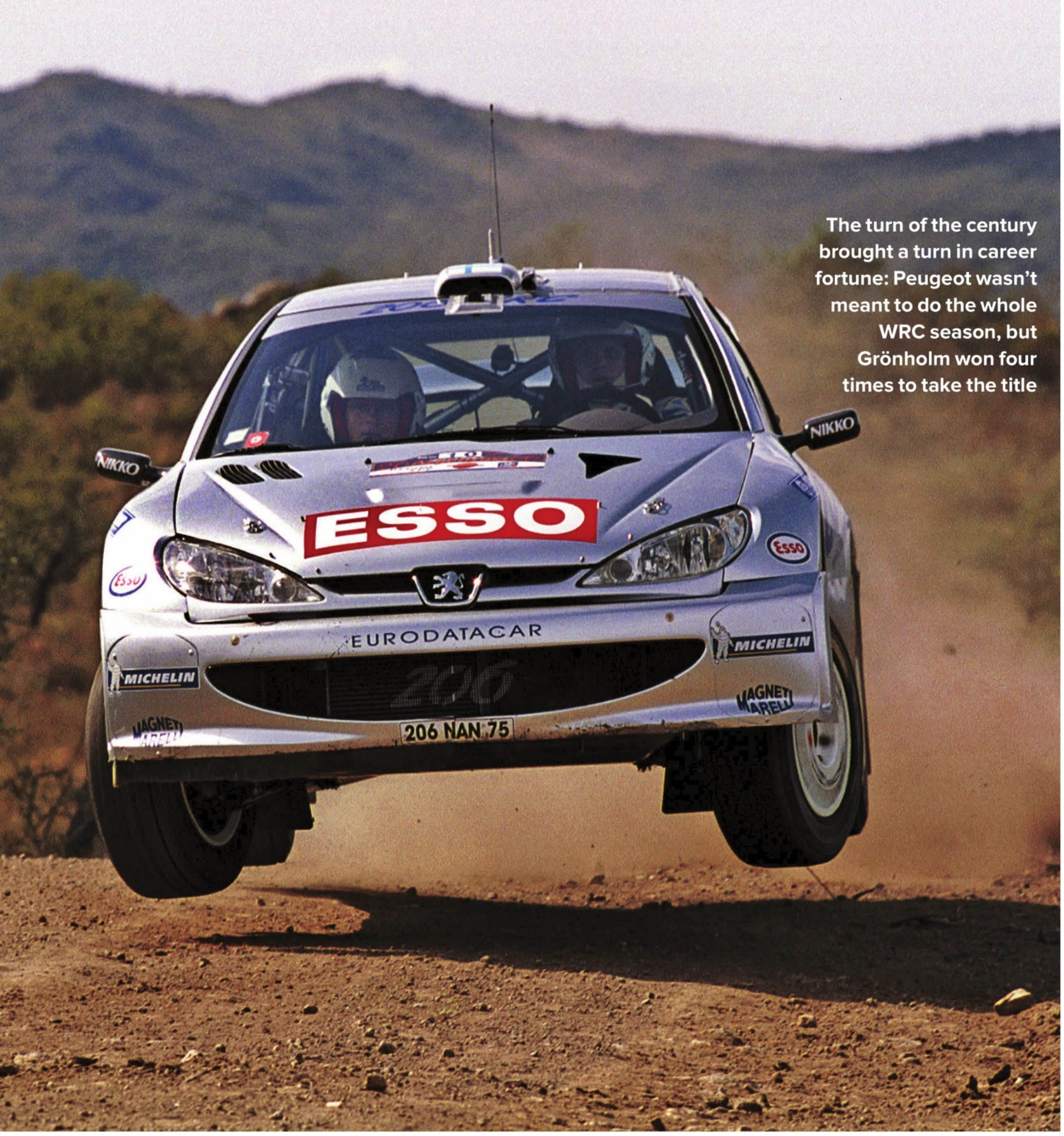
"It was the first season for the 206 WRC and Peugeot planned lots of testing and a limited WRC programme - just five events for me - so it was definitely the best option. I didn't have to be ready to attack from the Monte Carlo onwards, but had a chance to develop my speed while testing, which was very beneficial."

He scored his first win for Peugeot on the Martini Mänttä-ralli, a round of the



Famed for his end-of-stage interviews, Grönholm quickly became a fan favourite in the WRC

SHUTTERSTOCK, MOTORSPORT IMAGES



The turn of the century brought a turn in career fortune: Peugeot wasn't meant to do the whole WRC season, but Grönholm won four times to take the title



Finnish championship, and recorded his best WRC results in Finland and Australia, where he was fourth and fifth respectively. It was a solid start, but offered little clue about what lay ahead for him.

He retired from the 2000 season-opener in Monte Carlo, but then scored his first outright WRC victory in Sweden.

"I well remember how good that felt," he says, "and it was on one of my favourite events, too. When you win for the first time, then you know you can do it and that makes everything much easier afterwards. From that moment on, I was in the fight. Initially Peugeot hadn't promised me a full season. I was due to contest perhaps 10 events - none of the asphalt rallies, for instance - because I had little prior experience, but then they realised, 'Hey, this guy might actually win the championship' so I ended up taking part in all 14 rounds."

He finished all but four events, taking further victories in Finland, New Zealand and Australia - plus second places in Portugal, Argentina and Britain - to beat Subaru rival Richard Burns, his future Peugeot team-mate, by five points.

The biggest hurdle, he says, was acclimatising to the unfamiliarity of asphalt. "I really didn't have much experience," he says. "I'd contested the 1989 Rallye Deutschland in a Delta, and Spain with my own Corolla in 1998, but that was about it. I'd done absolutely no asphalt testing before I joined Peugeot, but fortunately my team-mates at that time were the best possible teachers, François Delecour and Gilles Panizzi. Both were super-quick and that was good because I could make direct comparisons. I remember one test in Corsica when I pushed like hell and actually managed to go faster than they had, which led to a congratulatory evening phone call from [team boss] Jean-Pierre Nicolas. I told him it didn't matter, because it was only a test, but from that moment I knew I could potentially match them, though in rallies I always found that difficult. Sometimes,



The 2000 title fight boiled down to Richard Burns vs Peugeot's rising star, who was already 32

Grönholm took seven event wins with Ford over the 2006 season, but lost the title to Citroën and Sébastien Loeb by a single point

On the top step against other rallying royalty: Grönholm wins in Finland 2001 to beat Subaru's Richard Burns and Ford's Colin McRae

though, I was not too far away. You have to remember that I never won on asphalt. Yes, I won Monte Carlo, but I don't consider that a proper, proper asphalt rally because of all the snow and ice. I was 3.6sec away from winning in Germany in 2003, behind Sébastien Loeb, and I finished second in Spain and Corsica, but no wins. And I was never truly comfortable on wet asphalt, either, when you had to feel for the grip level changing while pushing like hell - and sometimes on slick tyres... I didn't really enjoy that very much."

"Loeb was my toughest rival. He was so consistent, like a clock"

He scored three wins in the second half of the following season, but a run of poor reliability had already effectively eliminated him from title contention. "I've never really understood why that happened," he says, "because it was usually different things [engine failure, a suspension breakage, fading fuel pressure and a broken water pump were among the things that sidelined him]. With hindsight the 2002 season actually felt quite easy. I won the title by a big margin, the car was reliable and I felt on good form. Before any of the gravel rallies, it wasn't that I knew I *could* win if we had no problems, it was more that I knew I *would* win."

He took five victories during the campaign's course - and had a sixth taken away in Argentina, for receiving outside assistance from his team when his car refused to start on Sunday morning. He topped off the year by claiming the Race of Champions crown in Gran Canaria, beating NASCAR star Jimmie Johnson en route to a final in which he defeated future WRC nemesis Sébastien Loeb.

Grönholm would remain with Peugeot until the marque's WRC engagement concluded at the end of 2005. He added six more WRC successes to his CV in that time, but the irrepressible Loeb was now into his stride and, from 2004, was firmly on his way to an unprecedented run of nine straight WRC titles.

"Séb was absolutely my toughest rival," Grönholm says. "Early on I faced Tommi Mäkinen, Colin McRae and Richard Burns, but Colin could be a little up and down, Richard was very fast but not consistently super-quick and I came up against Tommi towards the end of his reign. I broke his run of titles, after he'd taken four on the trot, and I'm not sure he was quite so sharp in the seasons that followed. But Séb was always just so tough. He was incredibly consistent, committed very few errors, always seemed to make the correct tyre choices, his car almost always ran perfectly and he was like a clock - bang, quick time, bang, quick time, bang, quick time..."

Following Peugeot's withdrawal Grönholm had a number of offers from other teams - including one from Citroën. "A contract was on the table, ready to sign," he says, "but then I started to hesitate. Sébastien was well established there and I thought it might not be good to be fighting with him in the same team. Malcolm Wilson was also talking to me about driving an M-Sport Ford Focus, but at the time he didn't have the budget in place - although he seemed to find one quite quickly when he learned I had a serious offer from Citroën! I had a good two years with him and could have won the championship both seasons, had I not f***ed up. Loeb beat me by one point in 2006 and four in 2007."



A rivalry that simmered through the years. Grönholm and Sébastien Loeb (left) fought hard

In the first of those seasons the Frenchman won eight of the first 12 rallies, but then broke an arm in a mountain-bike accident before Turkey, forcing him to ▶

A varied life away from the wheel

Marcus Grönholm has spread his talents far and wide, from running teams to building shopping centres

For most of his 'retirement', Marcus Grönholm has blended several motor sport-associated activities – finding sponsors, organising high-speed 'taxi' rides, running a World RX team, driver management – with an array of commercial interests.

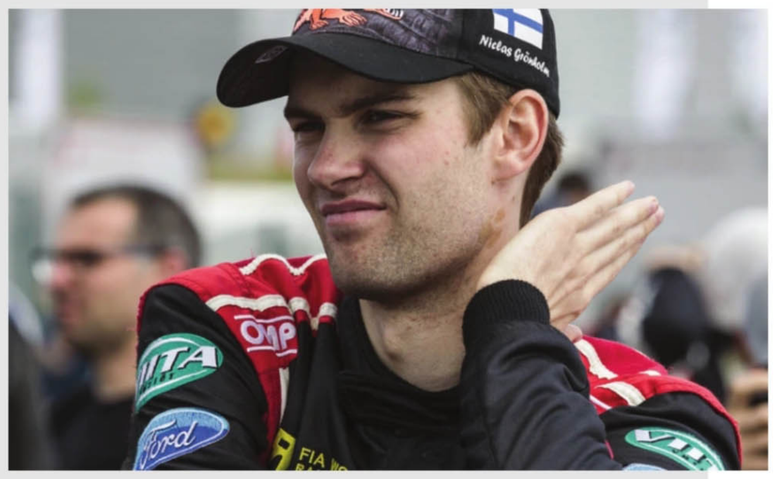
"More than 10 years ago I organised construction of a new shopping centre in our local community," he says, "and we are now developing the surrounding area with apartments and so on. We are in a small town, close to the sea, but I'm hoping our work will help us to attract more tourists."

His son Niclas is one of the drivers representing GRX, Grönholm's WRX team, which runs two or sometimes three Hyundai i20s. "I think I am OK now as a 'racing dad'," he says. "I don't want to interfere too much and just let him get on with it. He's quick enough, but we need to see where the championship is going. WRX has been through a bit of a lean period recently, but the races are still good to watch."

He is also managing Hyundai WRC2 driver Jari Huttunen and Sebastian Lindholm's son Emil, who is contesting the Finnish Rally Championship and selected WRC events in a VW Polo. "It keeps me busy," he says. "I am still able to follow what's happening in the WRC, but I don't have time to attend many events – this is only my third this year... and I was probably in Sweden only because I was taking part."

So which aspect does he find more straightforward, being a businessman or..?

He cuts in: "Being a rally driver," he says. "Much easier, definitely."



Niclas Grönholm is continuing the family tradition by running in World Rallycross

MOTORSPORT IMAGES

miss the final four events. Grönholm won three of those, but... "I ought to have taken things more easily in Australia," he says. "I went off on the very first stage and spent 10 minutes in a ditch, then had to fight back to finish fifth when I should probably have been third, which would have been enough to secure the title. In 2007 I was leading Sébastien by a few points, then slipped up in Japan and Ireland, where I was first car on the road and made a mistake in very damp, slippery conditions. I hit a wall and that was that."

Much as he had craved a third title, he decided to call time on his professional career at the end of that year. "It felt like completely the right decision at that point," he says. "I no longer wanted to travel all the time, because I had three children but was almost never at home to see them. I'd started developing other business interests, too, but the main thing was that I was always fighting with Séb and no longer wanted to have that stress all the time - one second here, half a second there... it was non-stop. I thought I'd win the title in 2007 and bow out as a champion, but f***ing hell, no. It was also a factor that I wanted to retire at a time when I knew I was still capable of challenging for the title - I wanted to stop on my own terms, not have Malcolm coming up to me and telling me he wouldn't be offering me a new contract. He had proposed a nice deal for 2008, but I really wanted to walk away when I was still at the top of my game."

"I wanted to walk away when I was still on top of my game"

Not that there weren't opportunities to resume his rallying career...

"After a year away I did begin to wonder whether I should do something," he says. "In 2008 I took part in my first rallycross, in Sweden, which was really good fun and I won [driving a Fiesta 4x4, he beat serial champion Kenneth Hansen into second place]. It was the European championship then, the equivalent of what is now World RX, so the standard was pretty good. That year Prodrive also approached me about coming back to the WRC with Subaru. I'd made up my mind that I was going to accept, but then Subaru pulled the plug on its factory team. I did Portugal with a Prodrive Subaru in 2009, though. That was OK, because I was quick until I went off on the second day. I thought I could compete with Séb and was only a few seconds behind him, so I pushed a bit harder and... bosh.



Grönholm kept his hand in with outings in the Global RX series in America

"I made a one-off appearance for M-Sport in Sweden in 2010, then came close to a return with Prodrive again when the Mini project began ahead of the 2011 season. I was involved early on, testing the car in Portugal, and they offered me the chance to be part of the programme, but at that stage I said to myself, 'Hey, come on, you've retired. Why would you want to go back?' So I declined."

That wasn't quite the end of the tale, though, for in 2019 - to commemorate the 30th anniversary of his first WRC start - Grönholm accepted Toyota's offer of a Yaris drive in Sweden, with his world title-winning co-driver Timo Rautiainen alongside. "It's not easy to come back after so long away," he says. "The Yaris was perfect for the event and things went OK during testing, when my pace was comparable with the other drivers. In terms of delivering on the event, however, I just couldn't do it as I had before, which caused frustration and I started to make mistakes, finishing up in snow banks and so on." He finished the event, albeit in 37th place. So was that definitely his WRC swansong? He ponders awhile before grinning broadly. "Yes," he says, "it was."

The sport changed significantly during Grönholm's time, from an era when the calendar embraced events such as the Safari Rally - and Britain's round of the WRC covered rather more than just Oulton Park and a slice of a western principality - to the current, more compact format with repeat stage cycles. "It wasn't necessarily better back then," he says, "but they were just different days. When I look back, I now think


MOTORSPORT IMAGES

CV **BORN: 5/2/68, KAUNIAINEN, FINLAND**

- **1978** motocross debut
- **1987** starts rallying
- **1989** WRC debut, 1000 Lakes Rally
- **1991** Finnish GpN champion
- **1994 & 1996-98** Finnish rally champion
- **1999** WRC, limited programme with Peugeot
- **2000** World Rally champion
- **2001** WRC, 4th
- **2002** World Rally champion; Race of Champions winner, Gran Canaria
- **2003** WRC, 6th
- **2004** WRC, 5th
- **2005** WRC, 3rd
- **2006** Switches to M-Sport Ford in WRC, 2nd
- **2007** WRC, 2nd; announces retirement as a full-time professional
- **2008** wins Euro RX event in Sweden
- **2009** Pikes Peak, 2nd
- **2011** declines chance of return to WRC with Mini
- **2019** makes what he insists will be his final WRC start with Toyota, in Sweden

A 2019 comeback on Rally Sweden with Toyota gave Grönholm a taste of modern rally machinery, 30 years on from his debut

it's nice that I did the Safari, but perhaps at the time I didn't enjoy it so much. You had to be so fast on the road sections, absolutely incredible - but also very difficult. My second year there [2001] was a bit of an adventure. I went off slightly on a bridge - there was no big damage to the car, but the steering had broken. I tried to repair it in the twilight, but couldn't and so the team helicopter came to pick us up. It was dark, raining and the pilot was concerned because he couldn't really see properly. That scared me..."

Apart from dabbling with rallycross - as well as a few other European events, he participated occasionally in the US-based Global RX series ("I wasn't going to commit to a full programme. I just wanted to do selected events, for fun. I didn't want to have to tell my wife that I was going to be away again for lengthy periods of time...")

"Dakar never appealed. It seems too easy to hurt yourself"

- Grönholm tackled Pikes Peak in 2009 at the wheel of an 800bhp Ford Fiesta, a modified rallycross car. His hopes of covering the 12.4 miles in less than 10 minutes were stymied by a loss of power on the upper part of the ascent. "It was still partly a loose-surface course then," he says, "so it was a nice experience and good to be able to say that I've done it, but it was difficult with no testing and my time was s**t." Although he was more than a minute shy of winner Nobuhiro Tajima's Suzuki SX4, he was still second overall.

Did cross-country rallies such as Dakar hold no appeal?

"Not really," he says. "I wasn't all that interested. I tested a BMW once in Morocco, but it seemed a bit dangerous to me, not knowing when the dunes were coming and flying here and there, landing in big holes. It would be a bit too easy to hurt yourself."

More so than in motocross?

"OK, maybe not..."

Is there anything he wishes he could have done, had the opportunity arisen?

"I don't think so," he says. "OK, I would like to have stopped as a champion, but I won a lot of rallies [he finished 100 of the 153 WRC events he started, with 30 wins] and I had a very nice time, so I've no complaints."



Grönholm in action at Pikes Peak. He was second



Turning the clock back

There are few names larger than Carrera in the watch world, and TAG Heuer is celebrating 160 years with a retro-inspired edition

IN THE WORLD OF WATCH BRANDS, ANY number divisible by 10 is cause for celebration. And since 2020 marks 160 years since Heuer was founded by Edouard Heuer, we can expect several months of pomp, circumstance and special editions - with the first being this delectable version of the famous Carrera.

The Spanish world 'carrera' translates as 'race' - and one of the most successful driving chronographs ever can be traced back to 1963 when Jack Heuer, the great-grandson of Edouard, was attending the 12 Hours of Sebring, at which the legendary Rodríguez brothers, Ricardo and Pedro, were driving for Ferrari.

They were Mexico's most famous racers, and present on the day were their parents, with whom Heuer struck up a conversation in the pits. Soon, talk turned to Mexico's 3500km Carrera PanAmericana road race and Heuer became enthralled by the event (which had been scrapped eight years earlier) and by the evocative 'Carrera' name.

He determined to use it for his next chronograph and registered exclusive rights to it for watch use - at almost the same time, incidentally, that Porsche acquired the right to use it on its sports cars.

The new Carrera driver's chronograph was launched in December 1963. It featured a 36mm steel case, a Valjoux 72 manual-wind movement and the reference number 2447D. Known as the 'Carrera-12' due to its 12-hour totaliser at six o'clock, it became the choice of both professional and amateur drivers.

The Carrera name has since appeared on many different Heuer designs, ranging from simple time-only models to automatic chronographs with dual time zone and date functions. It has remained a rugged tool watch, aimed specifically at drivers.

Over two decades, Carreras were seen on the wrists of the world's leading racers, such as Bruce McLaren, Jo Siffert, Ayrton Senna, Niki Lauda and Clay Regazzoni.

The line was dropped in the early 1980s, but strong demand resulted in its revival in 1998 with a Classics series based on the 1960s originals. The Carrera Silver Limited Edition combines the plain silver dial and vintage Heuer logo of the original with a slightly larger 39mm case and the brand's latest Heuer 02 movement that is slim, rugged, accurate and has an 80-hour power reserve. *The Carrera Silver Limited Edition goes on sale in June in a limited edition of 1860 pieces. £5250.*



IT'S NOW MORE THAN THREE YEARS since Land Rover and Zenith joined forces, during which time we've seen special watches honouring the Range Rover SV Autobiography, the Velar and the Evoque. And now it's time for the one many Landy fans have been waiting for, a chronograph designed to complement the long-awaited new Defender. It combines a micro-blasted titanium case with a grey dial. It is driven by the self-winding El Primero movement, and limited to 250 pieces. *Zenith Defy 21 Land Rover Edition. £11,400 zenith-watches.com*



CHRONOSWISS WAS FOUNDED IN 1983 by former TAG Heuer watch maker Gerd-Rüdiger Lang, a lifelong car enthusiast and Jaguar fanatic. 'Onion crown' Chronoswiss watches became cult among rallyists and the firm continues to produce them, such as the 41mm Regulator Classic Carbon Racer. Separate hands with dedicated counters mark it out as a Regulator, while the carbon dial, speedo markings and wheel-based seconds counter add motoring cues. *Chronoswiss Regulator Classic Carbon Racer Euros 4650 chronoswiss.com*

***Precision* is written by renowned luxury goods specialist Simon de Burton**

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MOTOR SPORT

LETTERS

YOUR SPEEDSHOP ARTICLE [*A BLOOMING LOTUS*, JANUARY 2020] REMINDED ME THAT during the '50s as a teenager in Bridgnorth, I and petrolhead friends spent our time working on our road cars or building 'specials' based on Austin 7s. A young student from Cirencester Agricultural College appeared, called John Whitmore. His road car was a Lotus 6 and he and I travelled many times to the Littleton Arms, Hagley, to attend meetings of Hagley and District Car Club. This always seemed to be in the winter and there was no windscreen, but John always seemed to find an old pair of goggles for me.

One bitter evening off we went with goggles in position. The whole evening was spent in great company and also thawing out from the journey. On the way out John said that we had to collect something, which turned out to be a Lotus windscreen and he placed it across the back of the car and asked me to put my arm over it to avoid it falling off. On the freezing 18-mile journey home, I quickly lost all feeling in my arm and lost interest as to whether the windscreen had fallen out. The only consolation was that while most people would have taken half an hour for the journey, John would take 15 minutes.

When John began racing we attended some events to support him, including a speed test around Marsh's Farmyard at Kinver, which was frightening as then they used just a few scattered straw bales to protect the public from death or injury.

A great character, John also had the reputation of racing a highly tuned Austin A35 around Bridgnorth very late at night, inches from a friend's identical car.

MALCOLM SCOTT, WOLVERHAMPTON



Hard-hat chicken logo connects Essex Racing with Classic Heroes' current Sussex base

I GREATLY ENJOYED THE ARTICLE ON THE Project Astons in the February issue. Whilst I knew that John Ogier had fielded the Essex Racing Stable team, I hadn't previously made the connection to his chicken-farming enterprise.

A small part of John Ogier's chicken-farming legacy continues to be suitably petrol-fuelled - his original building at Buxted in Sussex now houses the office for classic BMW specialist Classic Heroes.

Run by the ever-ebullient Barney Halse, Classic Heroes gives a nod to John Ogier's business in its logo of a chicken wearing a crash-helmet. One feels that Ogier would have approved.

ANDREW BARRETT, BRANDON, LINCS.

THE 2019 MATTERS OF MOMENT WAS A great opportunity to look back and remember some great moments.

A missed moment that deserved a mention was the three-abreast pass that Callum Macleod pulled off through Eau Rouge to take second place in the British GT race - surely it ranks as one of the standout moments of 2019?

Anyone lucky enough to have made the run down toward Eau Rouge in any car knows how daunting it looks as you get closer and closer - to have cars both sides, knowing no one is going to blink... It's a standout moment - no question!

GEOFF HANSON, LEIGHTERTON, GLOS

IT MAY BE MY AGE, 53, BUT I COULD NOT help nodding in agreement with Mr Thackwell [*Racing Lives*, February] when he spoke of vanity, self-obsession and lack of humility in motor sport. I notice these failings even more so in American football, where any successful play comes with chest-beating and gloating while looking for the nearest television camera. Old boys do think things were better back in the old days and in this area I'm afraid they (we) are correct.

Always enjoy your magazine, thanks for your efforts.

JORGE ALVEAR, DULUTH, GEORGIA, USA

THE PHOTO OF MARIO ANDRETTI AT THE rear wheel of his Lotus 78 [*Chapman and the Wing Car,* February] does not show him checking the wheel torque, but rather checking the corner weights on his car. Doug Nye refers to this on the same page in his article, together with Andretti's practice of checking the tyre circumferences to pick a well-matched set (or not if you wanted to induce some bias). All practices he learnt racing on American oval, dirt tracks.

ANDREW BEINT, CHIPPENHAM, WILTS

I NOTED IN SPEEDSHOP [JANUARY 2020] A disapproval of Lotus Elans fitted with Spyder chassis. I wish to plead the opposing case. Touting originality may be a tantalising prospect for the Lotus car buyer/seller, as it provides a case for downgrading a car's value and a profitable opportunity for replacing a serviceable chassis with another.

Between the late 1970s and 1994, Spyder Engineering manufactured over 4000 chassis for the Elan, the Plus 2, and Europas, almost all of them of spaceframe construction. The original chassis in the Elan and Plus 2 were unfit for purpose: the front suspension bulkhead towers were exposed to the ingress of water and road debris. As a result, they rotted and fell off, often after a mere 10 years.

If ever there was a car that triggered ambivalence, it was the Elan. Though a joy to drive, it was a persistent nuisance to own. Once, while attempting to catch a Stranraer ferry, my own Elan Sprint severed a driveshaft coupling by the roadside as night fell. For those who drove them, originality presented major disillusionments, as Jim Clark's candid notes to the factory testified.

Those Spyder chassis were premium products. Though more expensive than the original, they corrected inexcusable faults. They were also substantially stiffer. Proud of the work, I have always considered our contribution to the Lotus Elan as akin to Abarth's endeavours with the Fiat 500 – a desirable upgrade.

VIC MOORE (SPYDER CO-FOUNDER), ATLANTA

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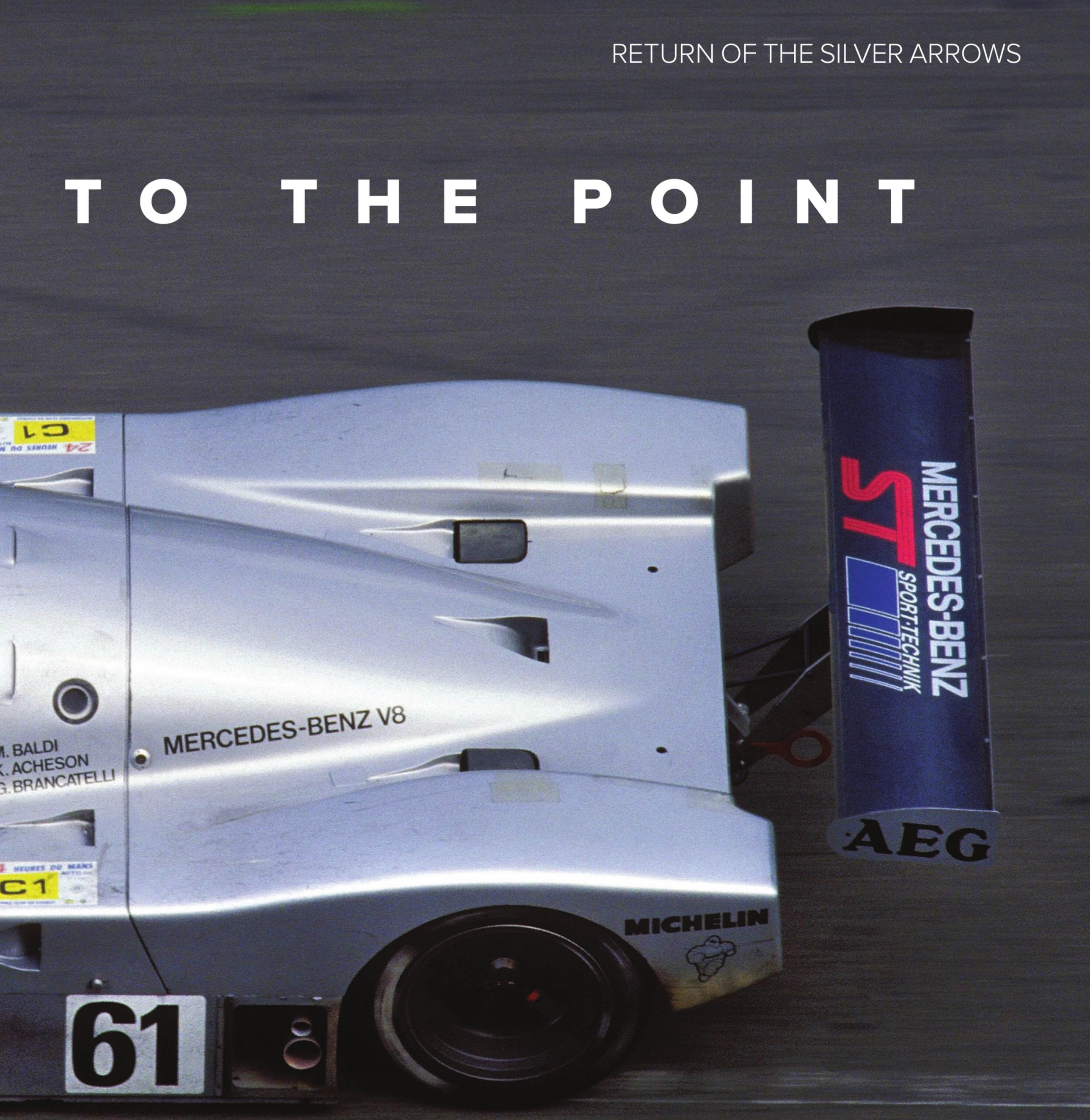
This A5 stylish black notepad is a wonderful addition to any desk. Featuring lined writing paper, the notepad is finished off with the prestigious *Motor Sport* logo on the front. The fountain pen comes with a black metal barrel, coated with a soft-feel satin finish, as well as being embossed with the *Motor Sport* logo.

GETTING BACK

The return of the Silver Arrows in 1989, for the first time in 34 years, resulted in domination that had echoes of the past – and Lewis Hamilton's F1 success of today, says **Gary Watkins**

RETURN OF THE SILVER ARROWS

TO THE POINT



RETURN OF THE SILVER ARROWS

It was a momentous decision. The Team Sauber Mercedes entries in the 1989 World Sports Car Championship would run as Silver Arrows, just like the W125 grand prix cars before World War II and the W196 Formula 1 racers afterwards. The 'new' livery for the Sauber-Mercedes C9 Group C design tipped its hat to the glorious past of a manufacturer returning to motor sport after a long hiatus. And it also paved the way for an equally bright future that comes right up to the present day with the line of championship-winning F1 hybrids.

Yet the call to adopt the famous livery of the marque wasn't made as the result of intense boardroom debate, extensive market research and never-ending focus groups. Rather it was the personal diktat of one of the highest authorities within Mercedes at the time - unsurprisingly after he'd had a few drinks inside him.

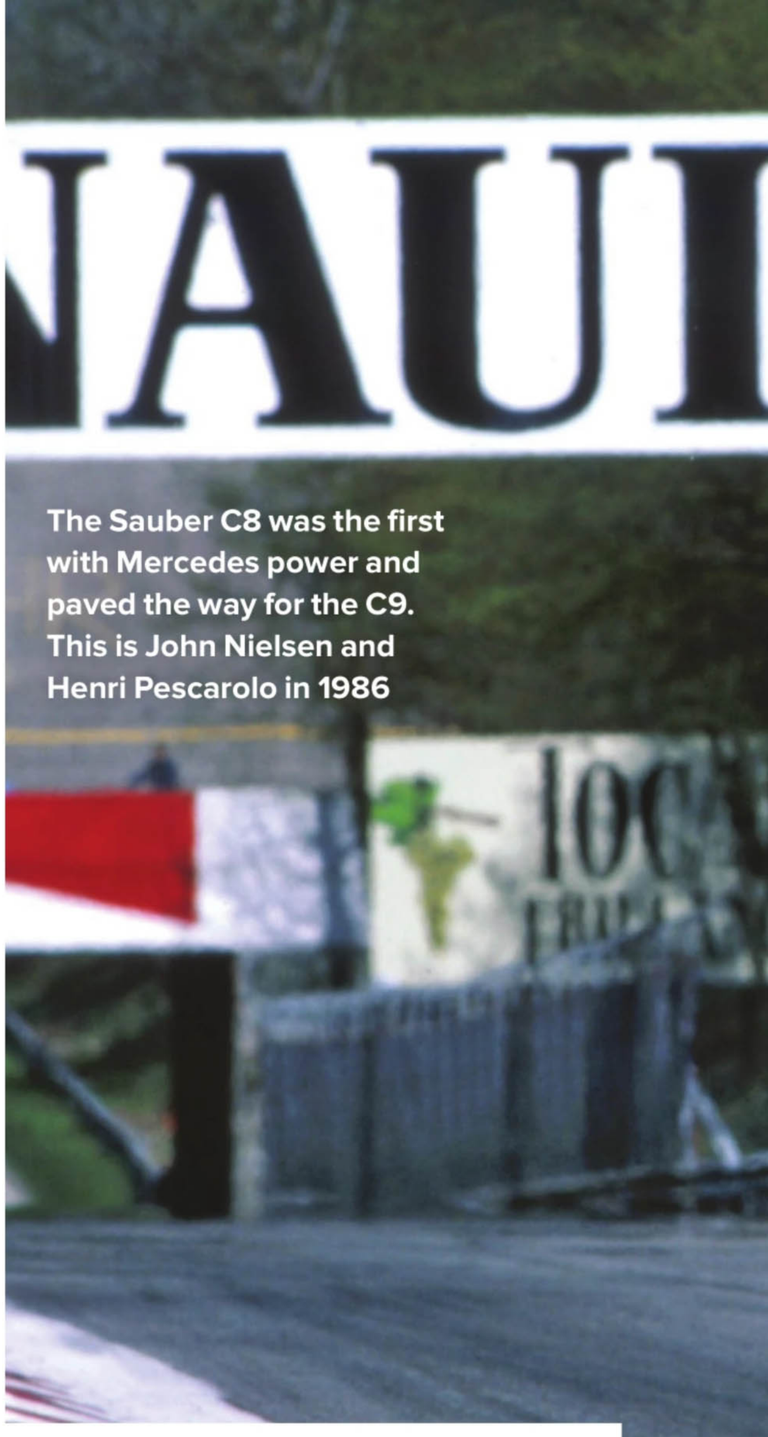
Mercedes had ended its official absence from motor sport in 1988, breaking a sabbatical that dated back to 1955 and the aftermath of the Le Mans 24 Hours disaster (*see sidebar, page 70*). It launched twin programmes: one with Sauber in the WSCC, then known as the World Sports-Prototype Championship, and also with the 190E 2.3-16 in the DTM touring car series in Germany. Only after some early successes - five wins in the WSPC, and six in the DTM - did the marque have the confidence to adopt the iconic racing livery that graced the C9's famous forebears.

That confidence was buoyed by alcohol at the Mercedes end-of-season motor sport party in 1988. The late Werner Niefer, deputy chairman of the board of parent company Daimler-Benz, was sitting around a table with the Sauber hierarchy when he decreed that the Silver Arrows would make a return after a year of the team's cars running in the colours of Daimler-Benz subsidiary AEG.

Max Welti, Sauber's long-time team manager, takes up the story: "We were all drunk, pretty drunk actually. Niefer had these big hands and he banged his big fist down on the table and said that we were going to race silver cars. The beer glasses literally sprang up in the air. It was all done by him, Mr Niefer. It was his decision and his decision alone."

The backstory to the return of the Silver Arrows had begun much nearer the start of the decade than its end. The Swiss Sauber team had forged a tentative link with Mercedes ahead of the 1982 season when it was developing its first car, the C6, for the new Group C fuel formula. Team boss Peter Sauber had approached the University of Stuttgart about using its wind tunnel. That wasn't possible courtesy of the institution's work with Porsche, but he was pointed in the direction of Mercedes by a helpful professor.

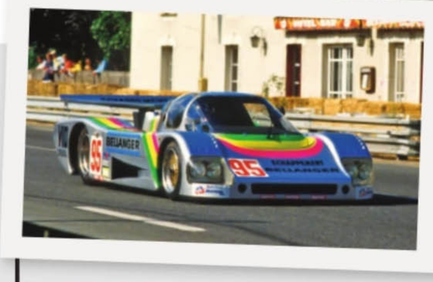
Sauber's team might have been a minnow of the sports car world at that time, but he had a receptive response from Mercedes, where a group of motor sport-minded road car engineers had already taken a close ▶



The Sauber C8 was the first with Mercedes power and paved the way for the C9. This is John Nielsen and Henri Pescarolo in 1986



Mercedes oversaw a considerable test programme with the C8 and its own V8 (right) during 1985, running here at Hockenheim



1985
Returns to racing as engine supplier to Sauber in Group C



1988
Enters DTM with 190E model



1989
Saubers painted in Silver Arrows colours win Le Mans and WSPC

Mercedes in motor sport 1985-present

After ending its absence from the sport, the Silver Arrows have thrived



"Niefer banged his huge fist on the table and said we would race silver cars"



Winners of Le Mans 1989, Stanley Dickens, Jochen Mass and Manuel Reuter





The official team photo, with number 63 going on to win at La Sarthe

1990
Wins WSPC again. Michael Schumacher helps team to victory in Mexico before joining F1





1993
Sauber enters F1 with Mercedes affiliation

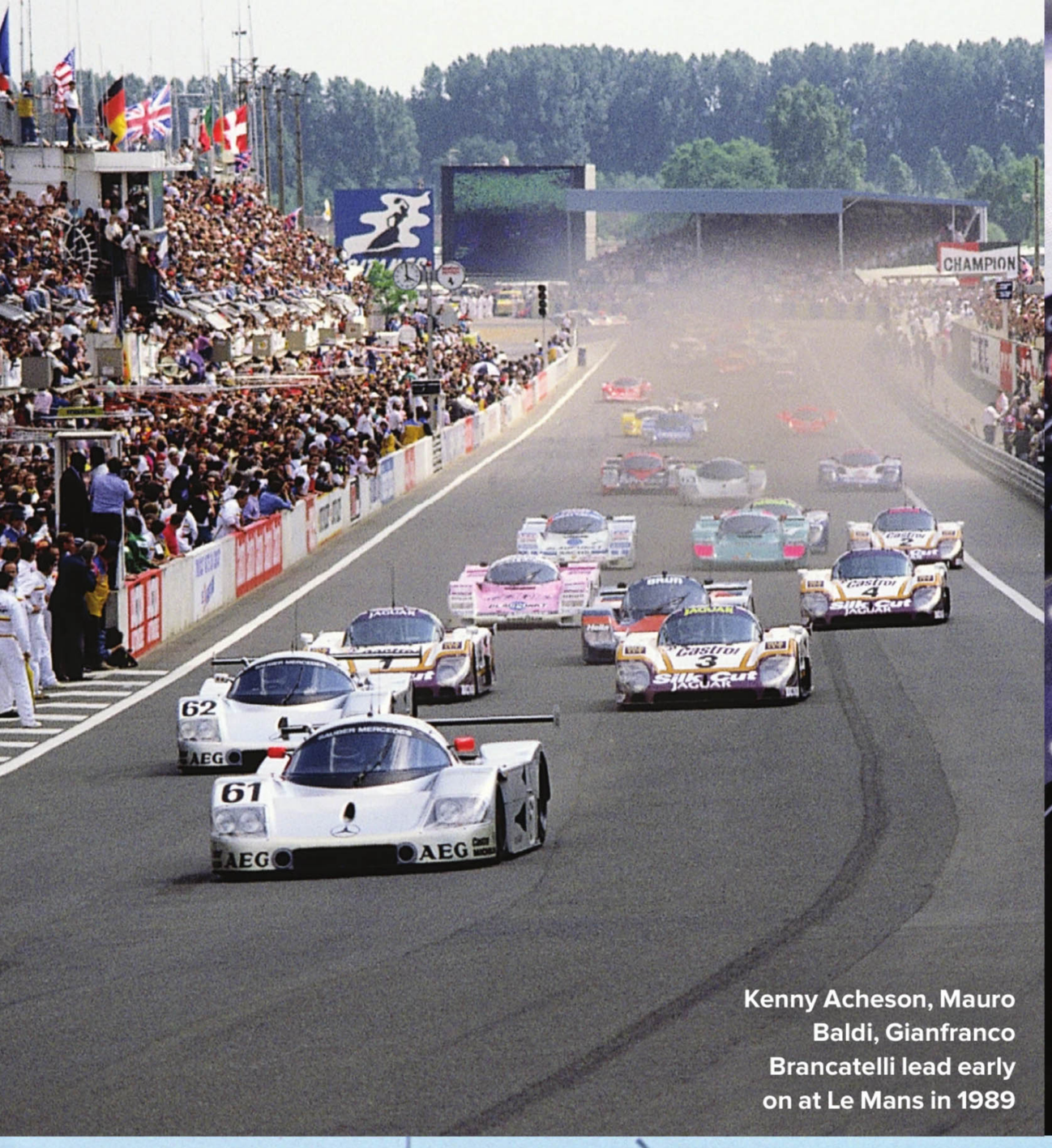


1994
Mercedes officially returns to F1 as Sauber engine partner



1995
Switches to McLaren. Powers team until 2014

DAIMLER AG, SUTTON, GETTY, LAT



Kenny Acheson, Mauro Baldi, Gianfranco Brancatelli lead early on at Le Mans in 1989





While he won with the C11, Michael Schumacher did test the C9, here making the brakes glow

Mercedes in motor sport 1985-present



1997
Enters FIA GT Championship with CLK. Wins both the drivers' and teams' titles



1998
Wins F1 titles with McLaren and Mika Häkkinen; FIA GT champion again



1999
Häkkinen wins second F1 title; new CLR flips three times at Le Mans



2010
Enters Formula 1 as a full-blown entrant

look at the Group C regs. This group, working on an unofficial basis, included Leo Ress. He would go on to design the monocoque of Sauber's next Group C machine, the C7 of 1983, (while on gardening leave after his recruitment by BMW) and all of its subsequent prototype sports cars (as technical director of the team from 1985).

"We were just a group of dreamers," says Ress, who also did the calculations for the suspension geometry of the C6 using the manufacturer's computer power. "We always believed that a low-revving, big-volume turbo engine would be the most fuel-efficient. But it took three years from Peter Sauber's first contact for Mercedes to be convinced."

The first Sauber powered by a Mercedes engine, the C8, broke cover in 1985. The turbocharged M117 powerplant had, officially at least, been developed by renowned Swiss tuner Heini Mader. The truth was slightly different, however: the new race engine was designed and built in-house at Mercedes.

Welti describes the Mader story as a "smokescreen" to hide the true origins of the V8s, put about by a manufacturer who still wasn't officially involved in motor sport. "Maybe Mader built up one or two engines, but no more," he says. Ress suggests that the original plan was for Mader to undertake the project, but recalls everything being quickly taken in-house because Mercedes wanted to be in control of an engine that bore its badges.

The Mercedes engine wouldn't make its maiden race start until 1986, however. The C8 non-started on its one appearance of the previous year at Le Mans when John Nielsen, who would win the race with Jaguar in 1990, crashed on the Mulsanne Straight. It didn't reappear that season.

Sauber undertook a partial world championship season, which included a fortuitous victory in a two-part wet race at the Nürburgring in '86 with backing from the Yves St Laurent aftershave brand Kouros. A deal that stretched through the 1987 season had been brokered by former BMW Motorsport boss Jochen Neerpasch, then working for Mark McCormack's IMG management group. The German would be brought in by Mercedes to head up its return to racing, a decision which was taken in early January 1988.

The Swiss operation now became Team Sauber Mercedes and with the AEG sponsorship undertook a first full-season campaign in the Group C ranks. It did win the WSPC opener at Jerez with a lone C9 shared by Jean-Louis Schlesser, Mauro Baldi and Jochen Mass, but the truth was that the team wasn't ready to take on reigning champion Jaguar.

The Mercedes decision to put its full weight behind Sauber hadn't been taken until January 12, yet the Jerez WSPC opener was on March 6. The programme remained a one-car effort until Silverstone in early May, the final race before Le Mans. The first factory assault by Mercedes at the Circuit de la Sarthe since '55 turned out to be disaster: Klaus Niedzwiedz suffered a high-speed blow-out on the Mulsanne Straight during qualifying; tyre supplier Michelin couldn't guarantee it wouldn't happen again, and Mercedes took the inevitable decision to withdraw from the race.



"Le Mans in 1988 was a disaster, with a high-speed blowout"

By Le Mans, Sauber had a new engineer running the race operations of the team. Dave Price joined from the Richard Lloyd Racing Porsche squad after being approached by Welti in the pitlane during the Silverstone 1000Km meeting in early May. He recalls arriving at an outfit that had yet to organise itself in a way befitting of a full factory team.

"It was very small when I first went there," remembers Price. "Leo was doing everything; he was the designer and was engineering both cars. And as we know, designers don't make very good race engineers! They probably had no more than 12 people in total, including Peter and Max."

Price helped knock the team into shape, while Ress was freed up to devote more time to car development. After a major suspension test with shocks supplier Bilstein after the Le Mans debacle, Sauber's season came alive. Team Sauber Mercedes ran a pair of cars in each of the six races post-Le Mans and ended up winning four of them. Schlesser and Baldi took second and third in the points respectively behind Jaguar's Martin Brundle.

That momentum carried into 1989 with a further upgrade of the C9, which was now powered by a four-valve version of the Mercedes engine known as the M119. Only once would one of the Silver Arrows fail to win over the course of the eight championship rounds in '89, when hot temperatures at Dijon killed its Michelin tyres and the Joest Porsche team took a surprise victory. Sauber also claimed the big prize at Le Mans, finishing one-two in a race that wasn't part of the WSPC that season.

The arrival of the new engine was an important factor in the domination of Team Sauber Mercedes, but perhaps not the defining one that some history books relate.

Continued on page 70



2011
Returns to GTs with SLS GT3



2014
Lewis Hamilton and team win both F1 titles





2019
Hamilton wins sixth F1 title and team records a sixth consecutive crown; enters Formula E (above)

SUTTON, MOTORSPORT IMAGES

SAUBER-MERCEDES C9

Chassis: aluminium honeycomb
Suspension: Double wishbones all round
Engine: Five-litre Mercedes M119 90-degree V8, twin turbos, four valves per cylinder
Power: 700bhp-plus
Torque: 600ft lb
Gearbox: Five-speed Hewland VGC
Weight: 900kg



The battle-scarred C9s return to the pits after their glorious Le Mans victory in 1989

"The engine was definitely more efficient and more power always helps, but at the first test it was actually slower," explains Ress. "We were a bit surprised and then we saw that we were slower in the corners. That was because the centre of gravity had gone up with the extra weight at the top of the engine. Mercedes undertook a big development programme to come back to the original centre of gravity."

The reorganisation of the team that took place through '88 and into '89 was just as important, he reckons. "Everything was less rushed and we were properly organised," continues Ress. "We had more time to focus on car development, the aerodynamics and car set-up. In 1988, we had been struggling just to get to the races."

Price has a similar viewpoint: "I went there at just the right time; you make some small improvements and you're a f**king hero. It was a piece of cake, really. We used to go to the races expecting to win. It's great to have that mentality in the team."

Team Sauber Mercedes ended up taking just about all the silverware in 1989. Schlesser claimed the WSPC title ahead of team-mates Mass and Baldi in second and third positions. The Le Mans victory went the way of Mass, Manuel Reuter and Stanley Dickens in a third C9 entered for the big one in France, with the car shared by Baldi, Kenny Acheson and Gianfranco Brancatelli in second.

It wasn't the first time that the Silver Arrows had dominated at or near the pinnacle of world motor sport. Nor would it be the last. They would maintain their superiority in 1990 on the arrival of a new Group C car – the Mercedes, not Sauber, C11 – that together with its predecessor won seven of the eight WSPC rounds that year.

Today's Mercedes F1 team has carried on the run nicely, with six drivers' and constructors' doubles since 2014. But it undoubtedly owes something to a drunken conversation more than 30 years ago.



The pits at Le Mans in 1955 became a sombre place after Levegh's SLR flew into the crowd

The long shadow of Le Mans 1955

Mercedes' three-decade sabbatical was understandable, even if it couldn't entirely be blamed for the French tragedy, says **Damien Smith**

On October 16, 1955, Stirling Moss and Peter Collins led a Mercedes-Benz 1-2-4 at the Targa Florio to clinch the manufacturers' world championship and complete a dominant season in the wheel tracks of Juan Manuel Fangio's F1 title. Little did anyone know it would be 34 years before a Silver Arrow would again grace the track, when a Sauber-Mercedes C9 carried the famous colours to victory at a World Sports-Prototype Championship round at Suzuka on April 9 1989.

The silencing of racing engines for more than three decades has always been blamed on the Le Mans disaster of that tragic 1955 season, when Pierre Levegh's 300 SLR was launched off the back of Lance Macklin's Austin Healey and into the crowd opposite the pits, killing more than 80 and injuring almost 100 more. But Mercedes has always claimed its decision to withdraw was down to more practical reasons. Fritz Nallinger, board member responsible for engineering, said at a ceremony honouring its racing drivers on October 22, 1955: "The development of our product makes it appear advisable to put these highly skilled people to work now, without overtaxing them, solely in an area which is the most interesting to our customers, namely production car engineering." It's even claimed the decision pre-dated Le Mans.



Levegh and John Fitch's 300 SLR

Whatever the backstory, consider the context of the disaster: it was just 10 years after the second war of the century in which Germany had wrought devastation on France. It also sparked a backlash against motor sport that led to the cancellation of four grands prix that season and a long-lasting ban on racing in Switzerland. A withdrawal was entirely reasonable in such circumstances.

Le Mans 1955 cast a long, dark shadow, even though poor Levegh was blameless for an accident that was triggered by Mike Hawthorn – in a Jaguar. Undeserved 'shame' kept Mercedes away and explains why clandestine measures were taken as 1980s engineers went racing on the quiet. In truth, the Silver Arrows' return was long overdue.

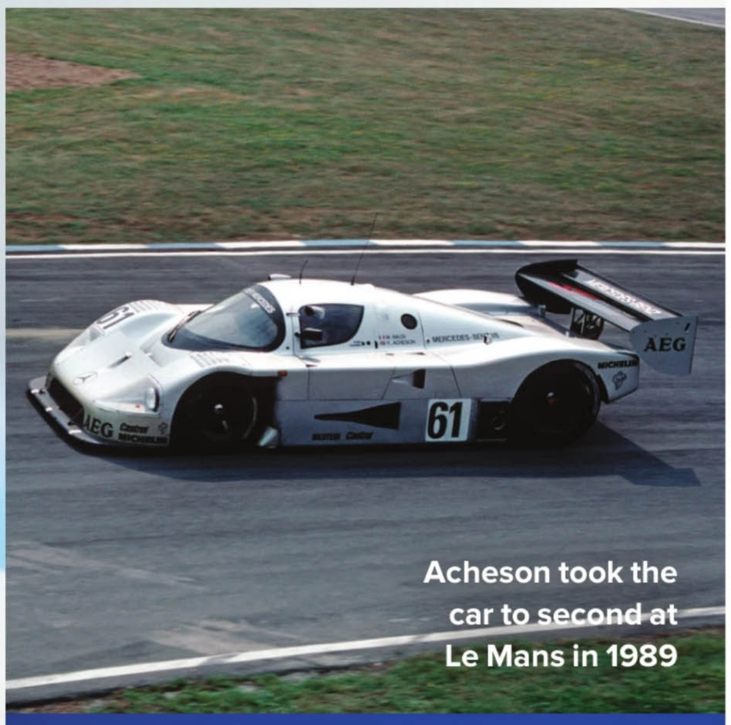
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WHAT'S THE FREQUENCY, KENNETH?

Team driver Kenny Acheson recently tuned back in to his Silver Arrows Sauber Mercedes C9. **Gary Watkins** was there to see an unlikely reunion

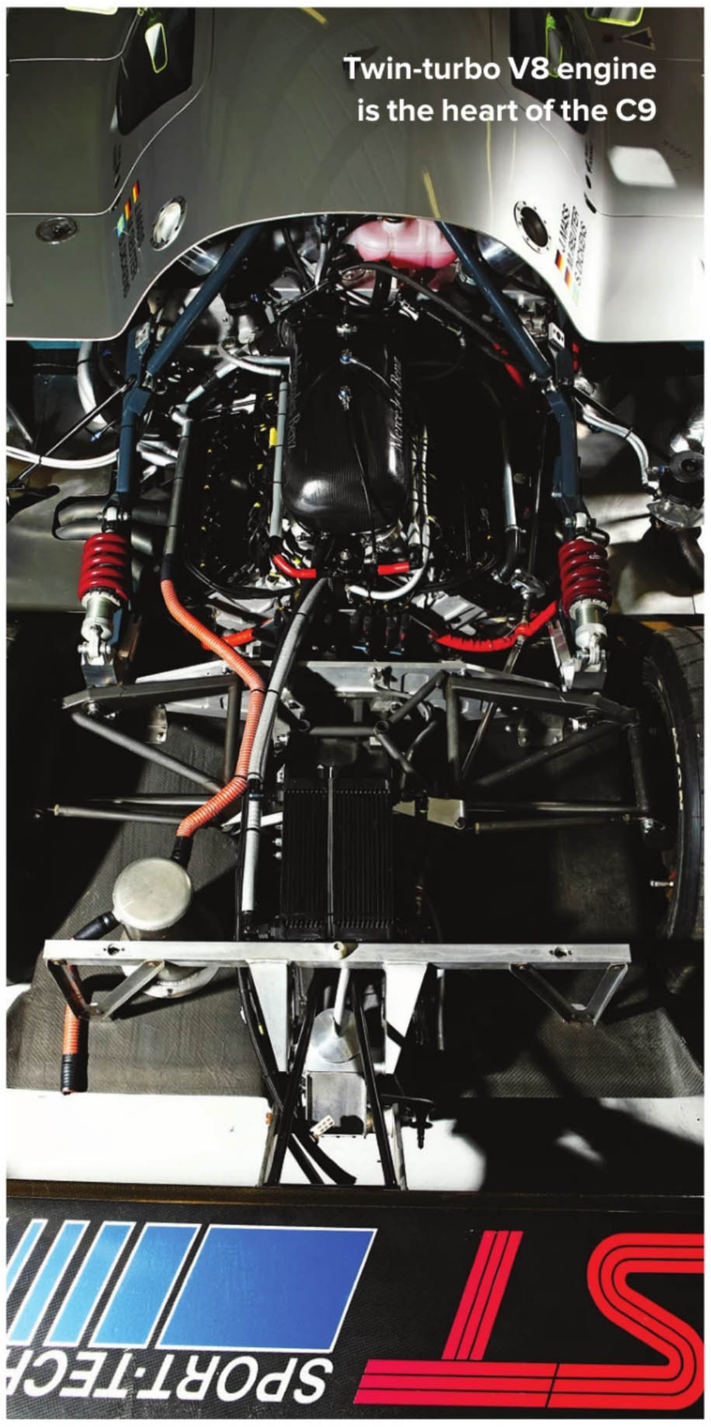
Kenny Acheson hadn't driven a race car in anger since retiring almost 25 years ago, before being reunited with the C9

DRIVING THE SAUBER C9



Acheson took the car to second at Le Mans in 1989





Twin-turbo V8 engine is the heart of the C9





A run in the Sauber brought back plenty of memories for Acheson



The overalls still fit and so, by definition, does the cockpit. Thirty years on from the most successful season of his racing career, Kenny Acheson is easing back behind the wheel of a Sauber-Mercedes C9 in the same grey Nomex in which he won two rounds of the 1989 World Sports Car Championship and endured a heart-breaking near-miss at the Le Mans 24 Hours.

Acheson, now 62, feels immediately at home in the Silver Arrow that put Mercedes back on the international motor sport map in only year two of its official comeback. He's not driving the car on a circuit - he hasn't had a competition licence since he walked away from the sport nearly a quarter of a century ago - but on the Turweston aerodrome runway just down the road from Silverstone. But it's enough to rekindle some fond memories.

"The strangest thing is that it doesn't feel strange at all, if that doesn't sound a bit odd," says Acheson, who has driven a racing car just the once, and only for a short demo, since retiring in 1996. "It all felt so natural - the noise of that V8 engine brings it all back. It really is a lovely racing car."

But then the Northern Irishman knew the C9 was something special from the moment he first took to the track for what should have been his race debut with the renamed Team Sauber Mercedes squad at Le Mans in 1988.

He had reservations about going back after a fraught maiden appearance at the Circuit de la Sarthe in 1985, which ended before qualifying was over with one of his team-mates in hospital with a broken leg.

He describes the Porsche 962C in which he completed just three laps as "awful and a bit scary - for some reason I couldn't go flat in a straight line". Three years later, the C9 was "an entirely different proposition – you could tell immediately that it was a good racing car".

Accepting the offer of a Le Mans drive with the Swiss Sauber team turned out to be a pivotal moment in Acheson's career. He might not have got to make his Le Mans debut, but his introduction to the factory Merc squad resulted in a full-season campaign in the following year's WSCC, or World Sports-Prototype Championship to use the name it adopted in 1986. Top drives followed as he racked up an impressive Le Mans CV that encompassed a trio of podiums in his first four starts.

Acheson was given a second outing aboard a C9 at the back end of the '88 season at Fuji, a home from home for him after four seasons racing in Japan. He finished fifth with Jean-Louis Schlesser and Jochen Mass, doing more than enough to be invited back for '89.

"I went there as a fifth driver, but every time I got in the car it was wet and I was quick," he recalls. "I remember the team telling me I was going to start the race. I said to them, 'hang on a minute, I'm not one of your regular drivers, I've only done a handful of laps'."

Acheson would be part of an historic year for Mercedes as both the manufacturer and its Swiss partner upped the ante. Sauber outgunned its rivals, including reigning champion Jaguar, which meant the big rivalry was within the Swiss team.



It is believed body panels came from the Le Mans-winning car

LYNDON McNEIL



"A Porsche 962C was scary, but the C9 was an entirely different proposition"

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Acheson had plenty of success during the 1989 season, here celebrating winning the 1000km of Brands Hatch alongside Mauro Baldi (left)

Schlesser and Mauro Baldi had started the 1988 season as co-drivers, winning first time out at Jerez and finishing on the podium at the next two races before the team expanded to run a pair of cars. Now they would be in separate entries from the outset, Baldi teamed with Acheson in car #61 and Schlesser lining up with Mass in #62.

"They were the two bulls in the field," recalls Acheson. "Jochen was really relaxed as always and I was just happy to be there. I was always aware of the rivalry, but I don't think it ever got in the way of things."

Schlesser wasn't happy from the get-go that Dave Price had been assigned to engineer the sister car, even less so when Baldi, recovering from breaking his right foot at the Daytona 24 Hours in February, ended up driving - and winning - with him at the season-opening Suzuka round. The team was forced to shuffle its line-up on race morning when Mass fell unwell. With the team down a driver, that meant Acheson had to race #62 alone over a 480km or 300-mile event lasting nearly three hours.

He ended up second, six seconds in arrears of the sister Sauber, but the newcomer was the moral winner after ceding his position to the car shared by the two bulls late in the race.

"I started 30th because I had to use Jochen's qualifying time," he remembers. "I thought there was no way I was going to be able to do the whole race on my own, because these are physical cars and Suzuka is a tough circuit. But suddenly I found myself running second and I was able to overtake Schless in the last stint.

"He claimed he believed I was unlapping myself. He didn't! I caught him and pulled away by a couple of seconds before the call came. When I pulled over, I made sure I did it in front of the pits to let everyone know what was going on.

"I sat on his tail to the end of the race, and it was only on the last lap when he nipped in front of someone in the S-Curves that he was able to pull a gap."

Neither Baldi nor Schlesser took the big prize at Le Mans that year. Instead it went to Mass, who was teamed with Stanley Dickens and Manuel Reuter in the additional #63 car entered for the French enduro. It might have been different, however.

> "Acheson had to race alone for a 300-mile, nearly three-hour, event"



GETTY, McNEIL

Baldi, Acheson and third driver Gianfranco Brancatelli held the lead on Sunday morning when its number one driver went off at the Dunlop Chicane. This incident and subsequent repairs to a damaged nose turned a narrow lead over the sister car into a one-lap deficit.

The second-placed Sauber made it back on to the lead lap, only for the gearbox to jam in fifth on Acheson's first lap back in the car for the run to the flag. When attempts to repair the transmission proved fruitless, the car's driver had the big task of getting out of the pits in top gear.

"All I did was keep hitting the starter and dropping the clutch, so the car would keep rolling," he explains. "Start, drop the clutch and stall; start, drop the clutch and stall. By the end of the pitlane, the clutch seemed to be burnt out and I couldn't really accelerate. I remember getting onto the Mulsanne and two thirds of the way down the clutch started to come back as it cooled down a bit."

> "You were in trouble if you got it sideways when the tyres were old"

Another WSPC win for Baldi and Acheson at Spa in September, coupled with a retirement for Schlesser and Mass, meant the Italian went to the series finale in Mexico City with a narrow advantage at the head of the championship table. But on the assumption of a Sauber one-two, he still had to win the race to claim the crown.

Baldi took the pole, but it was Schlesser who led throughout the opening stint on the Autódromo Hermanos Rodríguez. Acheson, though, quickly closed down Mass after the pitstops and outdragged the sister car on the start-finish straight after getting a better run out of the fast 180-degree Peraltada.

Just a couple of laps later, the Sauber driver attempted the same move on the lapped Richard Lloyd Racing Porsche driven by Tiff Needell. This time, the C9 ended up in the barriers. "I had Jochen just behind me and I knew I had to get a good run onto the straight," recalls Acheson. "I didn't want to get too close to Tiff in the corner, but I came up right behind him and lost downforce in his slipstream just at the point where there was a bump in the road.

"The Michelins were very difficult to drive: you were in trouble if you got the car sideways once the tyres were five or six laps old. The car went ever so slowly, but there was no chance to get it back on those tyres. I was just too close to the car in front at the wrong moment. My fault. Maybe it wasn't meant to be."

Acheson already knew that his services weren't required for 1990 by the time he headed for Mexico. His seat would be filled by a trio of youngsters - Michael Schumacher, Heinz-Harald Frentzen and Karl Wendlinger - as Mercedes motor sport boss Jochen Neerpasch sought to replicate the successes he'd enjoyed with his junior programme at BMW in the 1970s. The young tyros would alternate in the second car alongside Mass, while Schlesser and Baldi were reunited in the lead entry.

Acheson wouldn't drive a Sauber again after climbing from his damaged car in Mexico. Not, that is, until the offer last year to reacquaint himself, however briefly, with the C9. The run, however short, enables him to look back on his time with Team Sauber Mercedes with fondness.

"I feel lucky that I got that chance with Sauber and Mercedes," he says. "If I hadn't have got that opportunity, I'd probably have done a couple more years in Japan, and that would have been it. My life wouldn't have been so rich."

His exploits in 1989 won him the British Racing Drivers' Club Gold Star for the most successful Commonwealth driver of the season. He calls himself the "least famous and least-deserving name" on an honours board that includes Richard Seaman, Stirling Moss and every British Formula 1 world champion. That's a typically self-deprecating comment from a driver who was always one of the nice guys of the paddock.

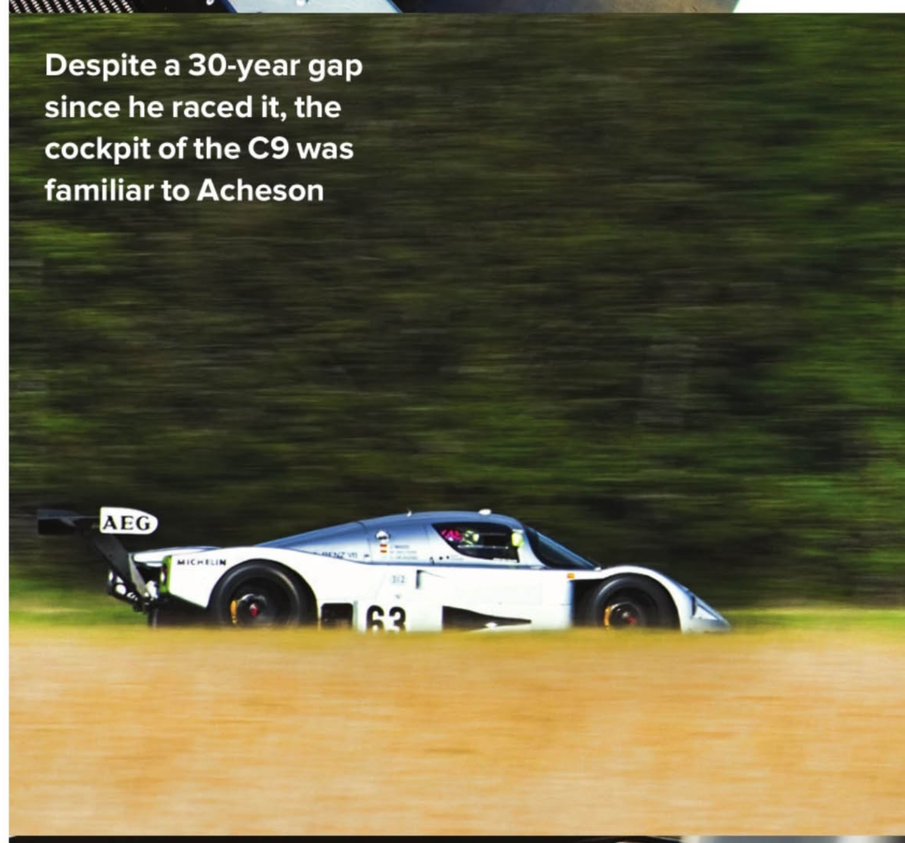
"I couldn't speak highly enough of the group of people I raced with in 1989," continues Acheson. "It was the nicest atmosphere I ever encountered in a team. Everyone worked well together, the Germans, the Swiss and the Brits."

The chance to once again slip into the cockpit of a C9 results in "a great day" for Acheson. "The only thing is," he says, "it's the wrong number on the car. If there was no #63, I would have won Le Mans."

Special thanks to BBM Sport for its help with this feature







Despite a 30-year gap since he raced it, the cockpit of the C9 was familiar to Acheson



A lunchtime coincidence

This Sauber's owner had no idea he was sitting across from Kenny Acheson during an encounter at Goodwood, which led to this test



Kenny Acheson's return to the cockpit of a Sauber-Mercedes came about entirely by chance. Invited to a corporate event at the Goodwood Festival of Speed last summer in his capacity as a businessman working in the cosmetics industry rather than as an ex-racing driver, he happened to sit opposite the owner of this C9, historic racer Rupert Clevely.

"Kenny asked me what I did and I ended up telling him that I raced a bit," explains Clevely, who has also owned Lancia LC2 and Peugeot 905 Group C cars. "He asked me what car I drove, I said it was a Sauber. When I told him it was a C9, he said, 'Wow, I finished second at Le Mans in one of those'. I had no idea who he was when we started talking."

One thing led to another, and suddenly Acheson was digging out his old overalls for a short test in Clevely's C9.

The car was purchased from the defunct Donington Collection by Clevely. An unraced spare car in period, chassis #89 C9 A1 became a display vehicle at the end of the design's competitive life early in 1990. The car came with an engine and gearbox, but no bellhousing between them, while other missing parts included the injection plenum and the rear suspension rockers.

What the car did come with, however, was a set of bodywork used at Le Mans. It is believed that the majority of the panels came off the Le Mans winner, while the 04B chalked inside the nose suggests that this section was used on Acheson's second-placed car, chassis #04.

BBM Sport, formerly Chamberlain-Synergy, readied it for Peter Auto's Group C Racing series. That meant reverse engineering components, something it was well qualified to do having previously run another C9, as well as the Sauber-built Mercedes C11.

The car was ready in time to run up the hill at Goodwood last summer and the plan is for Clevely to race the C9 a couple of times in the coming season. "I'm a massive Group C fan," he says, "and in my opinion this is the coolest looking of them all."

Backs to the wall ahead of Hamilton's defeat of Leclerc in Bahrain last year



2020: TRIPLE TROUBLE

Sparks have flown between Hamilton, Verstappen and Leclerc already. **Mark Hughes** examines the hidden factors that could help a titanic three-way battle burst into life

Max Verstappen's signature on a Red Bull contract extension to the end of 2023 has neatly put in place the line-ups of the three top teams for the foreseeable future. Widely perceived as the king-in-waiting, with Lewis Hamilton preparing for his 14th Formula 1 season, Verstappen's signing was crucial for Red Bull to remove him from Mercedes' possible grasp as a long term Hamilton replacement. Even more so once Ferrari had taken Charles Leclerc off the market a couple of weeks earlier by announcing a five-year contract that takes him up to the end of 2024.

Outside of Hamilton, Verstappen and Leclerc, who else could Mercedes, Ferrari or Red Bull have slotted in as bona fide would-be champions over the next few seasons, given the right equipment? Daniel Ricciardo? Carlos Sainz Jr? Sure, and possibly a couple of others, too – but without the certainty and solid gold status of this trio who are primed to slog it out over the next few years. It's a mouth-watering prospect and promises to be F1 box office.

MOTORSPORT IMAGES

What could derail the title fight?

This is the final season of Hamilton's Mercedes contract, but will both parties continue in F1? The team has not yet committed to F1 post-2020, the contracts of both its race drivers run only to the end of this year, and its long-term third driver Esteban Ocon has been released to Renault for now.

In the long term, the internal combustion engine is an ever-smaller part of the car industry's focus, and Mercedes already has its Formula E team.



Side-by-side in Austria, but who will come out on top in 2020?

On the other hand, it has recently been spending a lot of money on upgrading its facilities, investing before the regulation cost cap for 2021 onwards activates, which would seem to indicate a commitment to F1.

So, let's assume Mercedes is staying on in some form beyond 2020. If Hamilton can win a Michael Schumacher-equalling seventh title this year, will he be satisfied? On 84 grand prix wins, there's every possibility he will surpass Schumacher's record of 91 this season. Seven titles and more than 91 victories would make him statistically the most successful driver in F1 history, meaning he wouldn't need the eighth title to take that record. And if Mercedes does exit afterwards, or if team boss Toto Wolff moves on, then it would seem an opportune time for Hamilton to transition to a new phase of his life. Or does the lure and love of racing remain too strong, especially when he's still at the height of his powers? Perhaps a late career move to Ferrari alongside Leclerc would prove irresistible.

But let's assume that both Mercedes and Hamilton are continuing together into F1's brave new post-2020 era. Another factor that could frustrate the ideal 'three top drivers in the three top teams' line-up would be the specifics of Verstappen's Red Bull contract. Honda is committed as the team's engine supplier until the end of 2021. It would be unusual for a top driver's contract not to have a works engine break clause in it – potentially where the driver is not beholden to the contract if the team loses its works engine status. As well as taking Verstappen out of Mercedes' reach for 2021, his signing by Red Bull can also be read as a way of enticing Honda into extending its stay. Verstappen is increasingly viewed with awe by the racing arm of Honda, and managing director Masashi Yamamoto recently compared him to 'a young Senna'. Verstappen pointing to the Honda badge on his overalls on the podium in Austria after last year's breakthrough victory was emotionally powerful for the manufacturer. But if the anti-F1 faction of the Honda board should prevail, then Verstappen could be back on the market as early as 2022.

Could age catch up with Hamilton?

A very strong case could be made for hybrid-era Mercedes being the greatest team in F1 history, eclipsing even the Schumacher-era Ferrari. And then in Hamilton it's matched with one of the most devastating driving talents F1 has ever seen.

With F1 so tightly regulated, success is all about optimisation and depth of research, because the engineering facilities and brains are massive. Mercedes is unlikely to get beaten by a brighter idea and there's no tyre war to randomise things, so it comes down to meticulous excellence and depth, and that's why Mercedes is so strong. It won this hybrid era three or four years before it started, and the momentum is still carrying.

But time nibbles away where it can't be seen, in the neurons, in the minds, in the collective energy as entropy has its way. That's the biggest challenge facing Mercedes and Hamilton individually and collectively; keeping that process at bay against the surging tide of youth and unsatisfied ambition.

Already last year, the Mercedes power unit gave way to Ferrari as the pacesetter, and on race day power it was almost matched by Honda and Renault late in 2019. There were some races where Mercedes' downforce advantage wasn't enough to overcome the associated drag penalty. They are two key specific challenges to address for 2020 and beyond, all while trying to keep the cohesion of the team in place.

In terms of the competitive intra-team dynamics, this one works well in that Valtteri Bottas is never a disruptive force and is given a fair opportunity. As he stepped up his game, Hamilton had to respond.

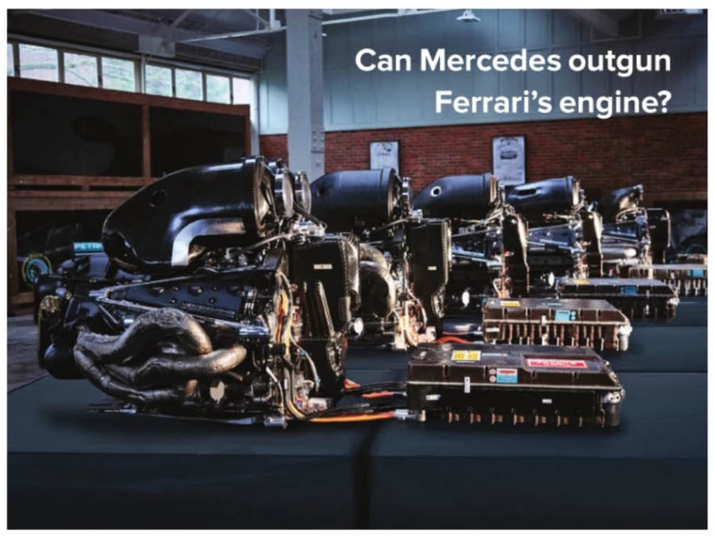
Last year Hamilton didn't quite deliver the sort of devastating qualifying laps he's done in the past. There was no equivalent of Singapore 2018, for example. It was a very contained campaign by his standards, and it took a few races for him to definitively establish an edge over Bottas after his number two performance engineer was switched to become Bottas's lead engineer during the off-season. It illustrates the delicate balance required to be constantly on that high wire. Was it only that, or was it the first indication that his raw speed cannot be readily summoned as it once was? After all, Hamilton would begin the 2022 season as a 37-year-old. With an equal car, would he race the young guns on their terms of all-out attack, or would the more street-smart Hamilton – who once left a tempting but impossible gap for Verstappen to try around Turn Eight in China 2018 – make more regular appearances.

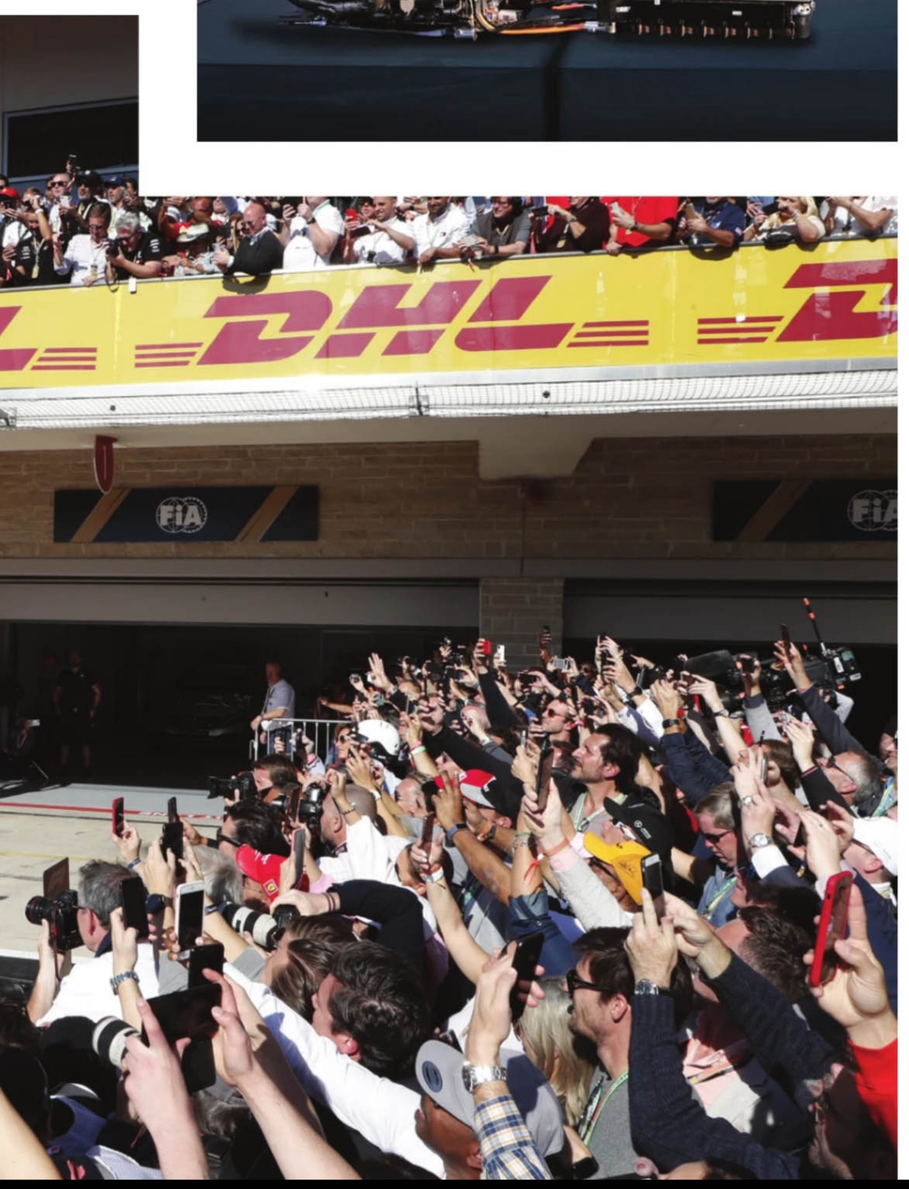
As an all-round package, Hamilton was the best last year. Verstappen and especially Leclerc had moments of impetuosity. But in the intensity of wheel-to-wheel racing,



Hamilton celebrates his latest title in Austin, closing in on Schumacher's record







Hamilton admits he doesn't quite know how to treat Verstappen other than to give him plenty of room. At Monza, Hamilton had the intelligence not to stand his ground when Leclerc resorted to driving him off track on corner approach in order to protect his lead. Hamilton insisted had he not still been chasing the title, he'd have stayed right where he was - and they'd have crashed. Those sorts of moments are sure to play out with greater regularity in the future, if Ferrari and Red Bull-Honda can produce consistently Mercedes-level cars. Hamilton says: "I'm going to be a machine this year, on another level than ever before". But how much appetite is there following six or seven world titles to go wheel-to-wheel with someone you don't quite trust at 200mph? Tick-tock...

Red Bull's trials ahead

The challenges are obvious: the team doesn't control its own destiny due to its reliance on an engine partner, something neither Mercedes nor Ferrari need worry about. Also, Honda has been equivocal about its F1 future despite 2019's breakthrough success. But Red Bull remains formidable, a superb combination of disciplined rigour but left-

Twists and turns

The Mercedes call that unlocked the driver market merry-go-round

The big names were all under contract with their respective teams until the end of **2020** but there were a number of decisions that hinged on what **Mercedes** chose to do with its 2020 line-up. Stick with **Valtteri Bottas** or throw an F1 lifeline to **Esteban Ocon?** The Silver Arrows opted to extend Bottas's contract and release Ocon into the wilds of the driver market, where he was immediately snapped up by **Renault.**

Romain Grosjean's F1 career was up in the air, but after a torrid 2019 stuck with a car it didn't fully understand, **Haas** decided to retain him alongside **Kevin Magnussen.**

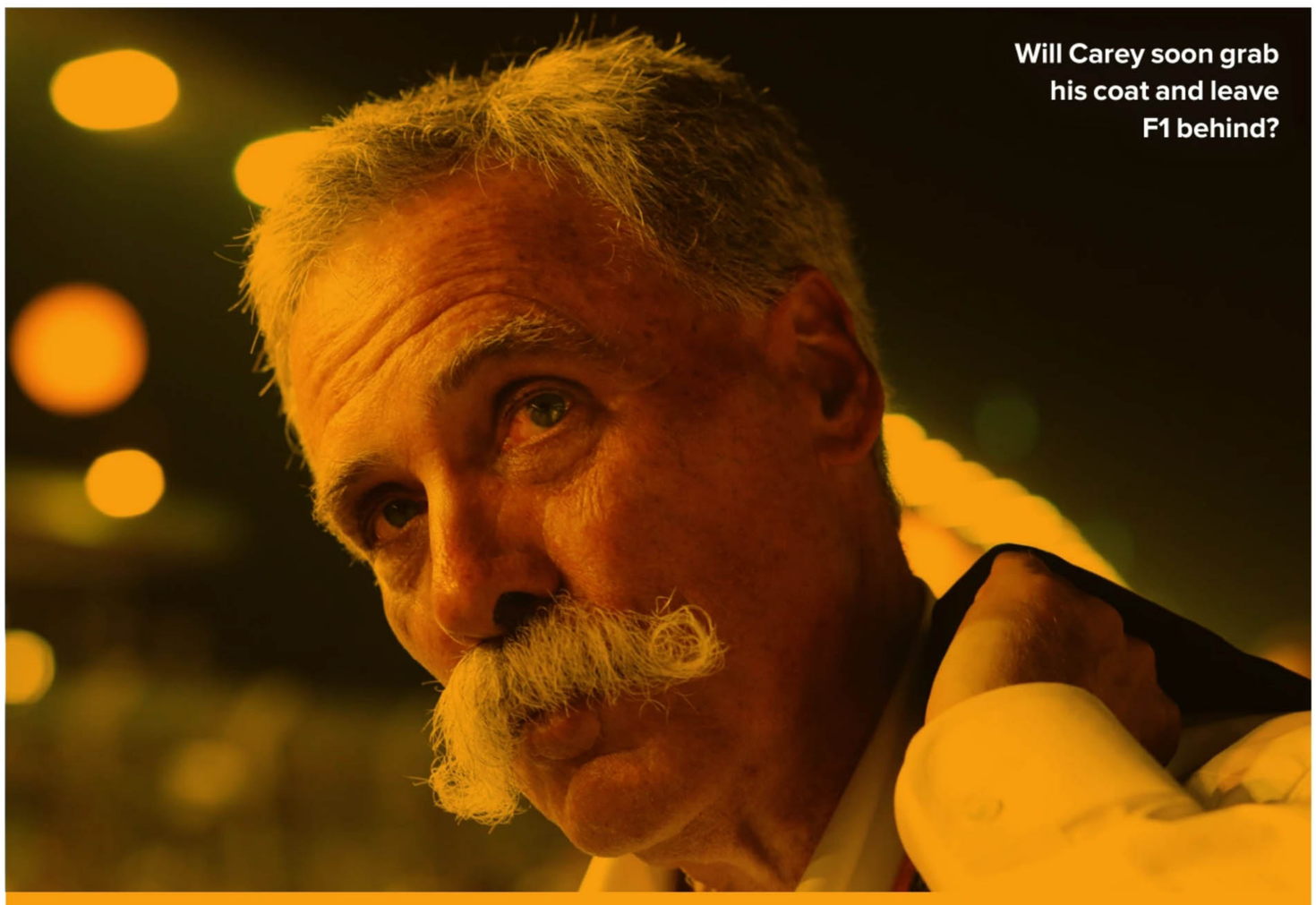
Red Bull's game of mid-season musical chairs ended with **Alexander Albon** impressing enough in place of **Pierre Gasly** to keep his seat next to **Max Verstappen** for 2020. Gasly remains at the renamed **AlphaTauri** for 2020.

With Ocon taking his seat at Renault alongside **Daniel Ricciardo** and Haas sticking with Grosjean, it meant **Nico Hülkenberg** was out of a seat. He wouldn't find a new home as **Alfa Romeo** confirmed **Antonio Giovinazzi** would remain, while **Williams** chose Formula 2 runner-up **Nicholas Latifi** to replace **Robert Kubica** for 2020.



Kubica found a simulator role with **Alfa Romeo**, returning to the team that gave him his F1 debut and first win in its previous BMW Sauber guise.

MOTORSPORT IMAGES, DAIMLER


Will Carey soon grab his coat and leave F1 behind?

Carey: F1's message must evolve rapidly

F1 CEO Chase Carey tells **Ian Parkes** why Formula E isn't a threat and how grand prix racing must roll with the times

With Formula E continually growing and environmental concerns filling the news agenda, Liberty Media head Chase Carey is adamant F1 will not be out of touch. "We recognise the environmental issue is important to our fans and our partners," says the man who has spent the last three years in charge of the sport after Liberty's buyout in early 2017.

"We're a platform that, in many ways, has led the automotive world from the get-go, and we now have a chance to play a leadership role in showing how the internal combustion engine and a hybrid engine can fit into creating a better environment for everybody."

F1 embraced hybrid technology in 2014 but Carey says greater measures can be taken: "There's a lot of work being done on synthetic fuels, energy recapture, and I think those solutions are important in many ways.

"A hybrid engine today is the most efficient engine in the world. We haven't done a good job of telling that story, but we can continue to build on that. We need partnerships with the original equipment manufacturers and the oil companies to continue to make those steps, and we can be a platform that shows what's possible."


Formula E is now a haven for manufacturers

Carey claims F1 is "not competing with Formula E" and insists he is not being negative in describing it as "mostly today a social cause and a street party". Instead, he says F1 has a bright future: "F1 captivates the world's imagination. It is a unique sport that shocks your senses. Those are features that stand out and what we will continue to build on."

And what of his own future? Rumours are rife a successor is being lined up, and commercial boss Sean Bratches has left the fold.

"My future is probably, by definition, short-term because I'm too old to have a long-term future," says the 66-year-old. He switches, perhaps inadvertently, to past tense: "This has been a wonderful adventure, a fascinating one. I'm not building careers anymore. If I was 50 years old, I guess, I'd have to worry about my future.

"At some point in time, there will probably be somebody younger than me, better positioned, to carry it [F1] forward."


In his own hands: Verstappen's key to Red Bull-Honda's F1 future

field ingenuity. It does rely quite heavily upon the creative vision of Adrian Newey, and although there's a great foundation in place that allows him to do what he does best, he's been 30 years in F1 now and becomes more frustrated with each additional piece of prescriptive technical regulation. And the 2021 regulations are very prescriptive. Can he remain motivated?

After its painful hybrid-era beginnings with McLaren, Honda has made remarkable progress. The exciting thing about its 2019 season was that the improvement curve remained steep even after it established race-winning form. The relationship between Honda's racing people and Red Bull is fantastic; different cultures but a common understanding and shared determination. The ambivalence about the programme is coming from corporate, not engineering or racing.

Red Bull isn't structured in the same way as Mercedes or Ferrari. It has more outside suppliers and isn't as integrated. But that smaller core can make it more flexible and quick to react. It's brilliant at developing its car through the season but too often in recent years it's started the year behind and then clawed itself back to full competitiveness. That was the case last year and in 2017, and although a strong case could be made that regulation changes specifically hurt Red Bull's aerodynamic philosophy, the team's most immediate challenge is to hit the ground running in 2020.

As for Verstappen, he's the most exciting thing to happen to F1 since Hamilton, a sublime talent and the perfect racing attitude.





Ferrari has set the benchmark in aero development



Three drivers fighting for supremacy before F1's new era

His moments of excess – not slowing for the yellows in Mexico qualifying the most obvious – will probably remain part of his make-up. That extremism has won him races just as it has lost them. His challenge isn't so much to draw more performance from himself, but to be in a position where his team provide him with a car as consistently and relentlessly competitive as Mercedes has for Hamilton. Verstappen could be a crucial part in making that happen and could prove the lynchpin that secures Honda's future. Because if that partnership cannot be made to work, there's a danger of career underachievement. Five years into F1, the 22-year-old has only eight wins and two poles on his CV. Arguably, no one could have achieved more in the same circumstances, but at what point does the driver dictate his own path?

Eras can change suddenly. It takes only a few races for a revolutionary change of form to become the new normal. Could Red Bull, Honda and Verstappen together conjure something that applies the crucial pressure cracks to Mercedes? Absolutely. Will it? That's probably up to the Honda board.

Can Ferrari and Leclerc learn from the past?

This is an exciting but perilous combination; a team bursting with promise and creativity but still young together. At the end of 2019, both parties were still a little fragile but had greatness within them. The pressure upon the Scuderia is always immense but was only intensified last year by the combative on-track relationship between Leclerc and Sebastian Vettel. That's just one of the challenges facing Mattia Binotto as he tries to shore up Ferrari's place in the competitive hierarchy.

Ferrari arguably lost the 2017 and 2018 championships just as much as Mercedes won them. Even though last year's car was less consistently competitive than its predecessors, it could have been a title contender had the team (and drivers) not made so many errors.

Technically, Ferrari has been the most creative team of the last three years, with many clever aerodynamic innovations that have since been incorporated into the cars of everyone else. The power unit department has excelled, and for the last two seasons it has had the most potent engine in the field.

Aerodynamically, the new regulations of 2019 derailed the productive path Ferrari had been on since 2017 and it took until Singapore for a basic aerodynamic flaw in the car to be properly addressed. But with lessons learned and unchanged aero regs for 2020, Ferrari should be well placed to get back to its 2018 level. The more prescriptive aero regulations of 2021 and beyond may also work in Ferrari's favour in placing emphasis on the power unit.

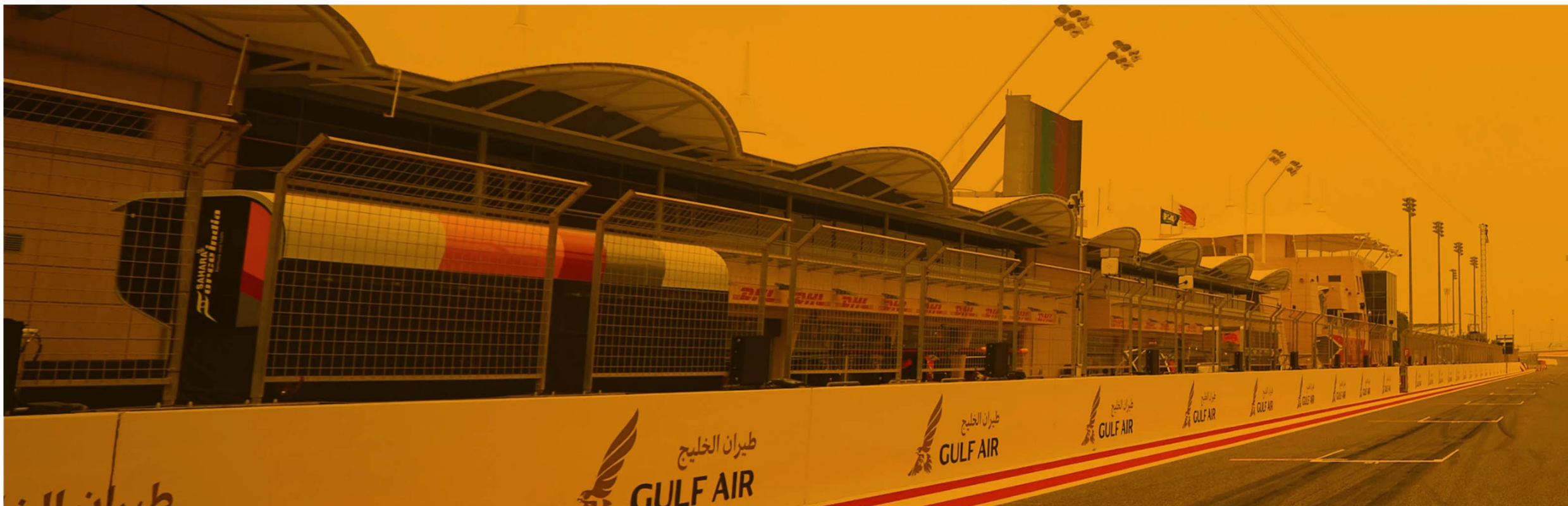
But for that to have any relevance, the team needs to improve operationally. It's not yet at Mercedes or Red Bull standards in its strategy calls or reliability processes. Then there's the tricky dynamic between the drivers, something which on occasion fed into the strategy failures (Monza qualifying, Sochi race). As a proud multiple champion, Vettel is not ready to relinquish automatic leadership to Leclerc, who in turn is not prepared to be restricted. The momentum is with Leclerc and historically the Scuderia has preferred to operate a number one and two policy. It's difficult to imagine Vettel complying.

Leclerc meanwhile has shown himself equally capable of swashbuckling, attacking drives, stretching his great talent out to the edge and putting in composed drives when the car just cannot deliver.

His competitive relationship with Max Verstappen – played out very obviously in Austria and Great Britain – is intense and goes back to their karting days. There is arguably less tension in the dynamic between him and Hamilton – although Italy's Roggia chicane incident suggests things could yet get more strained between them.

An equally matched Mercedes, Ferrari and Red Bull in 2020 could be the prelude to one of the greatest contests F1 has ever seen, with a fascinating dynamic of two young lions challenging the old master to be head of the pride in F1's new era.

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Runners &

A muted 'silly season' doesn't mean 2020 storylines are lacking. **Mark Hughes** analyses the hopes and expectations of the grid



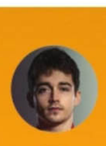
LEWIS HAMILTON
AGE **35** LAST YEAR **1**



VALTTERI BOTTAS
AGE **30** LAST YEAR **2**

Mercedes
Brackley, UK LAST YEAR **1**

MARK HUGHES: Overall, Mercedes had the best car last year, but there were times where it was revealed as out-powered and too draggy. Hamilton has identified these two areas as the targets for improvement if Mercedes is to maintain its clean sweep of hybrid era titles.



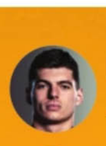
CHARLES LECLERC
AGE **22** LAST YEAR **4**



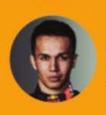
SEBASTIAN VETTEL
AGE **32** LAST YEAR **5**

Ferrari
Maranello, Italy LAST YEAR **2**

MARK HUGHES: Ferrari's challenges can be grouped as technical and operational. It needs a better aerodynamic concept and to retain its power advantage even under stricter fuel flow regulations. Also it must be sharper, eliminate errors and find calmness between its drivers.



MAX VERSTAPPEN
AGE **22** LAST YEAR **3**



ALEXANDER ALBON
AGE **23** LAST YEAR **8**

Red Bull Racing
Milton Keynes, UK LAST YEAR **3**

MARK HUGHES: Derailed by the introduction of the new aero regs for 2019, it took the team half a season to recover. The challenge now is to begin the season fully competitive and for Honda to continue its impressive recent rate of progress. Then a title challenge is realistic.



PIERRE GASLY
AGE **23** LAST YEAR **7**



DANIIL KVYAT
AGE **25** LAST YEAR **13**

AlphaTauri
Faenza, Italy LAST YEAR **6**

MARK HUGHES: The renamed team had two remarkable podiums in 2019, but will be targeting a more consistently competitive season with its 'half-a-Red Bull' car. If Gasly can continue with his psychological rebuild after his Red Bull battering, that would help a lot.



SERGIO PÉREZ
AGE **29** LAST YEAR **10**



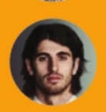
LANCE STROLL
AGE **21** LAST YEAR **15**

Racing Point
Silverstone, UK LAST YEAR **7**

MARK HUGHES: Last year's car was flawed in concept because of the combination of it being created when the team was financially insecure and a new set of aero regs. The target has to be to retain its former status of best of the rest – but the competition is fierce.



KIMI RÄIKKÖNEN
AGE **40** LAST YEAR **12**



ANTONIO GIOVINAZZI
AGE **26** LAST YEAR **17**

Alfa Romeo
Zürich, Switzerland LAST YEAR **8**

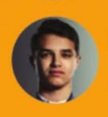
MARK HUGHES: Still suffering the long-term effects of the Sauber team being starved of investment a few years ago, the squad is steadily being built back up. Like Renault, a more balanced exploitation of its upgraded facilities is needed.



Riders



CARLOS SAINZ
AGE **25** LAST YEAR **6**



LANDO NORRIS
AGE **20** LAST YEAR **11**

McLaren
Woking, UK LAST YEAR **4**

MARK HUGHES: Until its new wind tunnel is online (mid-2021) McLaren can't realistically challenge the big three. But remaining 'best of the rest' in its final season with Renault would be an achievement, while eradicating some of 2019's 1.2sec deficit to the front of the field.



DANIEL RICCIARDO
AGE **30** LAST YEAR **9**



ESTEBAN OCON
AGE **23** LAST YEAR **N/A**

Renault
Enstone, UK LAST YEAR **5**

MARK HUGHES: Renault underdelivered technically in 2019, with an aerodynamically flawed car, despite it being created within hugely upgraded facilities. Nothing less than a clear 'best of the rest' and obvious gains would be acceptable to the parent company.



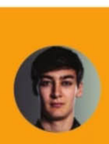
KEVIN MAGNUSSEN
AGE **27** LAST YEAR **16**



ROMAIN GROSJEAN
AGE **33** LAST YEAR **18**

HAAS F1
Kannapolis, USA LAST YEAR **9**

MARK HUGHES: Haas believes it understands why last year's car was such a disaster on race days. With unchanged aero regs, it should be in a position to reassert itself among the head of the midfield – which is where McLaren, Renault and Racing Point all expect to be, too...



GEORGE RUSSELL
AGE **22** LAST YEAR **20**



NICHOLAS LATIFI
AGE **24** LAST YEAR **N/A**

Williams
Grove, UK LAST YEAR **10**

MARK HUGHES: Getting back to a footing of technical respectability after two utterly desolate seasons is the only realistic target for this one-time colossus of a team. Just getting into a position where it's not an automatic Q1 casualty would be a good starting point.

2020 Calendar

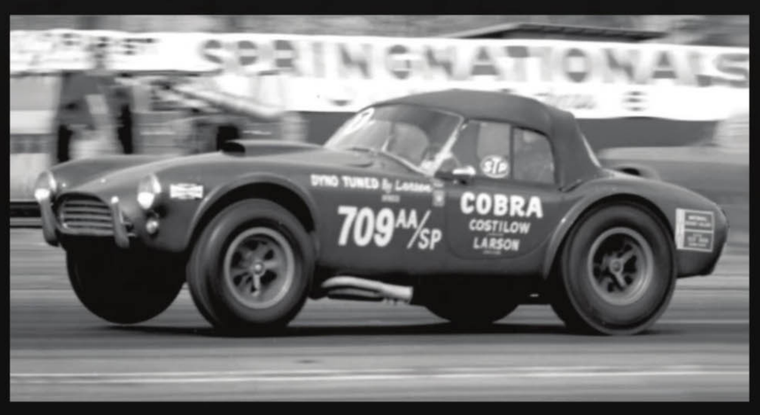
1	15 MAR	AUSTRALIA	Melbourne
2	22 MAR	BAHRAIN	Sakhir
3	5 APR	VIETNAM	Hanoi
4	19 APR	CHINA	Shanghai
5	3 MAY	NETHERLANDS	Zandvoort
6	10 MAY	SPAIN	Barcelona
7	24 MAY	MONACO	Monte Carlo
8	7 JUN	AZERBAIJAN	Baku
9	14 JUN	CANADA	Montréal
10	28 JUN	FRANCE	Le Castellet
11	5 JUL	AUSTRIA	Spielberg
12	19 JUL	GREAT BRITAIN	Silverstone
13	2 AUG	HUNGARY	Budapest
14	30 AUG	BELGIUM	Spa-Francorchamps
15	6 SEP	ITALY	Monza
16	20 SEP	SINGAPORE	Marina Bay
17	27 SEP	RUSSIA	Sochi
18	11 OCT	JAPAN	Suzuka
19	25 OCT	UNITED STATES	Austin
20	1 NOV	MEXICO CITY	Mexico City
21	15 NOV	BRAZIL	São Paulo
22	29 NOV	ABU DHABI	Yas Marina

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NO REST BEFORE 2021



GETTY

With the 2021 technical revolution closing in, 2020 will not be a stop-gap, says **Lawrence Butcher**

The 2020 season marks the end of an era for Formula 1, thanks to the sizeable 2021 regulation changes, but teams will not be easing off this year. Preparations for 2020 began well before last season had concluded, and the cars rolling out at Barcelona in February will be the culmination of 12 months of development, representing a carefully choreographed dance between teams' various departments.

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Even as the 2019 cars were lapping the Circuit de Barcelona-Catalunya for the first time, some teams had already started work on concepts for their 2020 machines. A few may have begun in 2018.

Most teams will have what is known as a concept group - a small cluster of engineers dedicated to looking beyond the current season and forming a blueprint for next year's cars. The group will be tasked with picking through upcoming regulation changes, as well as any problematic areas with a team's current car. They keep in close touch with the technical director, responsible for an outfit's overall engineering strategy.

The early work will be broad-brush ideas, parameters to guide the later detailed designs. The complexity of the engineering work undertaken will intensify as the season progresses, steadily drawing in more resources and feeding off data gathered during the current season. The aero department will be assessing concepts and weeding out those that show little promise, while other groups will focus on the structural or mechanical design of parts. Thousands of design drawings will be generated, with ideas undergoing many iterations before completion.

There will come a point where the bulk of effort will switch to next year's machine, depending on a team's circumstances. If it is locked in a tight race for championship points, it may choose to push development late into the season. Conversely, if its current car is a lost cause, or if its championship position is all but assured, it may switch focus to a new challenger early.

Resource is also important - a team with 800 personnel is better able to multitask than one with just 400. But either way, McLaren's technical director James Key says there is a balance to be struck for all teams. "You could prioritise one car over another and put a lot more focus on trying to ensure a stronger long-term future at the expense of the short term, but that's often very difficult to do in this sport. The key is to take a pragmatic approach, balancing the cars accordingly and making sure you can get the best of all worlds."



The dark art of carbon fibre moulding

The race to build a car

Complementing the engineering and design work is close coordination between many other departments. A vast matrix will be created that determines when each part needs to be signed off, manufactured, tested, and finally delivered to the mechanics in the build bays. Parts with a long lead time will start to be produced towards the end of the season, with the chassis and gearbox first on the list. One Mercedes team member noted: "We had parts of the chassis in the autoclaves on the day we celebrated the [2019] championship win here in Brackley."

If an important component is late, or a safety-critical part fails crash testing, it can halt car construction. One only has to look at Williams' tardy arrival at pre-season testing in 2019, crucially missing two days of running, to see how production delays can snowball. On the other hand, parts can be overtaken by new designs before manufacturing is finished, relegating the originals to expensive paperweights.

"The spectre of 2021 will loom large over teams"



Driver-in-the-loop simulators are increasingly key to F1's technical battleground



Winds of change: Mercedes' wind tunnel in action

There is a catch for teams that rely heavily on others for major components. Haas, Alfa Romeo and AlphaTauri (formerly Toro Rosso) take the bulk of their mechanical parts – power unit, gearbox, suspension – from other teams. These parts dictate much of a car's architecture and until they are signed off by those supplying them, customer outfits can't finalise their designs.

Simulated warfare

Alongside design work, teams will be modelling and simulating every aspect of a car, trying to predict its real-world performance. They are allowed just the two pre-season tests and a 'filming day', where 100km of running is permitted. The only track a car will encounter before this will be virtual. Simulation is a catch-all term but, in the context of F1, it means building mathematical models of car functions and running tests on those models, to mimic how a car will behave on track. The accuracy of these simulations, coupled to physical tests in the wind tunnel or on chassis rigs, has a significant impact on a car's competitiveness.

Most readers will be familiar with driver-in-the-loop (DIL) simulators, pioneered by McLaren. Not just for driver training and familiarisation, these are vital engineering tools. In simple terms, the driver becomes an input in a team's vehicle model. If a new aero concept provides amazing performance in the wind tunnel and other simulations but then makes the car too edgy for a driver to exploit, it is useless. The DIL will make this apparent before resources are wasted on physically making parts, in the same way that CFD reduces the number of parts needed for wind tunnel testing.

Up until 2019, Red Bull was widely considered to have the best DIL, but in 2020 McLaren is working to regain its position at the forefront of sim development. At the end of last year, Key explained: "Our new driver-in-the-loop simulator is a massive departure from what we've been using. [McLaren's existing sim is] still extremely effective and doing its job, but the technology has moved on... It's a completely fresh start."

Alfa Romeo has also finally joined the DIL simulator game, with the team installing one at its Hinwil base for the first time and filling an important hole in its engineering armoury. This will no doubt complement the outfit's expansion – ongoing since 2017 – to better capitalise on developments from its aero team and other departments.

Will Mercedes follow a Ferrari design trend?

The 2020 season represents relative stability from a regulation perspective. With no major changes, it is fair to assume that most teams' cars will be evolutions of their season-ending designs. Some trick details will become apparent once the cars are seen in the flesh, but there will also be a continuation of trends from 2019. Font wing designs will most likely continue to converge, and teams were out testing 2020 development wings during the closing races of last year.



Butcher's close-up snaps show the Ferrari/ Mercedes contrast

At the start of the season, there were two clear camps when it came to front wing concepts: that taken by the likes of Ferrari and Alfa Romeo, and at the opposite end, Mercedes. The latter, according to Mercedes technical director James Allison, was a result of the Silver Arrows' long-running philosophy of generating a lot of downforce at the outer ends of the wing, hence the full-height profile of the wing elements outboard. The disadvantage of this design is that it is difficult to generate outwash, a problem Mercedes managed to mitigate.

Ferrari and Alfa's tactic was very different, with their wing designs sharply sloping towards the endplate, forcing air outboard and the inner portion of the wing making the majority of downforce. This gave them greater control over the outwash, but with a potential loss of outright downforce. By the end of 2019, it seemed the Italian approach was finding greater favour, so 2020 should bring a further move in this direction. Whether Mercedes dumps its long-standing approach remains to be seen.

There were, however, some tantalising glimpses of Mercedes' potential development direction. A pre-season video of Valtteri Bottas's seat fitting showed the chassis mock-up, which looked quite different to that seen in 2019. It appeared the team was moving to a different sidepod layout, with the upper side-impact structure sitting lower on the 2020 tub than in 2019, which could indicate a move to Ferrari-style air management.

Power output will continue to converge. Ferrari arguably retained the upper hand at the end of 2019, but gone are the days where the field was separated by three-figure power differentials. Someone may find a step, as Ferrari did in 2019, but such gains are harder to come by now the power unit technology is mature. Honda and Renault are hot on the heels of Mercedes and Ferrari and a key performance differentiator will now be the efficiency of generating downforce.

Then there is the matter of tyres. Pirelli's 2019 rubber caused no small number of complaints across the field, Haas being a clear example of the troubles that befall those who can't get the tyres into their operating window consistently. But despite the option of new compounds for 2020, teams have been refining their tyre models through the season and voted to stick with the existing formulations.

DAIMLER, LAWRENCE BUTCHER

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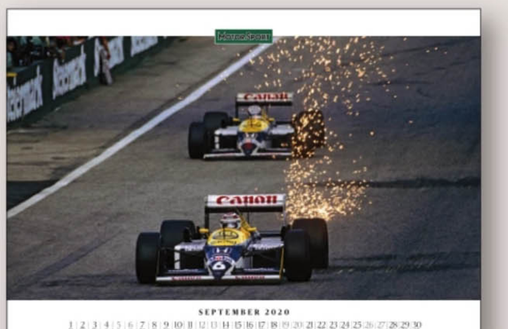
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The tight midfield battle

It is unlikely that anyone will gatecrash the top three in 2020. But if Honda continues its rapid development with Red Bull, and Ferrari gets on top of its organisational and strategic issues, the fight at the front could be a tight one. But how the midfield battle shakes out is anyone's guess. A fraction of a percent in performance can mean the difference between fifth and 15th.

Racing Point was in administration at the exact time it should have been finalising its 2019 car design, right before the outfit was saved by Lawrence Stroll's consortium. The new investment came too late to remedy the immediate deficit. As a result, the 2019 car was, according to technical director Andy Green, just an update of the 2018 VJM1, meaning 2020 will be "the first true Racing Point car."

Extra staff have been brought in, a new factory is being built and, significantly, Racing Point's wind tunnel testing has switched from the Toyota facility in Cologne to Mercedes in Brackley. Racing Point also completed a major update to its CFD cluster.

McLaren's fightback continues as



changes to the engineering department, spearheaded by team principal Andreas Seidl and Key, start to pay off. As well as the simulator upgrade, there's a new wind tunnel on the way and pitstop equipment. Notable is the rearrangement of the team away from the matrix management structure of Ron Dennis, the consensus being that this led to inertia with no one individual taking responsibility for the engineering direction.

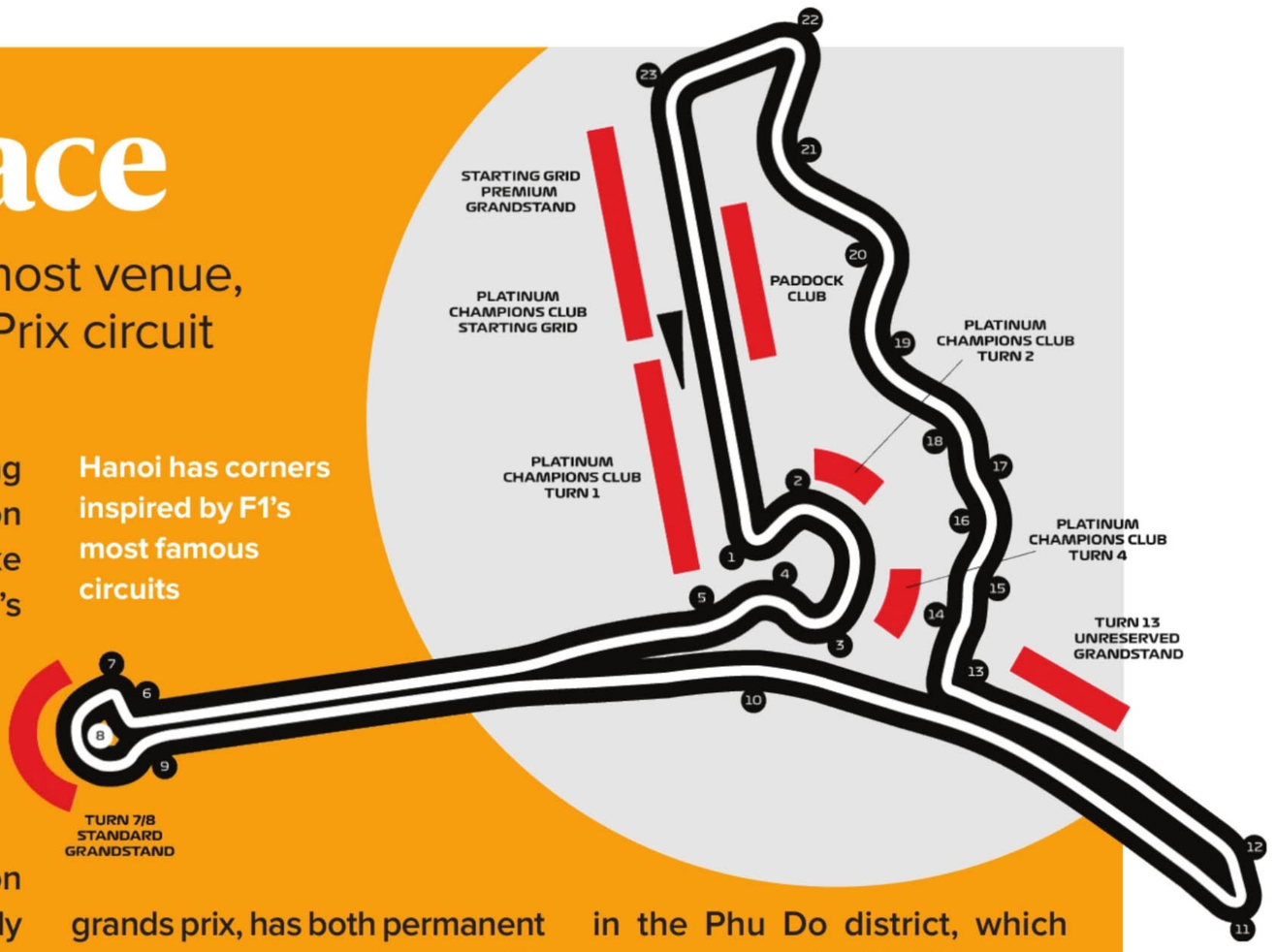
There will be many interesting plotlines elsewhere in 2020. Can Williams pull itself out of its downward spiral? Former engineers from the team hint that Williams has been unwilling to change some of its ingrained methods, but now Patrick Head has returned to the team and Claire Williams has spoken of a "new culture" in 2019. But it remains to be seen, with no clear engineering leadership, whether the team can rebuild.

Renault has a point to prove, not least to its board. It has had huge investment in facilities, and for 2020 the engineering management has undergone a shake-up. Long-time technical director Nick Chester and aero specialist Peter Machin have left, replaced by the returning Dirk de Beer. Ex-McLaren man Pat Fry has also joined. But the new signings will have had little chance to influence the 2020 car. Renault's target should be regular podiums, but the manufacturer still has a mountain to climb (a 1.4-second average deficit in qualifying to Mercedes in 2019), and it cannot afford to be trumped by its engine customer McLaren two years in a row.

Meanwhile, the spectre of 2021 will loom large over teams. Massive change is coming, and most will already be hard at work on their car concepts. Any outfit switching focus too late, choosing the short-term gain of 2020 championship points, could well spend the next half-decade playing catch-up.

F1's new street race

As Hanoi edges closer to being ready as a host venue, **Stewart Bell** visits the new Vietnam Grand Prix circuit



Vietnam may not be known for its motor racing pedigree, but it is set to become key to F1's plans to launch into Asia. When the country's first grand prix around the streets of Hanoi happens in April, it is hoped it will act as a springboard to a new market.

The first impression is that the new circuit layout is nothing if not bold. It opens with a Nürburgring arena-style complex, and then has two parallel straight sections linked by a sweeping 1.5-kilometre back straight, and a challenging final sector with corners reminiscent of Monaco, Suzuka, and Sepang. The 5.607km lap's top speed trap is expected to clock in at 335kph (208mph).

To the purists, the layout might look audacious, but it's been designed for better racing after much closer collaboration between circuit designer Tilke Engineers & Architects and F1's motor sport division.

"I think that this is the first time they have worked so closely with each other to develop such a track," says Vietnam Grand Prix Corporation CEO Ms Chi Le Ngoc, exclusively to *Motor Sport* at the promoter's Hanoi office.

"I understand Ross Brawn has followed the development and design of our track very closely. I mean, who's better than Ross Brawn to do this job? He knows what makes a track exciting, and for all the drivers to showcase their skills."

The Vietnam GP street circuit, like the Australian and Singapore grands prix, has both permanent and temporary sections – with the pit straight, pit building and the final sector from Turns 12-22 remaining after the event. The opening arena complex and parallel straights from Turns 5-12 uses existing arterial road Le Quang Dao, along which are both shopping centres and commercial buildings.

Hanoi has corners inspired by F1's most famous circuits

The majority of the track, including Turns 10-12, is actually in the Phu Do district, which encompasses the 40,000-seater My Dinh National Stadium that the track pivots around.

"If we bring F1 to Vietnam it will be the biggest chance for us to showcase Hanoi and Vietnam to the world," Ms Chi says. "And last but not least, we want the Vietnamese people to have a chance to attend something so big, on a scale that Formula 1 grands prix offer."

DAIMLER, FOM

“Destiny is

Almost 13 years after world rallying lost an icon, a new member of the McRae family got a chance to step into his famous uncle’s boots. **James Mills** watched on

PHOTOGRAPHY: JACK PASSEY

calling me”

IT'S 1995, AND COLIN MCRAE HAS JUST become Britain's first World Rally champion and the youngest driver ever to clinch the title. Fast forward nearly 25 years, and here comes his nephew, Max, a third-generation driver from the McRae stable, with his sights set on following uncle Colin, father Alister and 'Gramps' Jimmy into the sport their family name is synonymous with.

Max is powersliding his way through a gravel stage at Walters Arena, the rally stage and test venue, just half an hour north east of Swansea. The 15-year-old hopes to follow in his uncle's tyre tracks and is spending time driving some of Colin's old cars.

Not any old cars, like the clapped-out Ford Capri 1300L, in brown paint with a vinyl roof, that was Colin's first car after passing his driving test. The three machines represent the three most significant stages of Colin's career: a Subaru Legacy RS, and Impreza and Focus World Rally Cars.

This year, Max will undertake a season of racing in the Western Australia Formula 1000 series. But he says his heart is set on rallying, and he'll be driving at the McRae Rally Challenge, in October at Knockhill. "I hope destiny is calling me for rallying. That's really what I want do with my life. For rallying, I'd be willing to do anything, even leave Australia and come back to Britain. It's a really special day, especially to be driving that car with the McRae name on it."

At home he has a collection of scale models of all the cars Alister, Jimmy and Colin have competed in. And with mentors such as Alister and Jimmy on hand, the teenager says he has a strong work ethic. "Dad's always telling me to put the extra effort in to anything I do. He says, 'If you put the effort in, you get what you want, and hopefully, get your dreams.'"

One of those dreams is coming true today, as he gets to drive the selection of McRae machinery. First is a Subaru Legacy RS, the car that put McRae firmly on the map of the British and, later, international scene. Or rather, the car maker that McRae put on the map.

Then there's a 1997 Subaru Impreza S3, the first WRC-spec Impreza that Colin used to win five rallies. It's perhaps the model most associated with McRae having been the cover star of the original *Colin McRae Rally* video game series. And finally, the one that's caught the attention of Max, a Ford Focus RS World Rally Car from 2001, the year he won three rounds and finished ▶

"Rallying is what I really want to do with my life... I'd do anything"

Jimmy McRae: Colin's father, five British titles

Alister McRae: brother, and accomplished driver

Max McRae: 15, and Colin's nephew

Subaru Impreza S3 Colin drove to five wins in '97

Ford Focus WRC Fourth on Monte '02, crashed in Corsica

Subaru Legacy Colin starred with second in Sweden '92



The Welsh stages provided a blank canvas for youthful enthusiasm













JACK PASSEY, MCKLEIN,

Max gets acquainted with his uncle's famous surroundings



Alister had the emotional honour of taking Colin's place at the Race of Champions

Life after Colin

Back in 2007, the rallying world was rocked by the loss of its leading light. But the public response gave the McRae family strength

Four days after the funeral for Colin McRae and Johnny, his five-year old son, was held in Daldowie Crematorium near Glasgow, there was a celebration of life service for them, Graeme Duncan – an old friend of Colin's – and Ben Porcelli, one of Johnny's friends. It was held in Lanark, a small town of about 9000 people, south of Glasgow and home to the McRae family. The streets were overrun by well wishers, who had travelled from far and wide. As many as 15,0000 people gathered to face the doors of St Nicholas Church, stretching back along the high street as far as the eye could see.

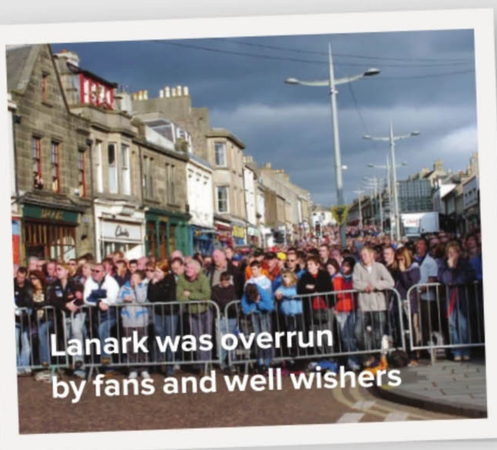
It was a moving spectacle. But then few had done as much as McRae to capture the public's attention and bring new followers to the sport.

"It was overwhelming," remembers Jimmy McRae. There are tears in his eyes. He and Margaret, his wife, have lived through every parent's worst fear. But that day's show of support meant more than any of us could imagine. "I don't think Colin would have believed that," adds Jimmy.

The loss was unimaginable, says Alister, Colin's brother: "It's obviously very tough. You can't really say how you come together as a family. It's just something that's happening to you; life can be terrible and you've just got to get on with it. But you don't ever get over it."

Three months after the fatal helicopter accident that claimed the lives of all four on board, Alister stood in for Colin, at the 2007 Race of Champions, alongside David Coulthard. He drove Colin's Subaru Impreza, and after stepping out the crowd delivered a standing ovation.

"That was probably one of the most difficult things I had to do. The support just showed what he meant to people," says Alister. He tails off, before stopping to compose himself. Almost 13 years may have passed, but the emotions will never be far from the surface.


Lanark was overrun by fans and well wishers




Colin conquered the world at the wheel of a Prodrive Subaru


From karts to the mud: Max McRae is already eyeing a career on the world stages







JACK PASSEY, MCKLEIN, SUTTON, LAT, PA

runner-up in the championship. The younger generation tend to connect with this one, having been used in the subsequent *Dirt* game franchise, one Max knows well.

The elder statesman, Jimmy, is in a mischievous mood. He half-jokes about how pleased he is that Alister now has the responsibility of paying for a son to go rallying. Having been through it, twice, he doesn't miss the financial commitment.

Because of his age Max has almost no recollection of being with Colin, but he says there are one or two memories of playing with his cousin Johnny. He looks up to Jimmy, his father and Colin and says he will try to live up to their performance.

Another driver Max looks up to is Daniel Ricciardo. "His local karting track was my local karting track. He's from my home town and he grew up with his parents not having a heap of money, unlike some other drivers." To date, Max's competition has been in karts, with a 2017 state championship to his name.

The family live in Perth, Australia. Max was taken to Perth airport by Tara, his mother, and travelled to the UK before being collected at the other end to come straight to the test. It's his first taste of the life of an international rally driver, and he's still a year away from sitting his ATAR exams – broadly equivalent to A-levels.

"I got a text from the school, saying 'Unexplained absence'!" says Alister. "Tara explained what was happening and they said, 'We can't give you permission to take your child out of school – but safe travels...'"

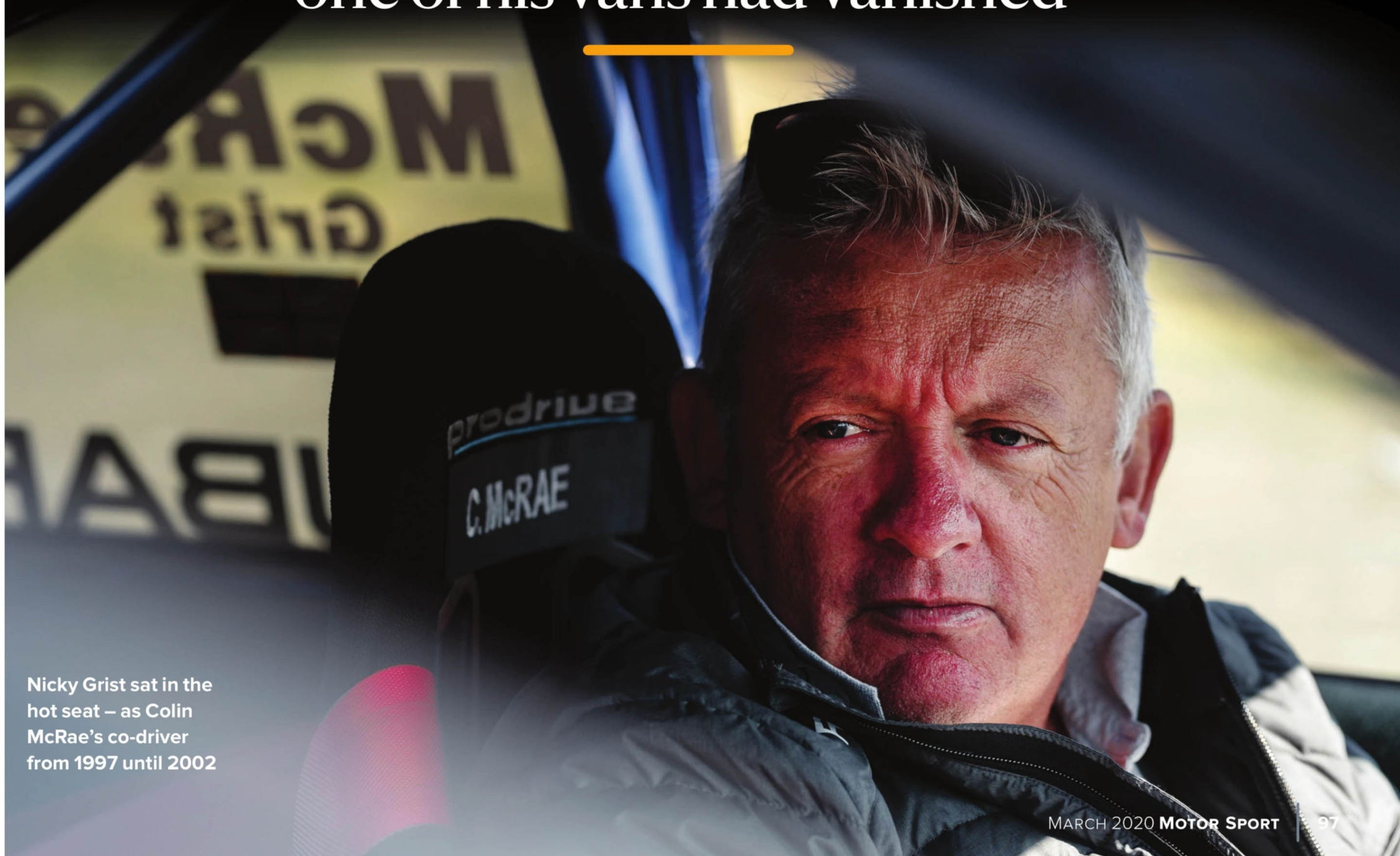
It all sounds rather familiar. Describing what it was like for him and Colin to grow up with a father who counted five British Rally Championships to his name, Alister tells of how it was always easy to convince dad to have a day off school, if there was a test day going on in Scotland.

After motocross bikes, by the time they were 12 or 13 Colin and Alister would drive old cars or vans around fields with friends. Occasionally Jimmy would get home to find one his company's vans had vanished.

Alister explains why motocross riding gives a good grounding for rallying. "It's good for finding the grip, looking and reading the roads and even balancing the throttle, controlling the brakes and everything you learn to keep it balanced."

And what of Max jumping into a WRC rally car, like the Impreza? How does Gramps think his grandson will cope?

"Jimmy would get home to find one of his vans had vanished"



Nicky Grist sat in the hot seat – as Colin McRae's co-driver from 1997 until 2002

"Although that car is 22 years old it's still very competitive; very good grip, very good engine. As far as handling the car it's not a problem. But it's left-hand drive, it's a very difficult gearbox with a dogleg and across the gate is at an angle. It's something that Colin developed and it's quite difficult to use it. But once you get used to it it's a far quicker change because of the angle.

"It's nice that it's one of Colin's winning cars as well," adds Jimmy, before getting onto the subject of the struggle that young drivers face to get a foothold in rallying.

As he puts it, the sport can do wonders for young people. But getting beyond club level is challenging: "I've been involved in the Scottish scene. You see these young drivers come in at 14, and they're shy and their mother is worried about them, and then they get into a car and just come out of their shell, mix with other people and learn how to be competitive."

Colin was one of those shy kids. Jimmy tells of how, whenever he got the chance, he would travel around with the service crew during the Scottish Rally. There are photographs of him when he was younger than Max, dressed in overalls – a part of it.

"At a certain age, you've got rich drivers with loads of money but no talent, and lots of young guys with loads of talent and no money. Take [new European Rally champion] Chris Ingram, and the struggles he faces to get through an ERC season. There are some teams that will charge you up to £150,000 per event before you've even paid for your own travel!"

The Subaru that Max gets to drive won the 1997 Safari Rally. Jimmy drove the recce car for Prodrive, another Impreza, and would relay stage notes back to Colin and Nicky Grist before they set off. At one point, Jimmy ended up checking on the conditions of a river, unsure whether it would be possible to cross it, when his car floated off downstream. "We were stuck for about two hours. In the end, Colin and Nicky and the team came out in the helicopter to get us out of there – and have a good laugh at us."

Colin earned the name Colin McCrash, but as Tommi Mäkinen, his greatest rival, once told Jimmy there were seasons where he'd have more accidents than Colin.

The Impreza that Max is driving is owned by Max Girardo. It sounds fantastic, looks spectacular off the line and seems calm and composed through the hairpins and assorted open corners of Walter Arena. Max is clearly enjoying himself.

By the end of the day, the third-generation driver is faster than Gramps but still some way behind Dad. That matters not one bit. What matters is that it has reinforced his desire to follow in the family footsteps and become a rally driver.

It's a long and winding road ahead. And millions of eyes around the world will be watching him. But to see another McRae compete at the forefront of rallying would be something very special indeed.

"To see another McRae compete at the forefront of rallying would be very special"

Max sampled the Subaru Impreza WRC that Colin will always be associated with



M-Sport's new line-up, and livery, has a very Finnish flavour

The state of play for 2020

The World Rally Championship is back with some headline changes. **Robert Ladbrook** looks at why this could be another golden year for the sport

Rallying is a sport better not viewed through rose-tinted glasses. While you may yearn for the days of heroes like McRae, Burns, Toivonen, Kankkunen and co., what we have now is arguably even better.

Group B is remembered as rallying's most dramatic era, but the current-generation WRC cars are faster, safer and just as spectacular. Don't believe me? Check out the videos from last year's Rally Sweden and see Ogier, Meeke and others taking flight off Colin's Crest...

But it's not just the jumps, crashes, bangs and wallops that are rejuvenating rallying, it's the diminishing winning margins and the tight competition the new cars have created. After years of domination by drivers called Sébastien – in either Citroëns or Volkswagens – rallying's new age is bringing back the unpredictability. Last year every rally was won by less than a minute, and only four of the 14 were over half that. In fact, the average winning margin across the entire year was just 23.9 seconds.

"I think the sport now is closer than it has ever been," says M-Sport Ford team boss Richard Millener. "I know we're always looking for the next McRae and the next golden era, but we're enjoying one now.

"The way I look at it, if you compare the times at the finish of a WRC event to something like F1, rallying is often closer... and if you think of what we're doing – running events over 300km – compared to circuit races, that's incredible and shows how tough winning a world rally actually is."

It's even tougher when we have three truly stand-out drivers – Séb Ogier, Ott Tänak and Thierry Neuville – all fighting it out in cars that are technically incredibly similar. Citroën may have been and gone (again...), but Ogier is now mounted in a Toyota, with Neuville in his usual Hyundai, and reigning champion Tänak now trying out the sister i20 for size. M-Sport will field a new Finnish line-up of Esapekka Lappi and Teemu Suninen.

"The drivers are also so close at the moment," adds Millener. "You could argue there's a distinct top three of Ogier, Neuville and Tänak, but they're so evenly matched, and there's a host of others always catching them up, with our guys at the forefront of that. Even drivers with limited experience can post the odd great time, but the skill is learning to do it over three days. Previously a driver could have been 3min behind on day one, and still win. That's impossible now, as we're looking at 2-3sec between the top three."

"What we have now is good for the WRC. Audiences have increased, as have on-event spectator numbers, and we're seeing the knowledge of rallying generally grow. WRC All Live [the WRC's streaming service] has been a great tool to boost that."

M-Sport will fly the flag for British teams, but the driver situation has changed. With Kris Meeke out, Elfyn Evans is the big home hope, and now he's in a Toyota... opposite Ogier.

"It's the biggest test of Elfyn's career," adds Millener, who has overseen each of Evans' 86 WRC starts with M-Sport Fiestas. "He's with a factory team at the top level, and he knows he'll have to perform. The danger is, if you don't succeed in the first year or two, it can be career over. But we all know Elfyn can do it, and we want to see him do it. He'll always be part of the family."

And there will be a new Brit this year, with Gus Greensmith securing a nine-rally programme with M-Sport. He made his WRC debut last year in Portugal, before deputising for the injured Evans in Finland and Germany, doing enough to earn a shot.

"I'm not as expected to deliver points, so I can go at it flat out and take risks and see where I can end up at the end," he says confidently. "But who knows? If I drive well enough those nine rallies could grow. But I'm just thinking of this year rally by rally."





It's Tänak vs Neuville at Hyundai, and Ogier vs Evans in Toyotas as part of the new-look line-ups

GREEN

F1 faces a fight to prove it can adapt in the face of environmental pressures. **Dominic Tobin** argues that the solution to the problem lies in the sport's past

Sign of F1's future? Audi's red-hot DTM engine trials low carbon fuel in 2019

POWER

LATER THIS YEAR FORMULA 1 WILL release its first fragrance collection. And you can bet that the heady aroma of burnt fuel won't be one of the scents placed on the shelf.

Previously revelling in high-octane entertainment, F1 is now facing questions over its future existence.

Bans on the sale of new conventional petrol and diesel cars are approaching, so manufacturers and sponsors are more likely to put money into Formula E than F1.

The young audience that F1 is desperate to attract are concerned about the world in which they'll grow up in. Where does that leave a championship that uses seven jumbo jets to transport cars around the world – to then burn fuel at each destination?

Rejecting managed decline or a new electric future, F1 has chosen an emissions-free direction, hoping thereby to retain the excitement, engines and noise. It's the equivalent of vegan burgers for the green-minded gourmands: F1 without the guilt.

From 2025, we could be seeing cars powered by two-stroke engines, using a zero-carbon fuel, which are more eco-friendly than Formula E racers.

F1 won't just leave its mark with dark strips of rubber on the track – although those will remain – it will also fund eco-projects in each country that it visits to offset carbon emissions it can't avoid.

Last year, F1 published a strategy to become carbon-neutral by 2030, which included team factories using renewable energy and a single-use plastic ban at races.

Now *Motor Sport* has learned more of F1's plan to reduce emissions on track: engine exhaust fumes account for just 0.7 per cent of the 226,551 tonnes of CO_2 emitted during each season, but they are the most visible part.

New engine regulations are due to be introduced in 2025 or 2026 and will bring major change, says Pat Symonds, F1's chief technical officer.

"I'm very keen on it being a two-stroke," he said last month. "Much more efficient, great sound from the exhaust, and a lot of the problems with the old two-strokes are just not relevant any more."

Symonds' words, at a green motor sport conference organised by the Motorsport Industry Association, came out of the blue.

Few would think of two-stroke engines as eco-friendly, given their smoky

The two-stroke engine was examined in a 1933 issue of *Motor Sport*



MOTOR SPORT 86 DECEMBER, 1933

A FOUR-CYLINDER TWO-STROKE RACING ENGINE

Full details of the Jameson power-unit, and of the two cars to which it has so far been fitted.

THE even torque and high theoretical efficiency of the two-stroke engine has engaged the attention of numerous inventors, but the practical results so far attained have been a little disappointing. With the three-port engine using crank-case compression, an asymetrical piston with a deflector head has to be used, scavenging is poor, and trouble is experienced with oil being sucked in with the mixture. A supercharged engine is the obvious solution, and the improvements which have lately been effected in these components makes them suitable for everyday use.

The Jameson engine employs an almost spherical combustion chamber, and the top of this is closed by a piston-type inlet valve. This is operated by a crank-shaft which runs along the top of the engine, and the valve is extended so that it passes round the shaft and carries a gudgeon pin at the top. A short connecting rod communicates the motion of the crank-pin to the valve. This arrangement gives a long dwell at the closed and open positions, and a quick opening and closing, which is the ideal timing for an inlet valve. The inlet ports are conical in shape, and the energy lost in compressing the mixture is regained when it escapes into the cylinder. Two 14 mm. sparking plugs are used, and the domed top of the piston, which carries three rings, projects into the combustion chamber. The exhaust ports are disposed on each side of the cylinder, and are uncovered by the piston just before the bottom of the stroke.

The centrally placed inlet valve gives good scavenging, and the design of piston and combustion space induces a high degree of turbulence, so that straight petrol may be used with a compression ratio of 7 to 1. A 500 c.c. engine built by the Jameson Engine Company gave the remarkable output of 52 horse power at 5,000 r.p.m., and unlike most high-speed two-strokes ran steadily down to 300 r.p.m.

The Jameson Company are now building 4 cylinder racing engines with a capacity of 996 c.c., this size being chosen in case the A.I.A.C.R. should regard the 100 c.c. displaced by the piston valves as part of the swept volume. Running on petrol-benzol the power output fulfils the high promise of the single cylinder engine, with readings of 72 h.p. at 3,500 r.p.m., and 110 at 4,800 and is expected to give 140 at 6,000 r.p.m. These figures are well in advance of anything which has been obtained with a four-stroke engine of similar capacity.

The four-cylinder engine employs the same lay-out of inlet valve and cylinder as that used on the single-cylinder, but two vertically disposed superchargers are used, their castings being embodied in the cylinder block, one at each end. The block and crank-case form a single casting, and the crank-shaft is carried in five roller bearings.

The housings are split in the same way as is the practise with white metal bearings, and a solid crankshaft with disc webs is used. The throws are arranged in pairs at 180 degrees, the forward and the back pairs being arranged at 90 degrees to each other. The firing order is 1.4, 2, 3 and the torque is equivalent to that of an eight-cylinder four-stroke.

Rollers are used for the big-ends, which are split like the main bearings. The little-ends run on needle-bearings.

The rear supercharger is bevel-driven from the crank-shaft, and a further bevel drive at its top end operates the overhead crank-shaft for the inlet valves. A cross-shaft drives two magnetos. A further bevel-drive at the front end drives the forward supercharger, which is not directly connected with the crank-shaft. Besides its normal duty of pumping the mixture, this blower steadies the overhead mechanism.

The engine has an inlet and an exhaust pipe on each side, and it has been found, as was the case with the old racing Scott motor-cycles, that efficient silencers add to the power-output.

A finned aluminium sump is fitted, but this merely acts as an oil-collector, as dry-sump lubrication will be used. There is a large oil-pump driven off the rear crankshaft bevel, and a water pump is fitted at the front end of the engine. A dynamotor is coupled direct to the front end of the crankshaft.

The engine with a cast-iron block and

The Jameson Special is a big car for its engine capacity of 996 c.c. Its robust chassis, with powerful brakes, should make it equally suitable for road or track.

A view of Mr. W. Fenson's workshops. The two racing cars in the foreground are Mr. Henrique's Riley and Mr. Conan Doyle's 12-cylinder Delage. Two Jameson Specials can be seen in the rear.

reputation and long absence from top-level motor sport. Two-strokes disappeared from motorcycle racing in the MotoGP era, and barely featured in grands prix.

It's not for lack of trying: the efficiencies of an engine that takes just two strokes to complete a cycle, rather than four, brought a flurry of early attempts to make the technology work. The offbeat Trossi-Monaco took its lead from aviation, with eight banks of 16 cylinders arranged in a radial formation at the front but the airflow couldn't overcome the overheating issues that come with the design. It failed to race at the 1935 Italian Grand Prix.

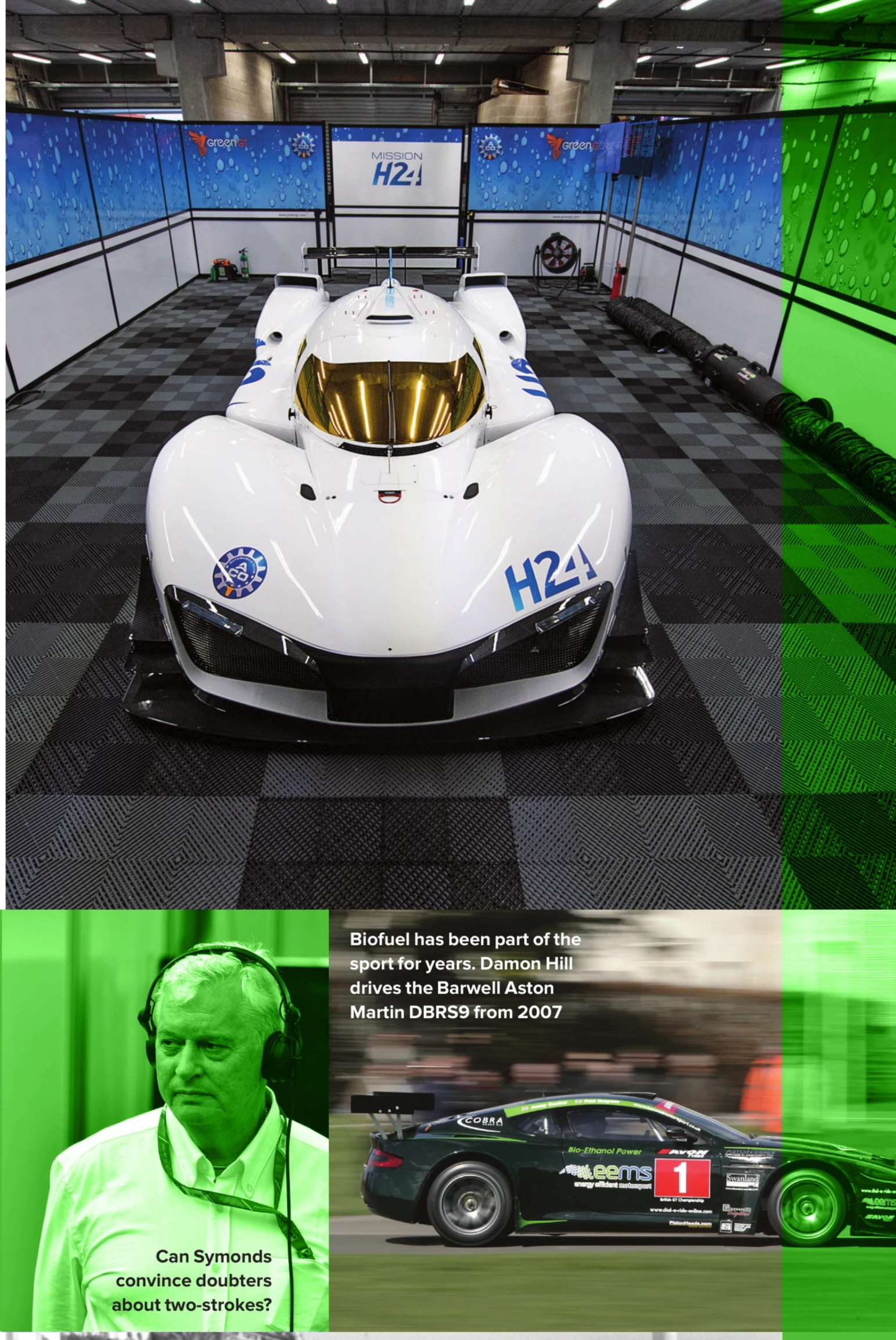
That happened a year after Sir Malcolm Campbell couldn't fire up the two-stroke-powered Jameson Special that he was due to drive at Brooklands.

A two-stroke Alva-DKW did win the Boxing Day John Davy Trophy for Formula Juniors in 1959, but there's been little since to suggest that two-strokes are the future for F1.

Red Bull's motor sport adviser Helmut Marko said that he was surprised by Symonds' "carnival speech" comments, adding that he would discuss the proposal with his engineers.

But the advantages of two-stroke engines, their lightness and efficiency, remain and Symonds is convinced they have a role.

"It's reasonably obvious that if you are going to pump that piston up and down, you might as well get work out of it every time the piston comes down rather than every other time the piston comes down," he said. "The opposed-piston engine is very much coming





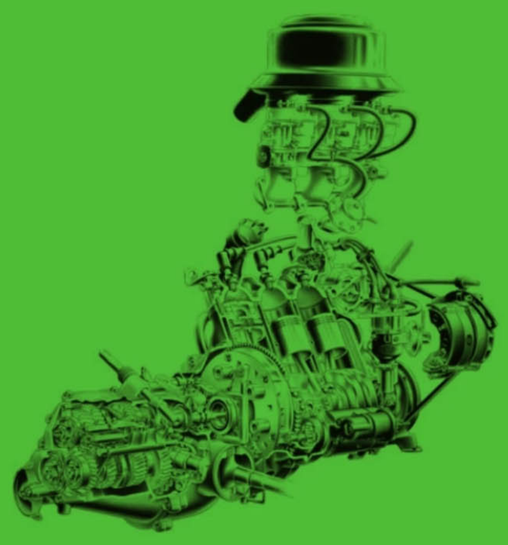
Can Symonds convince doubters about two-strokes?

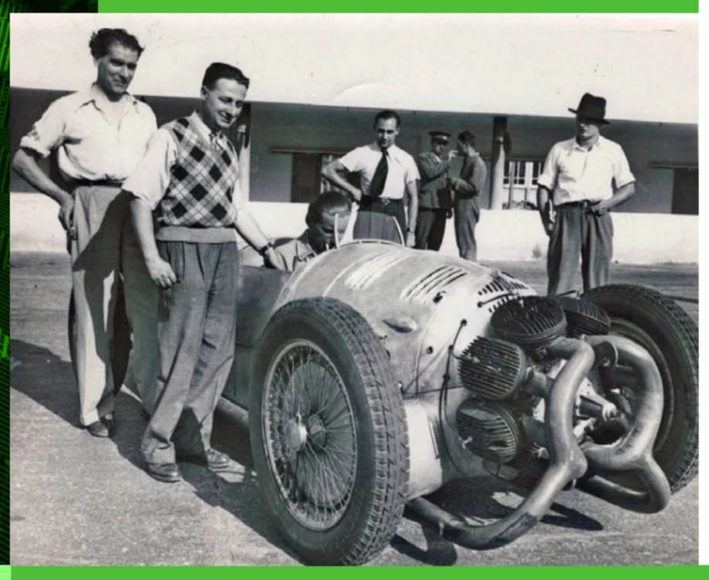
Biofuel has been part of the sport for years. Damon Hill drives the Barwell Aston Martin DBRS9 from 2007



Saab and star driver Erik Carlsson relied on two-strokes in rallying. Here's the Swede's 96 on its way to victory in Monte Carlo in 1963

MOTORSPORT IMAGES, SUTTON





Left: The H24 hydrogen Le Mans prototype. Below: The 1935 Trossi-Monaco had a 16-cylinder, two-stroke engine.

F1 in 2030

Two-stroke engines Currently just a proposal – albeit backed at a high level: technical advances could bring the efficiency benefits of two-stroke engines, without the downsides.

Synthetic fuel Pulling carbon out of the air to make into green fuel could transform F1's image and go a long way to shrinking its vast global transport carbon footprint.

Front-wheel energy recovery Recovering energy usually lost under braking boosts electrical power. There's less demand on brakes, so they can be made from materials that produce fewer particulates.

Greener tyres – restricted use Racing tyres are responsible for more carbon emissions than engines. Expect a greater focus on green compounds and tighter restrictions on the numbers being used per weekend.

Tyre warmers F1 hasn't banned tyre warmers yet, but the writing's on the wall. They produce up to 860kg of CO_2 each race weekend.

back and already in road car form is at around 50 per cent efficiency.

"Direct injection, pressure charging, and new ignition systems have all allowed new forms of two-stroke engines to be very efficient and very emission-friendly."

There are still several years for F1 to argue, discuss, then argue some more about the specification of the next-generation engine, so two-strokes are far from being a done deal.

Whichever engine is chosen will be a hybrid. Motors are likely to be fitted to the front wheels to recover energy under braking. This also reduces the brake load, allowing carbon-ceramic brakes to be used in place of the current carbon components, which produce high levels of particulates. Using the motors for four-wheel drive is out of the question, though, according to Symonds.

Water injection could be used for more efficient combustion, and exhaust treatment is set to improve, reducing toxic emissions.

Symonds wants to set up a working group to develop the specification, in the same way that the 2021 chassis rules were drawn up.

It's likely that tighter restrictions will limit areas where teams can innovate, with the aim of cutting costs and tightening the competition. The teams will be encouraged to develop specification parts collaboratively.

F1 is also looking to pioneer the use of synthetic fuel made in a laboratory, rather than being drilled out of the ground and refined.

Small-scale facilities have already shown that they can filter carbon out of the air and combine it with hydrogen to form the hydrocarbon chains that make up fuel.

When it's burnt, that same carbon is then released back into the atmosphere. If surplus renewable energy (wind farms can produce more energy than is needed on a blustery day) is used to make the fuel, the process can be made largely carbon-neutral.

The chemical formula can be altered to replicate existing fuel. But increased benefits come when the engine is designed with the fuel, allowing the use of greater compression ratios and improving efficiency.

Factories to produce the fuel industrially are under construction and Symonds believes that F1 could use it within a few years - despite a higher cost. "As soon as there is enough around we should be doing it and we're not that far away from what we need," he says.

In time, the planes that transport F1 around the world could also run on the fuel.

Limited production and higher cost means that it's unlikely to appear at fuel pumps soon, but the potential is there to make all road cars carbon-neutral at a stroke - with political help.

EU rules stipulate average carbon dioxide emissions for new cars should not exceed 95g/km. The easiest way for manufacturers to meet the target is to sell more electric cars.

However, these figures don't take into account the emissions released when producing vehicles: several studies suggest that making an electric car produces more carbon than a conventional one.

"This will be rethought again in 2023 - hopefully in the right direction," says Ulrich Baretzky, director of Audi Sport engine development, and the man behind the petrol and diesel engines that secured 13 wins for Audi at Le Mans. "Then electric vehicles will be dead - or some of them.

"They also want to rethink the decision not to adopt renewable fuels as a [measure for] reduction for CO_2, which is now the law unfortunately: absolute bulls**t."

Baretzky has already trialled using an alternative fuel in Audi's RS5 DTM taxi car in a trial at Hockenheim last year. He says the internal combustion engine's future is secure.

So that exhaust crackle is set to continue beyond the next decade. Hydrogen-powered cars are already under development, with the fuel cell-powered GreenGT H2 running at Le Mans ahead of last year's 24-hour race. The gas can also be used in a combustion engine, with water being the only emission.

> "When manufacturing gets rethought, electric vehicles will be dead"

"It might be that the next power unit we produce is the last one we do with liquid hydrocarbons," said Symonds. "I think there's a very high chance that there might still be an internal combustion engine, but maybe it's running on hydrogen.

"I certainly think that the internal combustion engine has a long future and I think it has a future that's longer than a lot of politicians realise because politicians are hanging everything on electric vehicles.

"There's nothing wrong with electric vehicles, but there are reasons why they are not the solution for everyone."

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The closest you'll get

Only a select band of people know what it feels like to drive a Formula 1 car. But for the (mere) price of a hypercar you too can now experience those staggering g-forces. **Andrew Frankel** flew across the world to explore new limits

I'VE BEEN TRYING TO THINK OF A WAY that explains even adequately what we have here. I could tell you it's called the Rodin FZED, I might mention that it is a highly developed version of the failed Lotus T125 project. I could even tell you it's the closest thing to a reasonably modern Formula 1 car most merely wealthy rather than impossibly rich people might imagine being able to buy and run.

But that doesn't really do it. So let me put it another way. Let us imagine you're a decent driver, with some talent and experience driving quite fast racing cars, be they historics, or modern GTs. I reckon if you were just planted in this car and sent out on a private track, at best you'd learn nothing other than experiencing a new world record from going from zero to absolutely bloody terrified. At worst, well, let's not even think about that.

I've been testing and driving racing cars for half my life and I still needed a full day of hands-on education before my tutor felt I was ready even to drive it. It would be another day before I got to go flat out. And he was right. But before all that, I had to travel to meet it, not at Silverstone or Donington, but the other side of the world: New Zealand, no less.

The company behind this car is called Rodin, after the sculptor, and particularly his most famous work, The Thinker. And it speaks volumes about its founder David Dicker, a man who thinks a very great deal, all of the time.

Australian by birth, he decamped to New Zealand describing his homeland as "the most over-regulated place on earth". He loves New Zealand where, within reason, you can do what you like. Which in his case involves running unsilenced racing cars around his private race track. Or three private tracks if I describe accurately his extraordinary facilities in the north east of the South Island. One is the original track, one looks like a rollercoaster ride in race track form that I'm going nowhere near, and the third is a perfectly sensible 1.5-mile circuit with a good blend of fast- and medium-speed corners and a pleasingly long not-quite straight.

Up until that moment, I'd been tempted to think of the Rodin project as one of those nice ideas that occur to men of a certain age with a certain amount of disposable income, almost all of which never come to fruition.

But then I saw the tracks, the facilities, the machines, the staff and the cars and started to wonder if I'd not rather underestimated David Dicker. Then I was told about the $1.6 billion his company, Dicker Data, turned over last year; then I heard from the man himself.

David Dicker is self-made, a man who got bored in his father's air-con business and discovered he'd rather sail boats and race cars. He's 66 now, but quick enough to win the Am category of the Ferrari Asia Pacific Challenge series in 2018. He's reticent at first but start talking cars in general or F1 in particular and he warms up fast. What interests me is not his vast car collection or his split existence between NZ and Dubai. It's that unlike most wealthy people who have got that way through graft, risk-taking and exceptional business sense, Dicker is happy to talk about the mistakes he's made. He is astonishingly self-aware and it's that, more than his wealth, that makes me think his plan will work.

"I started late because I needed to be in a position to do what I wanted to do,"he says. "So many guys start these projects thinking they can do it for 'x', then find they need '2x', which they don't have. So they then either do things that hurt the business or, more often, they're screwed. History is full of them."

So now you may be surprised to learn that "what I wanted to do" was not the Rodin FZED quasi-F1 car I am nervously eyeing up in the garage. "It was never part of the plan, but one day I got an e-mail from Lotus wondering if I was interested in a car they'd made. I took a look at it and thought 'that might help'."

The car in question was the T125, one of many stillborn Lotus projects of the Dany Bahar era. You may remember it - Clarkson drove it on *Top Gear* when it was new in 2011. The idea was to create a car that delivered as close to a genuine F1 experience as possible, but which mere mortals could afford both to buy and run. A good idea but little came of it.

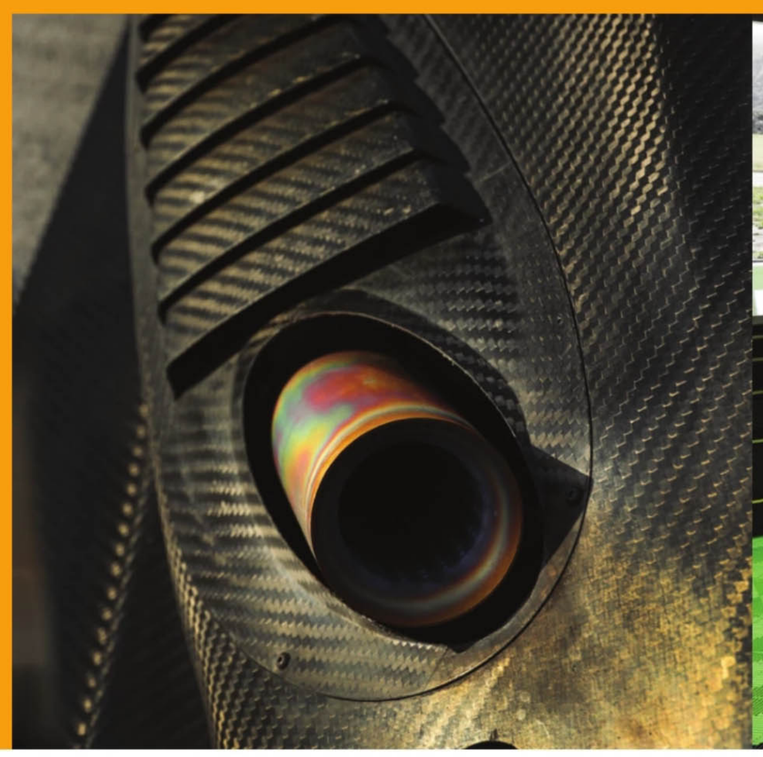
"I think in the end they sold five cars before contacting me," says David. He was interested because his grand plan was - and remains - far more ambitious than even the T125. He calls it FZERO, not because of its emissions - it's going to be powered by a 1000bhp twin-turbo petrol engine - but because it's designed with zero restrictions and because, as Dicker puts it, "what's one better than F1?"

And it's FZERO that shows the full scope of Dicker's ambitions: a closed-cockpit car ▶

"It will be called FZERO – because what's one better than F1?"



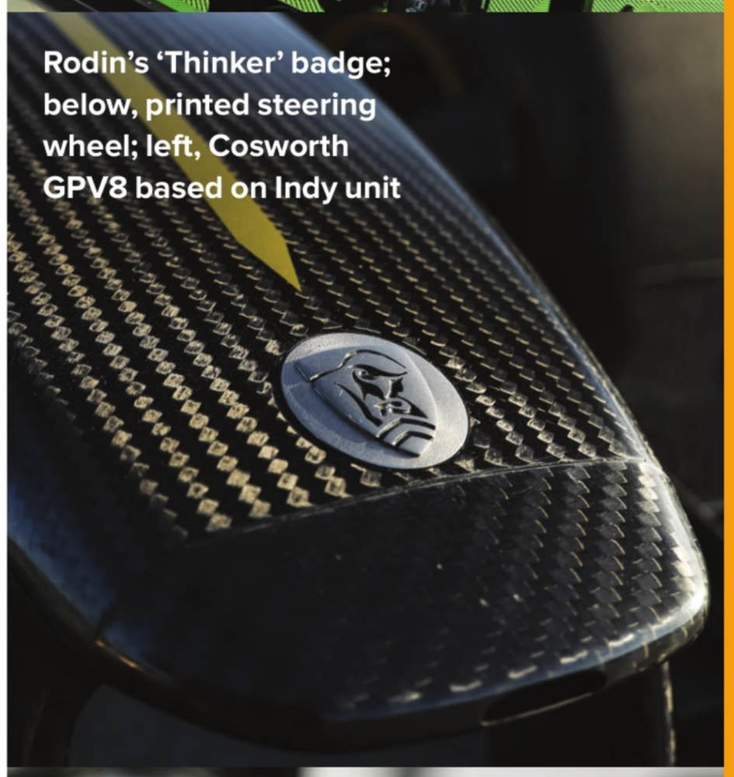
Born from a Lotus project, Rodin's FZED has been re-engineered for driveability and even greater performance





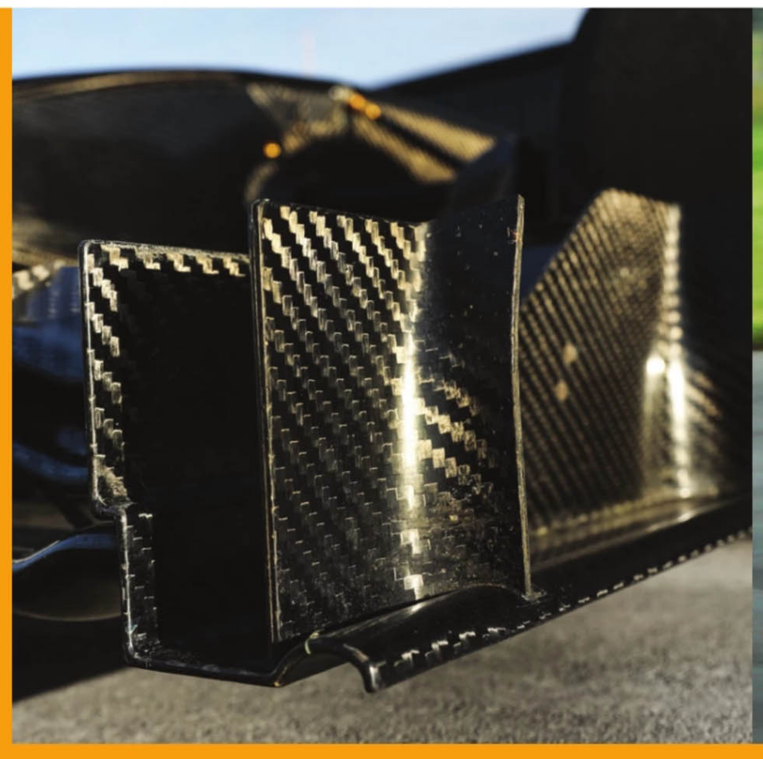
For a start-up firm Rodin's facilities are impressive





Rodin's 'Thinker' badge; below, printed steering wheel; left, Cosworth GPV8 based on Indy unit

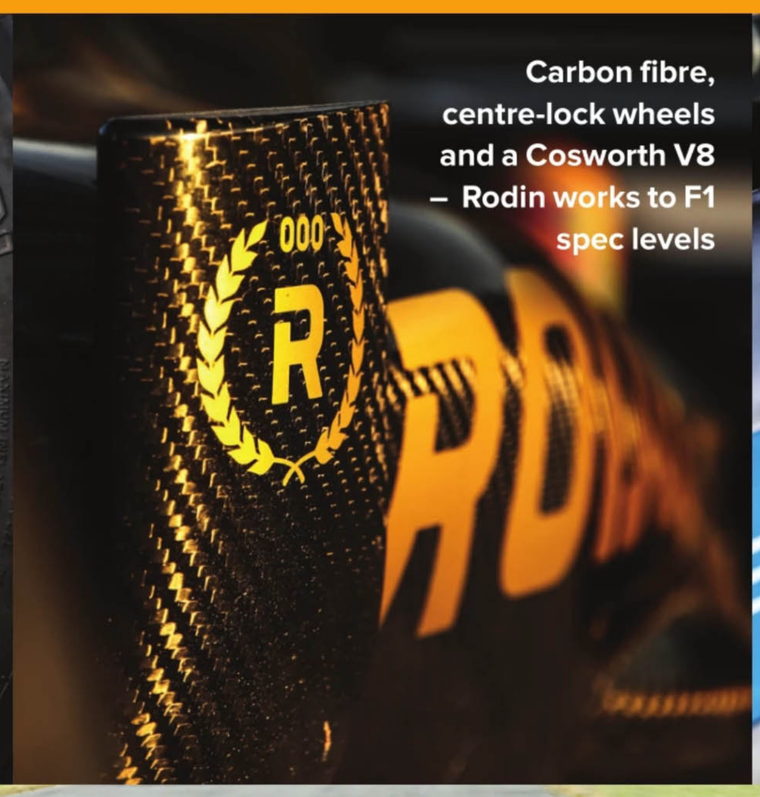






On one of Dicker's three tracks, the FZED displays adhesion and braking far beyond most people's experience





Carbon fibre, centre-lock wheels and a Cosworth V8 – Rodin works to F1 spec levels



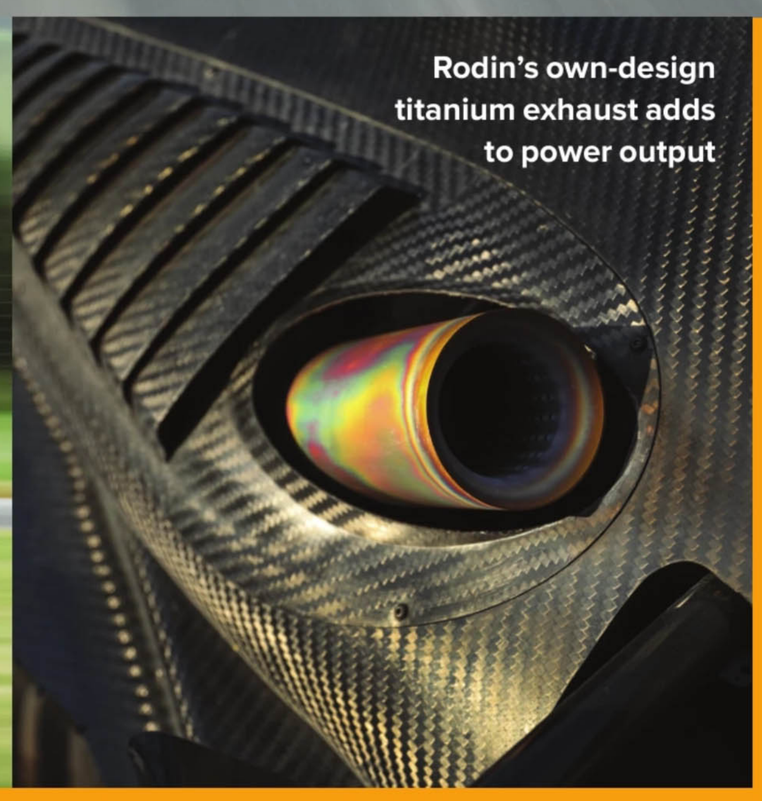
Slicks, wings and 675bhp – and you don't have to wait until raceday to drive it...





Carbon-fibre suspension arms operate inboard coilover shocks





Rodin's own-design titanium exhaust adds to power output

powered by a unique 4-litre V10 engine of Dicker's design that's being engineered for him by Neil Brown Engineering in Lincolnshire. Ricardo is creating an eight-speed gearbox for the car, again to Dicker's design.

There will be a normally aspirated version with a piffling 700bhp, while the turbo will start at 1000bhp but could go much further. There is talk of F1-busting lap times, 0-186mph in 10sec, many tonnes of downforce, a road-legal version and a price tag of $1m, which in Aston Martin Valkyrie and Mercedes-AMG One terms isn't that much. Indeed I don't think Dicker wants to make a killing on the FZERO, I think he just wants to show the world he can do it. And having spent three days with the man, I wouldn't bet against it.

But now attention returns to the FZED. And more lacerating honesty. "If I'd known what I was taking on, I probably wouldn't have got involved. It seemed like a good way to accelerate our knowledge base as we worked towards the FZERO. But the truth is if we'd not done the FZED, the FZERO would already be running." As it is we'll have to wait until later this year to see the finished product.

Dicker's particular problem with the Lotus was that it was horrible to drive. "You could barely get it out of the garage. Watching him stall it repeatedly on television was probably the only time I've felt sorry for Clarkson..."

So he went to work and two years later ended up with a car that looks similar to the T125, but is transformed underneath.

The first job was to lighten it, and because Rodin has some of the most sophisticated 3D printers in the world, it was able to carve 41kg from the 650kg T125. Everything from the steering wheel and seat to every individual fastening is now made from printed titanium.

The engine is a Cosworth GPV8, based on the XG IndyCar motor. It displaces 3.8 litres and had 640bhp at 11,000rpm in the Lotus. Now with a Rodin titanium exhaust it has 675bhp at 9800rpm; divided by 609kg of mass that's a power to weight ratio of 1067bhp per tonne, double that of a Bugatti Veyron. That's why it takes a lot of learning.

Rodin has an answer for that too, in the unflappable form of Mark Williamson, a 55-year-old Australian racing driver who's competed in everything from serious single-seaters to the GT4 cars in which he is still super-competitive today. His job is to get me match-fit for the FZED.

So we start in a GT4 McLaren 570S race car, which is one hell of a trainer. I'm using it to learn the track more than anything, but it's a fabulous weapon: fast, forgiving, monstrous on the brakes and pretty snappy down the straights, too. Mark sits next to me, shows me which way to go and tries not to wince.

The next step is a Dallara Formula 3 car. This is essential for understanding how a ultra-lightweight single-seater with significant downforce behaves. I've track-tested single-seaters, but this is different: I need to do more than just get a feel for the car, I must drive it as fast as I can.

It's not that nice. Its hand clutch is evil, the engine only works at full throttle, the steering is hideously heavy and I can't get my head around its brakes. And they're conventional steel discs. How will I cope with the full carbon/carbon set up on the FZED?

I was getting it all wrong. I knew I wasn't near the limit and I didn't have Mark next to me. He was meant to be talking over the radio but my brain was so focused elsewhere it could not discern a word.



"Earlier I wanted to run away from this car. Now I want to get going"

But it's amazing what a bit of time out of the car in the company of Mark, the data, the onboard camera and a packet of chocolate biscuits can do. And in my next stint I just trusted it would stop from where Mark said it would stop and go flat through corners that looked like they needed brakes and a downshift.

Then I began to understand. Just a little. Downforce like that is addictive and I can now see why drivers love it. It's not just the extra grip, it's the way it makes the car feel planted in a way that four patches of wobbly rubber never could.

So that was the tuition. But before I could drive the FZED, I needed a fitting. Initially I thought making a bespoke seat insert (where you sit effectively in a bean bag and mould its contours to your shape before resin is poured in and allowed to set) was just a bit of theatre. Now I know that without it you'd be so black and blue you'd feel like you'd been mugged.

I was told I'd find the ultra-reclined, knees-up driving position strange, but to me it feels natural. I was more worried about left-foot braking which, save the odd kart when I was a kid, is something I've never done. "You'll be amazed," says Mark. "You'll think about it the first time and not again. It's not even an issue." We'll see about that.

More concerning to Mark are the brakes themselves. "One of the great things about carbon/ceramic brakes is they don't need much heat to start working. They work better when hot, but they won't stick you in the wall on your out-lap. Carbon/carbon brakes will. Unless they are hot, you have no brakes.' He's so concerned that when we need to do 40mph tracking shots behind a camera car, he insists on driving. "It would be so easy to drive into the camera car. I'll use your helmet and no-one will notice..."

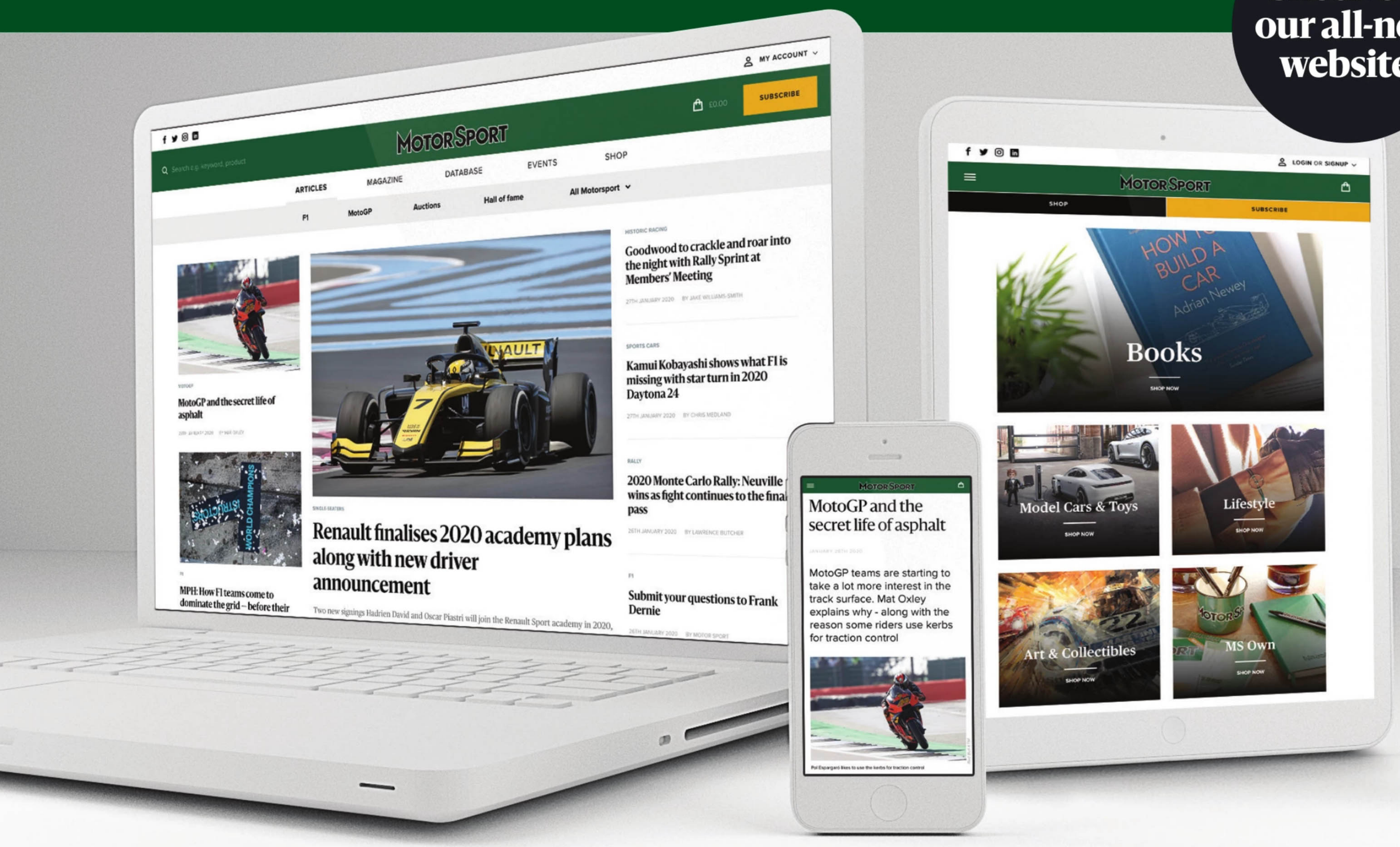
Finally it's time for me to drive and though I can't quite explain this, a strange calm descends on the cockpit. Thanks to the team's efforts I've never been more comfortable in a racing car. I know the track, I've done competitive times in the F3 car and the weather is good. Just 24 hours earlier I wanted to run away from this car; now I just want to get going. That's how good the training is.

The titanium steering wheel holds all the controls I'll need, and I won't need many of those. Someone plugs in the external starter, I catch the engine on the throttle and 3.8 litres of very angry Cosworth blasts into life. It reminds me of a DFV in an unusually bad mood. The enormous Avons have been in warmers for hours and are nicely cooked, so let's not waste time letting them go cold.

In so many ways the FZED is far easier to drive than the Dallara, at least until you try to go fast. On this initial, exploratory outing all I have to do is learn about the brakes and go sufficiently rapidly for the tyres not to fall off the end of the grip cliff. Initial observations are that the hand clutch is more progressive than the Dallara's, vibration levels are so reduced the FZED feels like an S-class, the steering is much lighter and if I want to use part throttle, it doesn't want to pogo down the track. It's all very reassuring.

Apart from the brakes. You stand on the pedal and nothing happens, which is quite disconcerting, and then the brakes come

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Rear venturis confirm that downforce is central to the Rodin experience

in so hard and fast your brain associates the deceleration with an impact. Which is more disconcerting still. I do a few laps using around 8000rpm – then head for the pits, smoothly using the clutch pedal to bring it to a halt, until I remember it doesn't have a clutch pedal and that's actually the brake I'm pressing which is why the car stalls 100 yards shy of the pit garage. Professional it is not.

In some regards driving this car feels like walking into a super-luxurious hotel room in a land far, far away: extremely welcoming, exceptionally comfortable, full of interesting stuff, yet still utterly unfamiliar.

More data, more biscuits. Mark says I've done really well; I suspect his public relations skills may be as great as his driving talent.

The following morning there are no more rev-limits. And like so many racing cars I've driven, once you drive it the way it's designed to be driven, suddenly it makes sense.

Of course the acceleration is shattering. A 0-100mph time of 5sec does no justice to it because traction limitations mean it would be on part throttle for most of the run. But you can get used to that. At the exit of slow corners where traction needs are highest and downforce is lowest you need to be careful about where you jump back on the throttle, but if you're progressive, or just wait until the car is straight, there's not much to fear here.

Corners are more difficult, especially if you have a background in historic racing. The apex speeds will make you laugh or gasp depending on whether the corner is slow or fast: once the downforce kicks in adhesion levels are far beyond anything I've known. But my insistence on playing with the throttle mid corner is in danger of landing me in trouble. Where I come from it's just what you do: pitch it in and sort it out. But in a car like this, constant minute pitch changes can play havoc with the downforce generated by the floor of the car, which is most of it.

> "You can be the fastest person at any track day anywhere in the world"

But even that I learned. Brake all the way in, smoothly accelerate all the way out. Not having to move a foot from one pedal to another really helps. Soon I was even able to make it oversteer on exit without scaring myself senseless. The car is now so well set up even the reactions of a bloke in his mid-50s who's never driven anything like it before are enough to keep it pointing the right way.

The brakes, however, I never got near. I was pleased to have come close to Mark's times in the F3 car, but in the FZED I remained a mile away. I blame my left foot. At the end of the straight I was braking at 150 metres from around 175mph, which felt pretty damn brave to me. Mark brakes at 80 metres, which is beyond not just my ability, but my powers of imagination. The subconscious part of your mind looks at what the conscious part is trying to do, concludes it's gone mad and takes over.

I came away from Rodin with my mind comprehensively blown by what I'd seen. What I experienced was the exact programme any prospective FZED buyer will receive as part of the $650,000 purchase price, around £500,000 as I type; or, put another way, not a lot more than one of the pricier GT3 cars you might buy. You can race it in the BOSS GP Series, or just be the fastest person at any track day, anywhere in the world. And run it you can, because it doesn't require an army of boffins to fire it up, and the Cosworth motor will go over 3000 miles on pump fuel between rebuilds, which is a hell of a lot of track time.

But what is most extraordinary is that the FZED represents the beginning, not the end of David Dicker's ambitions. The FZERO promises another level of performance altogether – beyond that of modern F1 cars I'm told – and there'll be a road-going version too, and another electric supercar as well.

You may never have heard of Rodin Cars before reading this, but having been to New Zealand, seen the track, the factory, the facilities, met the team and driven the car, I'm confident you'll be hearing a whole lot more from it in future.

Billy Vukovich kicks up a storm in Champ Car's last ever dirt race, in 1970. He'd finish third

RACEMAKER PRESS

WHEN INDY RAN OFF ROAD

Dirt tracks were ingrained in Indy car history, but as a new glamorous age dawned they were deemed surplus to requirements. **Preston Lerner** revisits the 1970 Golden State 100, destined to become the last of the dirt races

Mario Andretti, left, with car restyler Dean Jeffries at Sacramento, the last championship dirt race – to Mario's disappointment

When 18 dirt Champ Cars took the green flag at the California State Fairgrounds in Sacramento in 1970 and arced through the first turn in long, graceful power-slides, it marked the end of an Indycar era that predated the first Indy 500 in 1911. Never again would Indy cars run on dirt in a race that counted toward the national championship.

"It was the car owners' idea. They didn't want to spend the money on the different cars," says Al Unser. "It didn't make any difference to me what kind of car I was driving. A race car is a race car. The cars I liked most were the cars I could win in."

According to this standard, Unser liked almost all of the cars he drove that year. Belted into a front-engined dirt car or a rear-engined pavement chassis, Unser won 10 of 18 races on superspeedways, short ovals, road courses and mile-long fairground tracks. The next year he won five more races, including Indy for the second year running. But this time around, every race on the schedule was run on a paved oval. The paradigm shift away from dirt was complete.

Indycar racing gets its name from the Indianapolis Motor Speedway, and what made Indianapolis so special was its singularity. Well into the 1950s, it was the only major circuit in America featuring a paved surface, first bricks and later asphalt. Board tracks, which had proliferated during the Roaring Twenties, died during the Depression. That left Indy and a boundless nation teeming with dirt tracks of various shapes and sizes. And while a handful of thoroughbreds were built specifically for the Brickyard, the vast majority of American open-wheel race cars were designed to do double duty.

The landscape changed in 1954, when the Milwaukee Mile was paved. Three years later, another paved oval opened at Trenton. With each getting two races a year on USAC's so-called Championship Trail, top-tier owners suddenly needed two cars in their stables – a longer, lower roadster for paved tracks and a more upright chassis for the dirt. Mechanically, though, the cars were two peas in a pod, both with a pair of solid axles, torsion bars all around and the engine in front of the driver, where God and Frank Kurtis decreed it ought to be. The same architecture was found in shorter and lighter sprint cars, and midgets, which were smaller still.

Then Jack Brabham showed up at Indianapolis in 1961 with a modified rear-engined Formula 1 Cooper-Climax that was mocked as a 'funny car'.

A lone gazelle among a herd of elephants, Brabham's Cooper was overmatched by the Offy-powered roadsters. But a mere two years later Jim Clark finished second in the 500 in a Lotus-Ford. By 1965, when he obliterated the field in the seminal Lotus 38, Indy roadsters were obsolete. Team owners now had to invest in newfangled rear-engine funny cars that shared no technology with their existing dirt Champ Cars.

There was plenty of consternation. "The guys who couldn't drive on the dirt felt that the guys who could had an advantage in winning the national championship," says Jim Dilamarter, the Vel's Parnelli Jones Racing crew chief for Al Unser. "Number Two, a lot of owners had spent a lot of money on rear-engined cars and they didn't want to spend more on dirt cars that could race only five times a year, especially if their driver wasn't that good on the dirt. Also, don't forget there were a lot of English and Australian and Kiwi mechanics coming over. They didn't know dirt, and they just wouldn't touch those cars."

Just about the only people who wanted to keep dirt tracks on the schedule were – as you might expect – the guys who excelled on them. "To be a national champion, you had to be able to score on dirt, on short ovals, on superspeedways and on road courses, and I *loved* that challenge," says Mario Andretti, who just happened to have earned a national championship in 1969 by winning on dirt, a short oval, a superspeedway and a road course – plus the hillclimb at Pikes Peak. "Driving on dirt helped me in so many ways – car control, always searching for grip, dealing with changing conditions, driving in the rain on road courses. Something always correlated between disciplines."

The decision to abandon dirt tracks was a done deal by the middle of the 1970 season. So everybody knew the Golden State 100 in Sacramento was going to be the last dirt race on the Champ Car schedule. But despite its historic nature, most teams weren't gung-ho about entering the race, which paid the smallest purse of the year and entailed a long, arduous tow to Northern California.

Adding to the logistical nightmares, the Trenton 300 had been rained out the previous week and rescheduled for the day before the race in Sacramento. The teams had been forced to send the dirt cars out to California while their drivers raced on the asphalt in New Jersey, 3000 miles away. Unser led all but five laps and lapped the field at Trenton before flying to San Francisco on Saturday night and flogging a rental car to Sacramento. "I woke Aggie [legendary race promoter JC Agajanian] at 2.30 in the morning to find out where we were staying," Unser says.

"The cars I liked most were the cars I could win in"



Al Unser won as he pleased in his Bignotti-modified Johnny Lightning special

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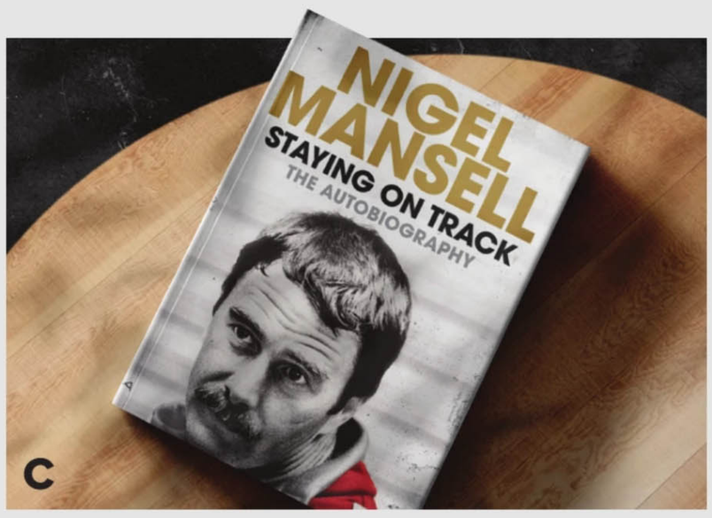
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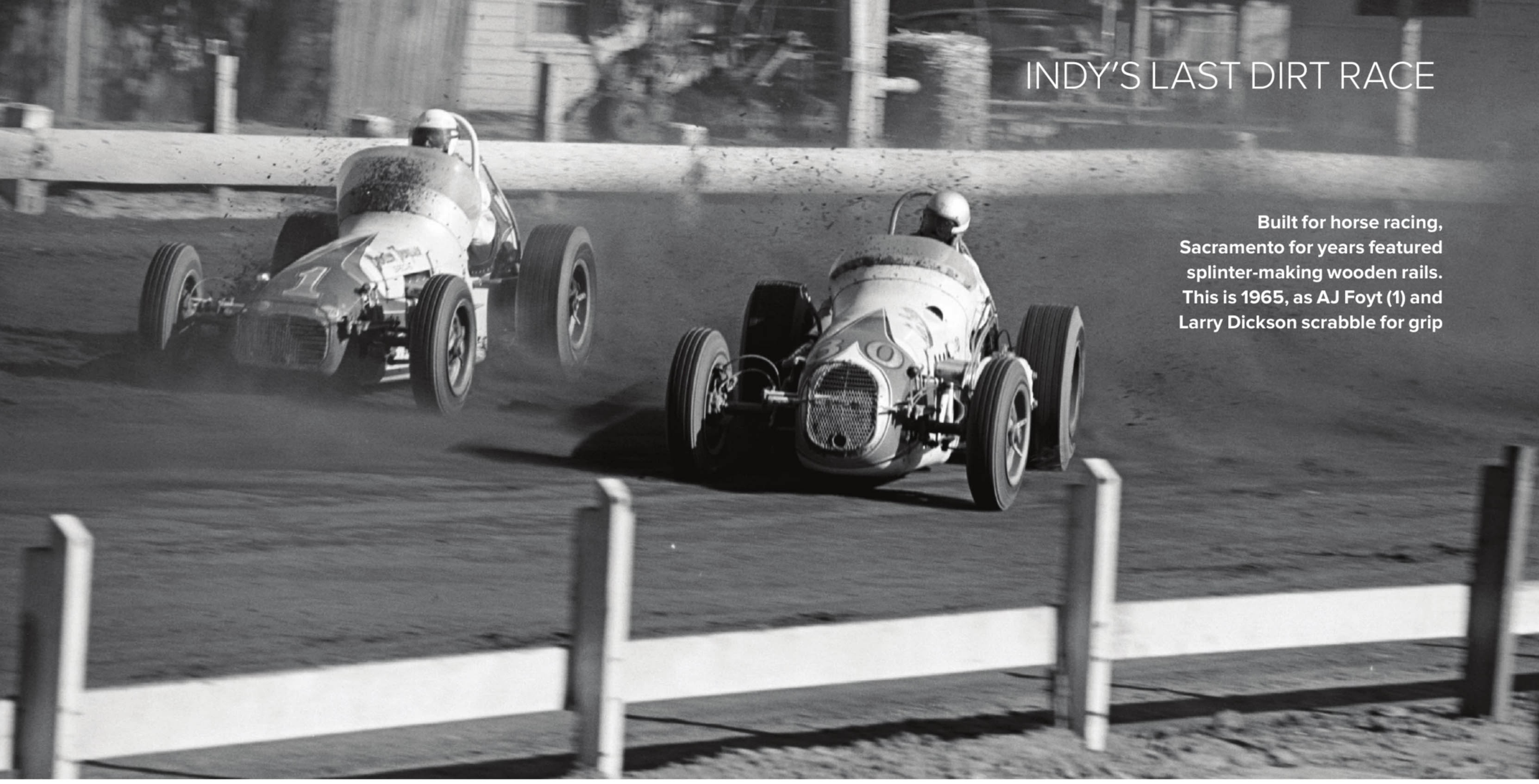


C



D

motorsportmagazine.com/shop



Built for horse racing, Sacramento for years featured splinter-making wooden rails. This is 1965, as AJ Foyt (1) and Larry Dickson scrabble for grip

"I'd see guys before qualifying and they'd be as white as a sheet"

More than half the drivers who raced at Trenton didn't bother to make the transcontinental trip. (To be fair, a lot of them were pavement specialists.) The 25 cars that did arrive in Sacramento were a ragtag collection. Andretti was one of the only drivers with a new-for-1970 entry – a bright red STP-sponsored chassis designed by Grant King. But most of the cars had been built five, 10, 15 years earlier, and Tom Bigelow even managed to squeeze into the show in a Kurtis 4000 laid down in 1951.

Bigelow was one of Indy's most tenacious Bump Day warriors. He bumped his way into the 500 on the final day of qualifying five times and was himself bumped on three other occasions, and he would later be enshrined in both the midget and sprint car halls of fame. "I preferred the dirt Champ Cars to the sprint cars," he says. "You could hang the ass-end out a little more because they had a longer wheelbase. And that old Kurtis was really good on the dirt."

Other than bodywork, there wasn't much to distinguish a dirt Champ Car built in 1951 from one built in 1970 (although a couple of entries featured – gasp! – rudimentary, first-generation roll cages). The biggest difference was under the gaudily painted hoods.

The most popular engine by far was still a 255-cubic-inch version of the venerable Offenhauser, the Indy car standard since it had been developed in 1933 from a Harry Miller marine engine design. Although down on power, the four-cylinder monoblock Offy was largely bulletproof and well understood by engine tuners young and old. But it was being challenged by the Chevrolet V8. A stock-block motor, the Chevy was cheaper than the Offy, and because it featured pushrods rather than overhead camshafts it was allowed to displace 350 cubic inches, which translated into a bunch of extra grunt.

Meanwhile, team boss Andy Granatelli was experimenting with a Mopar V8 hot-rodded by drag-racing stalwart Keith Black for Andretti, but it never generated a following. The pick of the litter was the four-cam Indy Ford, the all-conquering V8 that had been created in Dearborn to help Clark and Colin Chapman win the 500. "The Chevy made a lot of horsepower, but it came on all at once, and that just broke the tyres loose," says Unser, who had the only Ford in the field. "The Ford was a better motor because it was a smoother motor."

Like most of the one-mile dirt ovals, the track at the California State Fairgrounds had been built for horse-racing rather than race cars. For many years the inner perimeter was lined by a low wooden guardrail that broke into boards that acted like lethal spears after a crash. "I hated that track," says Bobby Unser, Al's older brother. "I'd see guys before qualifying, and they'd be white as a sheet."

By 1970, fortunately, the guardrail had been replaced by a dirt bank. Bobby overcame his aversion to the track to qualify second in a one-off ride he'd secured for the occasion. ("I drove everything I could get," he says.) Andretti stuck his car on the pole, with dirt wizard George Snider third and Al a surprising fourth in his metallic-blue and gold Johnny Lightning Special. Not that the VPJ team was worried about starting so far back.

"The tracks were muddy and wet during hot laps and qualifying, and the Chevys and the Offys could dig in there because of their torque," Dilamarter recalls. "But once the race started the tracks were like pavement, which was perfect for the Ford, so as the race progressed Al got better and better."

Engine aside, Al also had an unfair advantage in the chassis department. George Bignotti, the unconventional genius who would become the crew chief with the most wins in Indycar history, had altered the



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Al Unser wields his Kuzma-Offy in the 1965 Golden State race



Andretti after '69 Indy 500 win. Below, l-r: Unser, Andretti and Foyt



GETTY, SHUTTERSTOCK

Long haul: Mario's Kuzma-Offy is towed to Sacramento for the '65 Golden State race

suspension attachment points to improve the handling. The previous year at Sacramento, Al had dominated so thoroughly that he'd won despite breaking the rear suspension two laps from the finish. And this year he'd already swept all four of the dirt races on the Champ Car circuit. So, he was the prohibitive favourite going into the race.

After the start, Bobby powered to the front as the field pitched their cars sideways, dirt spraying off their rear tyres, but Andretti elbowed his way past to lead the first lap. Al cruised by Andretti on lap two and said, "See ya!". Andretti had to work hard to fend off Snider before losing 10 laps in the pits while his throttle linkage was repaired. Chasing Snider was a tightly bunched pack consisting of Gary Bettenhausen, Bobby Unser, Billy Vukovich, dirt specialist Greg Weld, Roger McCluskey and Johnny Rutherford.

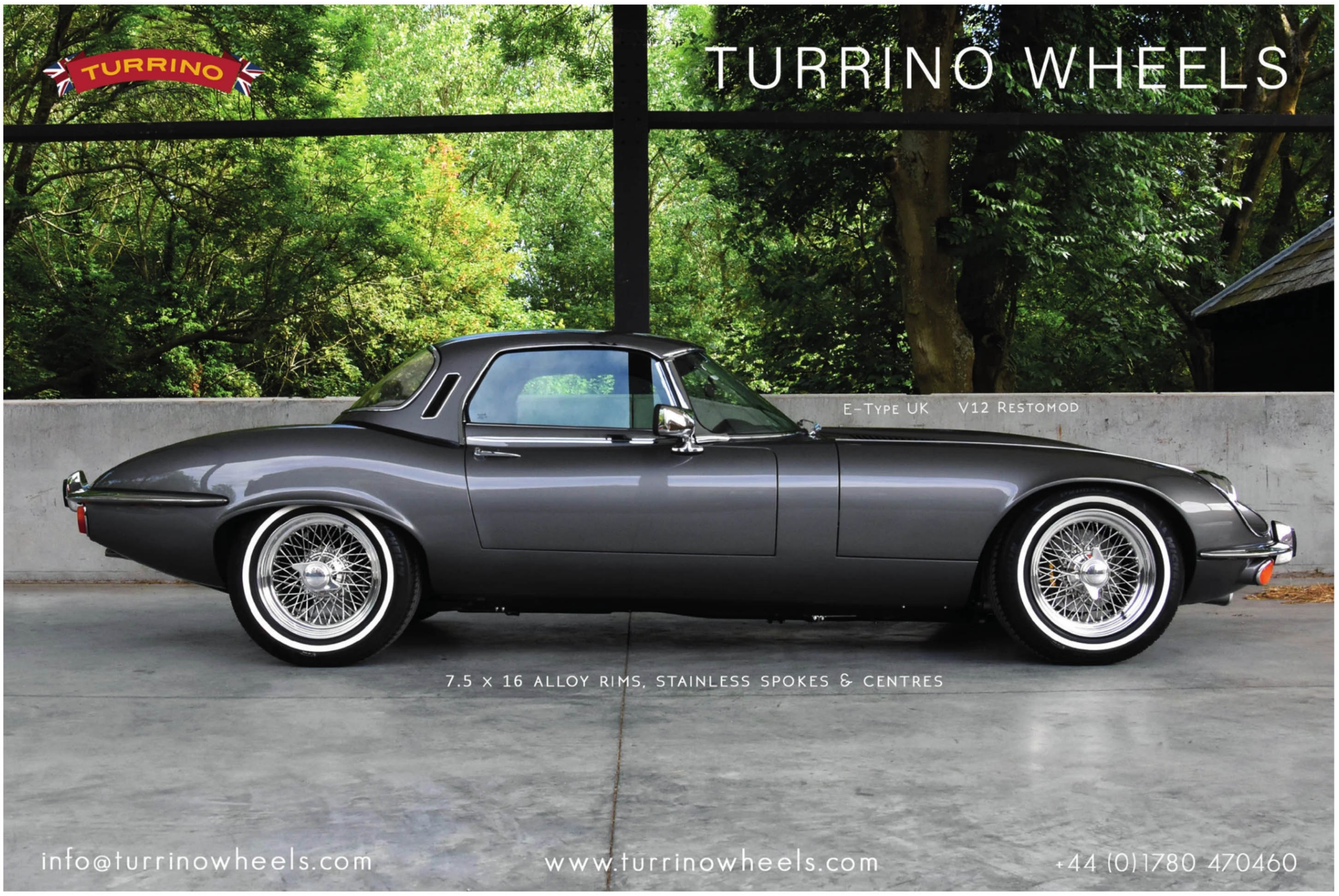
Four distinct engine notes reverberated off the grandstands as the cars oversteered around the track, their drivers searching for grip. Salt Walther hit the fence. Vuky sneaked past Bobby and chased Bettenhausen. Lone Star JR overcooked it and Mario couldn't avoid the wreck, knocking both of them out. Bettenhausen lost a wheel and spun, falling behind his younger brother, Merle. The dirt cushion up high wore away, forcing the drivers to hug the bottom line. Through it all, Al circulated serenely in the lead, running high, low, middle, wherever. At the finish he was a mere six seconds ahead of Snider only because cautions had bunched up the field.

Dirt Champ Cars didn't disappear after Sacramento, so USAC inaugurated a separate National Dirt Car Championship for them in 1971. The first four titles were won, in order, by Snider, A J Foyt, Al Unser (still driving his Bignotti-modified Grant King chassis) and Andretti. But by 1975 the series was dominated by dirt specialists who rarely raced Indy cars. In 1981 the cars were reclassified under the Silver Crown heading. Although several champions graduated to careers in NASCAR, most notably Jeff Gordon and Tony Stewart, the series boasts none of the prestige once commanded by the dirt Champ Cars.

These days, the NTT IndyCar Series bills itself as the most versatile championship in the world, and it's got the mixture of racetracks to justify this claim. But what passes for variety in 2019 seems positively mundane compared with the motor sport world a half-century ago, when drivers were expected to race anything and everything. "No other driver went from a Formula 1 race in Austria to a dirt Champ Car race at Springfield in back-to-back weekends," Andretti says.

And no other driver ever will.

"No other driver went straight from an F1 race to a dirt race"



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Based on the 1939 B119MX chassis, the Embiricos Bentley was designed as the ultimate continental cruiser

Fashioning a classic

The original Embiricos Bentley is a superb example of bespoke design, and this replica is just as stunning, says **Simon de Burton**

Bob Petersen is quietly famous in the old car world for creating superb evocations of pre-War Bentleys at his huddle of workshops in the grounds of an old Devonshire mill.

Starting with a genuine Derby Bentley chassis, Petersen and his team build the cars in the old-fashioned way, using a combination of original parts and beautifully crafted new ones to produce either close replicas of originals or bespoke cars in a vintage style.

Often the cars change hands on the pre-owned market for considerably more than Petersen charges to build them, and among his best known are models such as the replica of Woolf Barnato's 'Blue Train Special' and the 'Monster', in which everything was up-scaled in size to create a 'Bentley-and-a-half' powered by a 27-litre Meteor aircraft engine.

But arguably the most beautiful of all the Petersen builds is the replica of the legendary 'Embiricos Bentley' commissioned in 1937 by the Greek shipping magnet and playboy racing driver André Embiricos, who asked the marque's board director, Walter Sleator, to fulfil his dream of owning a bespoke coupé specifically designed for dashing across Europe at high speeds.

Sleator recommended Paris-based Embiricos to commission Frenchman Georges Paulin – a trained dentist and a superbly talented designer of aerodynamic cars – to pen a suitably striking body



The Embiricos Bentley is certainly a head-turner with its striking lines





which was subsequently brought to life by local coachbuilder Pourtout.

The result, based on a 1939 MX chassis, must certainly have been described as 'avant-garde' by the French but, due to the outbreak of war shortly after its completion, Embiricos failed to fully realise his plan to use the car as the ultimate gentleman's continent crosser.

In the hands of a new owner post-war, however, it competed at Le Mans on no fewer than three occasions, claiming a creditable sixth place in 1949 - despite still being in road tune.

The original Embiricos Bentley now forms part of a Californian collection and is unlikely to be sold any time in the near future - a fact that prompted a Petersen client to ask if it could be recreated.

The answer was, of course, 'yes', and the result, which was completed seven years later in 2006, is now on sale in London with classic car specialist Graeme Hunt.

Running its original engine, the car has an exquisite, hand-crafted aluminium body resting on an ash frame, as well as 18-inch wheels with 'Ace' discs and an interior trimmed in rich, tan hide and luxurious Wilton carpet. A trio of suitably French Marchal lamps light the way and the gunmetal pewter paintwork gleams like new.

Not long after completion the car was sold to musician Jay Kay, of Jamiroquai fame, who subsequently sold it on to the late Orin Smith, CEO of Starbucks and noted automobile enthusiast.

It was sold on by R.M. Sotheby's at Amelia Island in 2017, where it went for a relatively modest $671,000. Subsequently checked and thoroughly tested at events ranging from tours of the Scottish Highlands to the Le Mans Classic (where it won a concours trophy) the car is 'on the button' and ready to take Europe in its stride.

1939 BENTLEY 'EMBIRICOS COUPE' REPLICA
On sale at Graeme Hunt Ltd, London, SW1. graemehunt.com Price: £797,500

In the market for a classic cruiser?

You don't have to go the 'full-Embiricos' to traverse continents in style



1958 ASTON MARTIN DB2/4 MKIII €345,000 One of the more overlooked Astons, fully restored and sold new to an owner in Los Angeles, so it's left-hand drive. *classiccarholland.eu*



1949 BENTLEY MKVI SPECIAL SALOON BY MULLINER £75,000 Classic carrosserie that's been extensively restored, and with the Mulliner seal of approval. *pa-wood.co.uk*



1950 ALFA ROMEO 6C2500 SPORT FRECCIA D'ORO £228,000 A stunning example that's found homes across Europe. One of only 62 known to exist. *retrolegends.nl*



1935 ALVIS SPEED 25 SC CHARLESWORTH DROPHEAD £45,000EST It's conquered a 2800-mile tour of New Zealand, and is now up for auction with H&H. *online.handh.co.uk*

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The only Aston Martin DB4 GT Zagato finished in red will woo British buyers

AUCTION HERO

American invasion

Gooding & Co. has never held a sale outside the USA, but will soon bring a special collection to London, says **Simon de Burton**

SINCE ITS FOUNDING IN 2003 BY former Christie's and RM Sotheby's executive David Gooding, California-based auction house Gooding and Co. has established a reputation for selling the best of the best collector cars at its blue chip Pebble Beach, Amelia Island and Scottsdale events - but it has never held a sale outside the U.S.

That will change on April 1 when the firm will take the stage at London's Somerset House to disperse what may prove to be one of the most, if not the most valuable single-owner car collection to come to market this year.

Comprising just 16 lots with valuations ranging from £450,000 to £10m apiece, the sale could raise more than £45m - although, if the results from Sotheby's London sales of 2018 and 2019 are anything to go by, there is no guarantee that collectors will be falling over themselves to bid.

That said, many of the offerings are celebrated cars of the type that only rarely become available, such as the £10m 1934 Bugatti Type 59 - originally owned and raced by King Leopold of Belgium - the £7m 1937 Bugatti Type 57S Atalante that belonged to gentleman racer Francis Curzon, fifth Earl Howe, or the £1.5m 1952 Bentley R-Type Continental that once served as 'race support' for the Briggs Cunningham team.

These are all exceptional cars and, if there are buyers out there with the will and the means to own them, the location in which they are offered for sale is irrelevant - and, since half of the cars are British anyway, it's fitting that they should be offered in the U.K.

Among them are three significant Aston Martins, comprising the 1935 Ulster that was owned and raced by Prince Bira of Siam, the ex-'Kangaroo Stable' DB3S that set an Australian land speed record in 1957 - and the car pictured above, a 1961 DB4 GT Zagato.

Carrying a pre-sale estimate of £7-9m, it's the second most valuable car in the sale (after the Type 59) and is one of the best known of the 19 DB4 GT Zagatos built, both because it was the only one to leave the factory in Peony red, and because of its illustrious former owners: famed collector Paul Vestey and former Aston boss Victor Gauntlett.

The current owner has had the car since 1985 and done more than 30,000 miles in it. It has won concours awards aplenty, been featured in numerous books and, with its matching numbers engine, is one of a tiny number to have remained almost entirely original. Anyone who wants one of these cars will need to have about £10m handy.

1961 Aston Martin DB4 GT Zagato. On sale at Gooding and Co, London, April 1

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1919 Rolls-Royce Silver Ghost £1 -1.4m
1939 Bentley 4 ¼ cabriolet £450-600,000
1927 Bentley Three Litre Speed Model £350-450,000
1924 Vauxhall 30/98 £800,000-1.2m
1952 Bentley R-Type Continental, ex-Briggs Cunningham team c £1.5m
1961 Aston Martin DB4 GT Zagato £7-9m
1935 Aston Martin Ulster, ex-Prince Bira £1.6-2.2m
1971 Lamborghini Miura SV £1.6-2m
1928 Bugatti Type 35 Grand Prix car £3m +
1934 Bugatti Type 59 Sports, ex-works grand prix team and King Leopold of Belgium £10m+
1937 Bugatti Type 57S Atalante, ex-Earl Howe £7m+
1955 Aston Martin DB3S £3-4m
1924 Lancia Lambda £320,000-400,000
1965 Lamborghini 350 GT £400-550,000
1959 Lancia Flaminia Zagato £400-500,000
1955 Lancia Aurelia B24S £700-900,000

SPEEDSHOP *Auctions*



Changing of the guard

Aside from the very best rarities, buyers now hold the trump cards in the market

On February 6 at the Peninsula Hotel in Paris, lifelong car fan Sir Michael Kadoorie will stage the latest edition of the Best of the Best awards he founded in 2015 along with fellow collector car stalwarts Chip Connor, Bruce Meyer and Christian Philippsen. As the name suggests, the top prize will go to the automobile deemed the best out of eight that have already been judged 'best in show' at the world's most prestigious concours events, ranging from Pebble Beach to Hampton Court. Another common link between the cars is that their values are unlikely to waver.

Away from this rarified world, however, the collector car market continues to undergo a correction and many believe it's not only welcome, but long overdue. It has been said lately that only the top examples of given marques and models are now saleable. But that's not true. The reality is that no car is unsaleable and there is invariably a taker for everything. As the results from the first auctions of 2020 show, the difference between now and five years ago is that prices are named by buyers, not sellers... a fact many are having to face.

For everyone else, the current market signals a welcome return to the buying and using of old cars for the enjoyment they can bring rather than their investment potential.

And that is surely no bad thing.



NART Ferrari logos and livery give this particular Sunbeam an interesting backstory

1961 SUNBEAM HARRINGTON ALPINE. SOLD FOR $196,000. R.M SOTHEBY'S
Originally belonging to the Italian nobleman Marchese Filippo Theodoli, whose work with a U.S. advertising agency that looked after Ferrari resulted in him becoming close friends with Luigi Chinetti, the US importer of the marque. As a result, the Sunbeam lined up at the 1963 Sebring 12 Hours in the livery of Chinetti's North American Racing Team (NART), crossing the line fourth in class. The car had just three other owners.



1991 VECTOR W8. SOLD FOR $720,000. R.M. SOTHEBY'S The American-built Vector was at least a decade ahead of its time. Bristling with exotic materials, Vector claimed a top speed of 242mph back in 1991. But a price tag of more than $170,000 and cashflow problems within the company resulted in just 17 production cars being built. This was number nine.



1958 MGA 1500. SOLD FOR $11,760. BONHAMS Some cars seem to suit the 'rat rod' look, and this MGA carries it well. The 1958 car was exhumed from storage and, with its original red paint tatty, the new owner stripped the lot. It revealed sound metal and, with aluminium bonnet, boot and doors, it could be left bare with the minimum of 'stabilisation' treatment.



1967 AUSTIN-HEALEY STREAMLINER. SOLD FOR $123,200, BONHAMS A humble Austin-Healey Sprite underneath, this was a one of the Donald Healey Motor Company Streamliner racing cars – but is believed to have been driven mainly on the road as a promotional vehicle for a Philadelphia dealership. Its body and interior were superbly preserved and its original XSP race engine had been recently refreshed.



1970 PORSCHE 914/6GT. SOLD FOR $995,000. GOODING AND CO. This factory 914/6 GT was one of just 16 customer cars released in 1970. Owned by journalist and racer Jacques Duval, in 1971 he drove it to first in class at the 24 Hours of Daytona and fourth in class at the 12 Hours of Sebring. Remarkably original, it was returned to the Sunoco livery in which it first raced after doing a tribute event at Daytona in 1991.



1951 FERRARI INTER CABRIOLET. SOLD FOR $1.9M. BONHAMS One of 78 Inters built, this example spent the majority of its life in Switzerland. Dismantled for restoration in 2002 by an owner who subsequently died, it was restored by Heinrich Kampfer and issued with a Ferrari Classiche certificate confirming its extreme originality. The car subsequently won second in class at Pebble Beach in 2014.



Chris Stockton battles with a young Phil Keen at Brands Hatch in 2003. Lee Caroline would take that year's title

Buying guide

TVR Tuscan Challenge

Once the UK's best one-make series, now a classic racer

FOR MANY RACEGOERS THROUGHOUT the 1990s, the sight - and sound - of the TVR Tuscan Challenge was the highlight of any given weekend. The series proved so successful that it arguably set the tone for every single-make sports car championship since, and it did so using simple but effective ingredients.

It had the drama of vibrant, curvaceous, open-topped sports cars, with huge V8 engines that endowed them with more power than grip. They looked spectacular, sounded even better, and were usually sideways, everywhere... What's not to like?

The TVR Tuscan Challenge epitomised a key era in British sports car racing. It came way before a Lamborghini Super Trofeo or a Ferrari Challenge, and led the way in Britain when Porsche's mighty Carrera Cup was still only in its infancy in Germany.

It was a mighty achievement for a diminutive manufacturer from Blackpool. However, it came about almost by accident.

In the early 1980s, TVR was going through changes. Its second owner, Martin Lilley, sold his shares to Peter Wheeler, a chemical engineer and TVR fanatic. Wheeler instigated a change in engineering, ditching the more economical V6 engines Lilley had leaned toward in favour of moving back to a TVR heartland, a thumping V8. That brought an inevitable cost rise for TVR models, meaning a gap opened up for a new entry-level affordable model. That design was the S series, which arrived from 1986 as an open-topped roadster, initially using a Ford V6. However, customers wanted more, so Wheeler sourced a supply of 4.5-litre Rover V8s. To boost interest in the more powerful model, Wheeler decided to show what it could do on the race track.

At the British Motor Show in 1988, the wraps came off the new V8-powered prototype, which resurrected the Tuscan name. Starting a race series was a gamble, but to ensure a healthy grid straight away Wheeler offered a tempting deal. Customers could buy their Tuscan and enter the

TVR TUSCAN CHALLENGE

- **Price new** £16,000
- **Price now** £40,000-£60,000
- **Engine** TVR Power naturally aspirated 4.5 Rover V8, TVR AJP8 4.5 V8
- **Rivals** Porsche 944 Turbo, Ferrari 348 Berlinetta
- **Verdict** One of Britain's great racing successes. Cost-effective, simple and glorious.





High power, low grip and often sideways: David Mason is in pursuit of Lee Caroline



TVR head Peter Wheeler competed regularly, even if things didn't end well here in a clash with Nathan Freke (28)

MOTORSPORT IMAGES

Challenge for just £16,000 + VAT, provided they committed to at least six of the 12 races. Should they fail to do so, they'd be met with another £16,000 invoice.

The first batch sold out and the series was such a success during its first year in 1989 that plans for the road car were shelved to keep up with demand for the race cars, which initially offered 400bhp and a manual Borg-Warner transmission in a car weighing only 1000kg.

"They looked spectacular, and sounded even better. What wasn't to like?"

Car development didn't stand still, either. With the TVR Power-tuned Rover V8s soon maxing out at around 450bhp, Wheeler went looking for a replacement. Dead against having a German engine in his cars, Wheeler instead contracted engine gurus Al Melling and John Ravenscroft to work alongside him to develop an all-new lightweight V8, and so was born the AJP8 – the name formed from the designers' shared initials. The AJP boosted peak power to 536bhp and allowed a Tuscan to accelerate from 0-60mph in around three seconds and on to a top speed of over 190mph, making it the UK's fastest race series.

Motor Sport's own Jeremy Walton got a turn at the wheel of the series' guest car at Mallory Park in 1991, where he reported that the Tuscan "made the 500bhp Ford Sierra Cosworth I also raced that day feel comparatively civilised."

With the AJP, Tuscans retailed at closer to £22,000, but against the higher costs of something like a Porsche Carrera Cup car, they still represented great value, and by now had front-line TV coverage as support to the British Touring Car Championship and a host of star drivers, too. Names like Jamie Campbell-Walter, Bobby Verdon-Roe, Martin Short, Gerry Marshall and even TVR's top brass such as Wheeler himself all competed regularly. Even the great Colin McRae jumped into a guest car for a play.

Wheeler's sale of the company to Russian Nikolay Smolensky brought a halt to the Challenge as we knew it when the new owner stripped the class of factory support in 2005.

Tuscans continue to race today, and around 35 original Challenge cars survive, with a handful still owned by their star drivers. Others were re-bodied to the Sagaris, and some even converted for road use.

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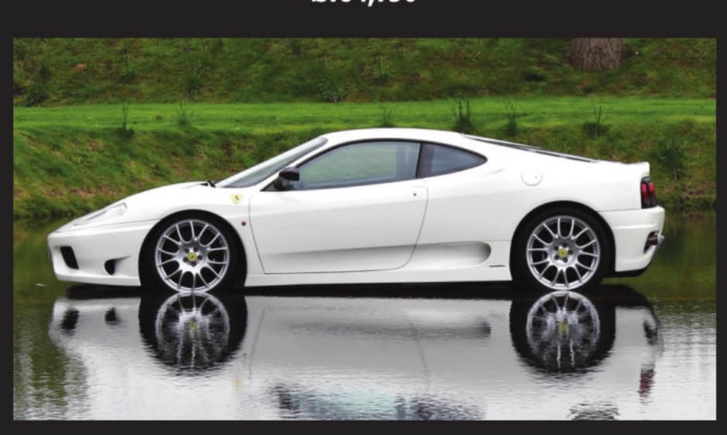
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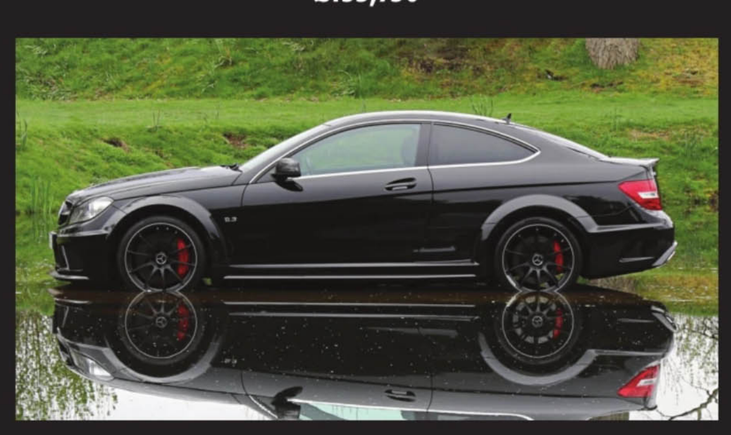
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ONE CURRENTLY FOR SALE

1989 TVR Tuscan Challenge

On the forecourt

Rover V8 or an AJP? Take your pick from these two available from a regular racer

The number of pure Tuscan Challenge cars has begun to dwindle over time, but seasoned racer Tim Davis always keeps a ready supply, and currently has two different options ready to go for the right buyers.

Davis has raced Tuscans for a decade, and knows the cars inside-out, confessing: "If you cut me open, it would probably say TVR right the way through – I just love them, always have ever since I first saw one on the road. I always promised myself one, and I've had four!"

Both 1989 chassis – one finished in pure white and the other in red – have been fully serviced by the BOSS Racing team and are in ready to race condition. The white chassis has an original Rover V8, whereas the red – which finished second in the 2002 championship with Jay Shepherd driving – boasts an original AJP. It brings about the question... which is better?

"My heart always stays with the big, lazy Rover, as it has so much torque it would eat an AJP out of the corners," adds Davis. "But on the straights the sheer grunt of the AJP will pull it away, especially through the higher gear changes. The fastest thing I ever drove was an AJP8, but those engines are now very rare and nobody builds the blocks anymore. They can therefore be very costly compared to the Rover.

"Both cars are immaculate, and have been looked after professionally. I've also got a third car in restoration, but I'm planning to keep that as I'd always like to have one with me."

The asking price for each is £40,000.

Tim Davis, Tim@DNPnet.com, Tel: 07870 668713



SAM MOORES

ONE PREVIOUSLY RESTORED

1995 TVR Tuscan Challenge

In the workshop

Running a Tuscan can be more demanding than some other cars, but it's still great bang-for-buck

Most Tuscan Challenge cars tend to be looked after professionally by experienced teams, and they don't come much more experienced than Jason Clegg's Str8Six team.

Clegg used to work in the TVR factory as an engine technician before establishing the business to look after all things TVR road and race, and has successfully run multiple Tuscan Challenge cars for customers. His client list includes the Gulf Oils-liveried AJP machine of Matthew Holben.

"The Tuscans aren't the most technically advanced cars – there aren't any complicated electrics like traction control or ABS – but you have to stay on top of the maintenance," says Clegg. "The big thing is accident damage. Probably 90 per cent will have had some sort of ding, so you need to make sure the chassis is nice and straight, and not welded up here and there. The wiring looms usually need looking at because many have been chopped to bits to try and fix faults, so we tend to fully re-wire the cars we get. Oils and fluids also need changing mid-season to protect the drivetrain.

"The Rover V8s are easier to work on due to the better supply of spares, whereas a rebuild on an AJP is around £10,000. But considering the performance you get from these cars compared to other classic sports cars, that's not too bad.

"The Tuscans are out of this world to drive. They like to be thrown around, and aren't for the shy. They're quite twitchy at anything less than 100 per cent, but when you really grab them by the scruff of the neck they're like a rally car for the circuit."

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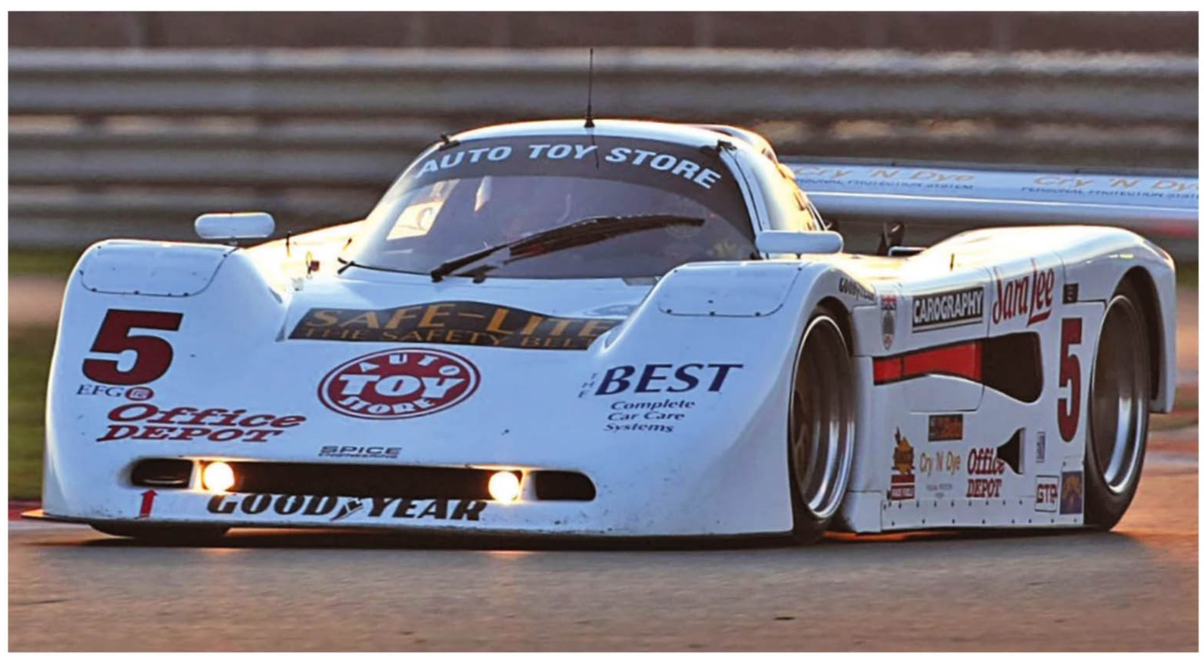
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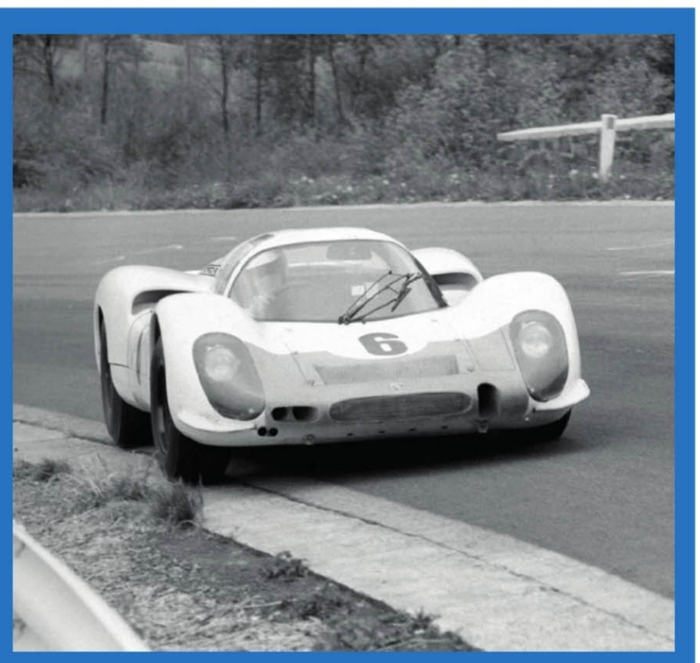


1982 ex-Keke Rosberg World Championship Williams FW08-1

The FW08 Prototype which contributed 10 points to Keke Rosberg's 1982 World Championship title. Totally Race-ready with good spares.

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1968 Porsche 908 Works 'Short Tail' Coupe (908-010)

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Buying guide

Lamborghini Gallardo

When German engineering met Italian design, it was a winner

HERE'S A QUESTION: BY THE time Lamborghini reached its 50th anniversary back in 2013 it had produced around 30,000 cars in total. But what percentage of that was due to the humble entry-level Gallardo?

Ten per cent...? Maybe 20...? Perhaps 30? Surely everybody was buying the firm's big, raucous V12s; after all, that's what a Lambo is all about isn't it? Wrong.

Between its introduction in 2003 and it being succeeded by the current Huracán from 2014, the Gallardo sold over 14,000 units worldwide, equating to essentially *half* of Lamborghini's all-time sales figures. That gives you some idea about quite how big a milestone the Gallardo was for one of the world's most recognisable car brands.

And it all came about because of a boardroom shuffle and a change in attitude. Historically, Lamborghini made loud, brash - and often horrible to drive - supercars. Its designs lit up the walls of teenagers' bedrooms around the world, but usually it was a case of 'never meet your heroes'. Then along came Audi and the Volkswagen Group, which bought Lamborghini in September 1998 to bring a boost to the struggling bull, which at the time was only selling around 200 V12-powered coupés each year.

The company needed a new direction, and Audi brought one in the form of the Gallardo - named after a breed of Spanish fighting bull - the first car designed and developed under the new ownership.

Audi recognised the need for Lambo to reach a wider audience, to produce a car that was both more usable, and more affordable. Audi transferred some of its technical knowhow to Lambo's engine department and it came up with a new 500bhp 5-litre V10 specifically for the Gallardo. The unit would also eventually

Lamborghini Gallardo

- **Price new** £164,444
- **Price now** £60,000-230,000 (Balboni limited edition)
- **Engine** 5-litre V10 naturally aspirated; 5.2 V10 from 2008
- **Power** 493bhp
- **0-60mph** 4.1sec
- **Top speed** 192mph
- **Rivals** Porsche 911 Turbo, Ferrari 360 Modena
- **Verdict** German engineering only enhanced the Lamborghini brand



The Gallardo enjoyed a stellar 10-year reign as Lamborghini's best seller. This Superleggera model is one of multiple special editions produced



It may have been based on a 1995 design concept, but the Gallardo's striking lines, and bold interior, were a hit



also go on to power Audi's own R8 coupé, and was the first non-V12 fitted to a production Lambo since the 1988 Jalpa.

The engine was installed midships in a lightweight aluminium chassis, and initially given rear-wheel drive only, hence the first LP500-2 designation – the LP standing for 'Longitudinale Posteriore' (or longitudinal, mid-engined) followed by the horsepower and number of driven wheels. Audi also invested in the semi-automatic, paddle-shift 'E-gear' system that made the car simple to drive and which Lambo says adorned 90 per cent of the Gallardos built. The interior also benefited from gaining Audi switchgear, electrics and sat-nav, meaning everything also worked as it should.

"The Gallardo also brought Lamborghini back to racing, with the Super Trofeo"

Former Audi man Luc Donckerwolke designed the body, but started from a not-so-obvious point by updating the 1995 Calà concept initially produced by Italdesign.

There were a few small niggles at first, mostly with customers noting it could be a tad noisy during city driving. Lambo responded with a big update in 2005 with the SE, which included revised steering and suspension, an extra 20bhp and exhaust butterfly valves.

Suddenly Lamborghini had a hit on its hands, with sales topping 2000 units per year, the Gallardo massively out-selling the flagship V12 Murciélago. Multiple variations followed: roofless ones, lightweights, and numerous special editions.

The biggest change was the introduction of the face-lifted model in 2008, which got an enlarged 5.2-litre V10 with direct injection to create 560bhp and drove through all four wheels to create the LP560-4.

The Gallardo also brought Lamborghini back to racing, with a stripped-out version being used in the firm's single-make Super Trofeo championship and its chassis being used for customer GT3 projects.

The body was revised to create the limited-edition, track-only Sesto Elemento in 2010. Only 20 of these were built, with their styling pointing the way toward the Huracán, which was revealed in 2014. But by then the Gallardo had done its job.



ONE CURRENTLY FOR SALE

2007 Lamborghini Gallardo LP560-4

On the forecourt

If you're after a pristine, and rare, Gallardo, you'll struggle to find better than this low-miles example

With over 14,000 Gallardos having been sold, it can be tough to stand out in a crowd, except that the example on offer at Hendon Way Motors is rare in more ways than one.

"It's a manual, rather than an E-gear, so it's one of very, very few sold with that configuration. The original owner clearly knew exactly what they wanted," says Anthony Pozner, who now looks after the family-run company that has been in business since 1951, making it one of the longest-established independent sports car retailers in Europe. The business also has a strong history with Lamborghinis, having once sold the first right-hand-drive Countach to come into the UK.

This example features the 5-litre V10, plus the additional upgraded carbon ceramic brakes, 19-inch Callisto alloy wheels and four-wheel drive. Plus, having only covered 15,000 miles through its life, it's a prime example of the breed.

"The car wants for nothing," adds Pozner. "It's been used very sparingly, having been part of a private collection, and it comes with full documentation, service history and a recent road test from Lamborghini in Birmingham confirming everything to be in full working order.

"It's a beautiful car to drive, the sort that you put on rather than get into. It feels very alive and there's so much going on, yet it's very easy to just take for a spin. It gives you a real sense of occasion, and that's the selling point of a Lamborghini."

The asking price is £86,500.

Hendon Way Motors, London
Tel: 020 8202 8011, hendonwaymotors.co.uk



MAINTAINING YOUR CAR

2003-2013 Lamborghini Gallardo

In the workshop

Being a supercar, you have to expect the odd maintenance job. London specialist GVE can handle the lot

Gallardos tend to come with the odd hefty maintenance bill – regardless of how good the engineering is. GVE London is an independent Lamborghini specialist which has cared for many of the capital's Gallardos, offering servicing packages, repairs, restorations, paint detailing and even wrapping.

"The most common issues on early Gallardos are oil leaks, small electrical glitches like sensors failing and causing idling issues or low power, and the suspension bushes can take a beating," says GVE senior technician Bruce Nizath.

"Being mid-engined, the Gallardo isn't all that accessible to work on, and something like a clutch replacement involves removing half the rear end – from the bumpers to the exhaust and some electrics – which can be costly. The E-gear can suffer selection issues and the clutch release bearing can wear on high-mileage cars. A good tip is to keep the car on a trickle charge if it's not used often. That avoids the battery running flat and wiping the ECU memory, which can have a bad impact on the drivetrain. If you're getting a Spyder, check the convertible roof. These sometimes have microswitch issues.

"But overall a Gallardo is a wonderful car. At the time it was by far the most reliable Lambo ever made and the engine is a masterpiece. The drive is sensational, and they look stunning, even today. Just avoid any that have had major chassis repairs as they will never handle correctly if the work is not carried out to either ours or Lamborghini's high standards."

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1974 SHADOW DN3

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THE EX – PHILIP MORRIS, MARLBORO PRESS CAR
1974 LANCIA STRATOS STRADALE

The third Lancia Stratos Stradale ever produced and sold to Philip Morris Ciragrettes in 1974 before being used by them in Marlboro livery as a press car through the 1970s, present at many race, rally and show events. Sold to England in 1980, 1003 is only in its second ownership since. Recently subject of extensive work including engine rebuild, suspension rebuild and repaint. As one of the earliest remaining Lancia Stratos Stradale and one of only a handful of cars to ever be owned by Philip Morris, wearing the iconic Marlboro livery, 1003 sits in a special group of historically significant Lancia.

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THE EX – HEINZ-HARALD FRENTZEN, SAN MARINO GRAND PRIX WINNING, 2ND IN THE WORLD CHAMPIONSHIP 1997 WILLIAMS FW19

Winner of the San Marino Grand Prix, with pole position at the Monaco Grand Prix and six podiums, FW19-05 is a stunning example Williams' last FIA Formula 1 World Championship winning model. Campaigned by Heinz-Harald Frentzen in 14 of the 17 Grand Prix of 1997, he claimed 2nd overall in the Drivers' World Championship and largely contributed to Williams winning the Constructors' World Championship that year. Remaining in the sole ownership of Williams Grand Prix Engineering, FW19-05 is offered as freshly restored with Renault V10 and entry to the impressive Williams Heritage Programme.



THE EX – LEONIDAS, ACROPOLIS WRC RALLY, 2ND IN THE GREEK CHAMPIONSHIP 1981 RENAULT 5 TURBO GROUP 4

Believed to be the Calberson liveried Works Group 4 car of Bruno Saby from the 1981 Monte Carlo Rally, which was damaged during the rally and bought by Greek Renault importer and preferred client 'Leonidas' Alexandros Maniatopoulos. Debuting in Greece in 1981 with Leonidas, it went on to take 8th overall at the 1982 Acropolis World Rally Championship round, and 2nd in the 1982 Greek Championship. Continually rallied in Greece, with 200 wins. One of only a few Renault 5 Turbo to score a WRC top 10 finish. In its fourth ownership and presented in it's original FINA livery with minimal use since engine rebuild.



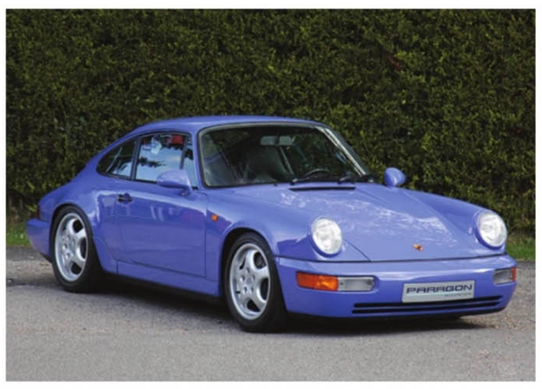
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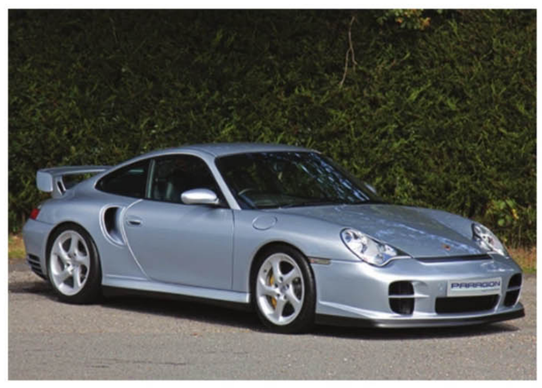
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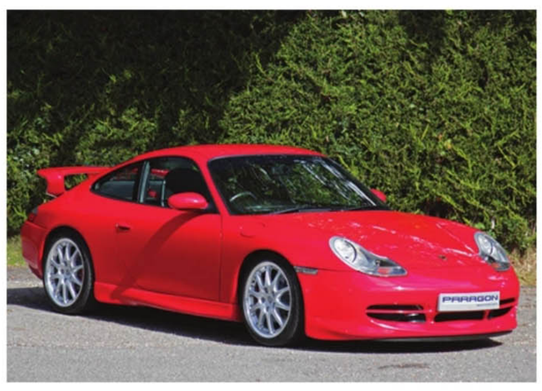
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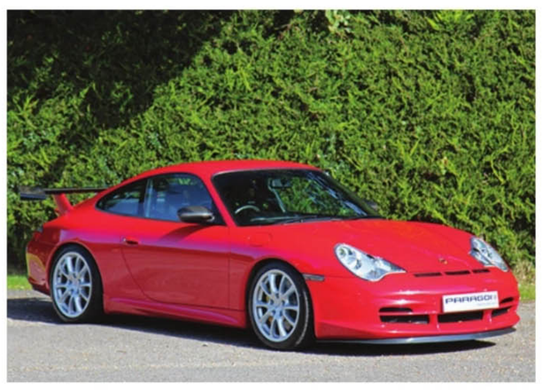
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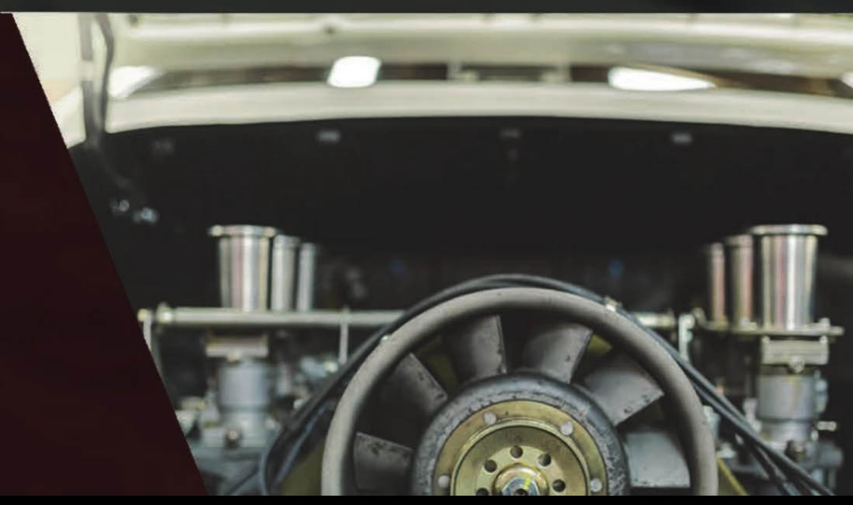
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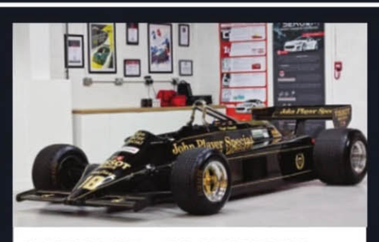
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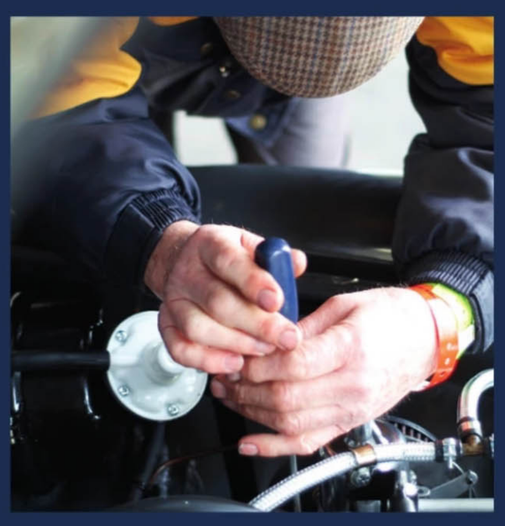
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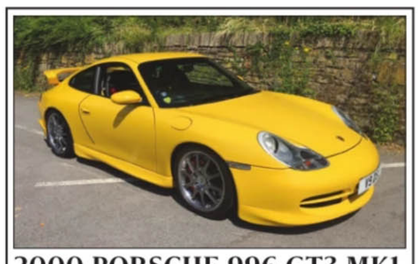
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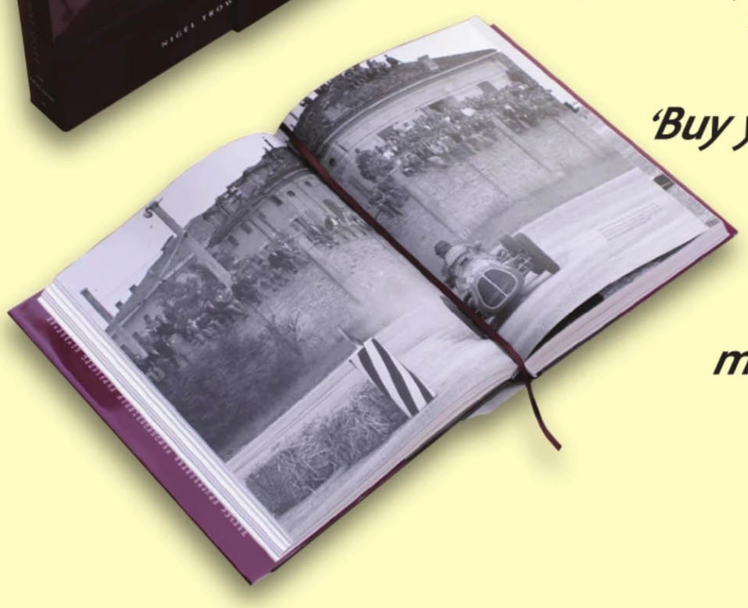
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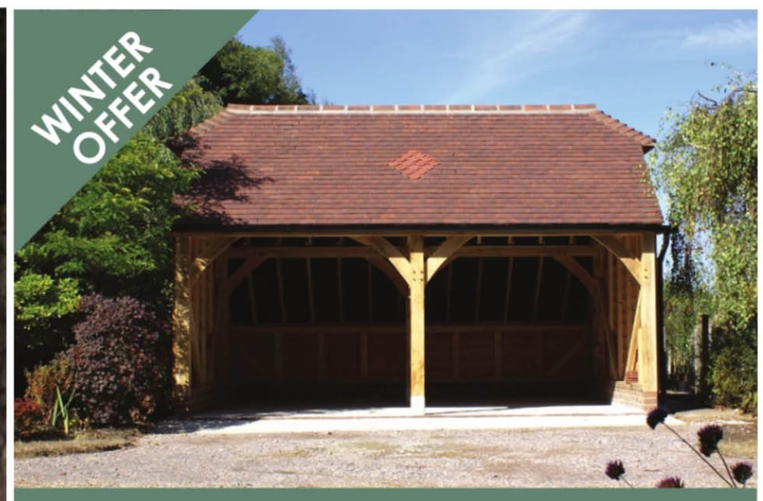
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Bright news for older cars

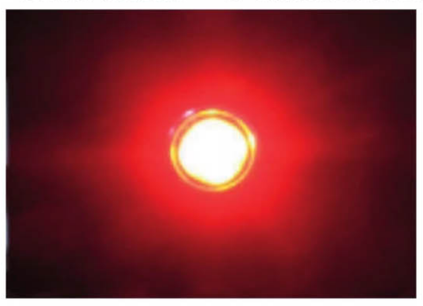
Most responsible owners of vintage and older classic cars recognise that the lighting needs upgrading to make the cars safe to use in modern traffic. This has involved quite a lot of time and effort in the past, but now Better Car Lighting of Warwickshire have announced a revolutionary new conversion which uses the latest technology to make the upgrade surprisingly quick and easy to install.

At the front a new LED bulb replaces the original sidelight unit. It is very bright warm white until the indicators are activated, and then it changes to flashing orange.

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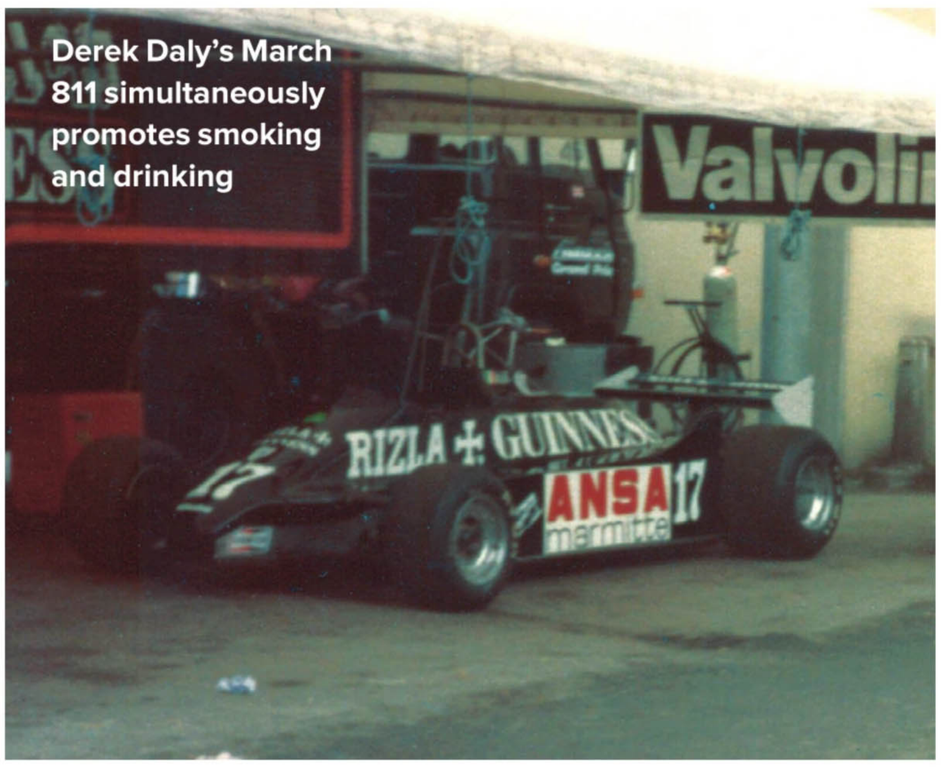




YOU WERE THERE



Tensator barriers and corporate overkill conspicuously absent in the pits...



Derek Daly's March 811 simultaneously promotes smoking and drinking



Traditional post-race chaos as Alain Prost stands atop the podium



Slim Borgudd's ATS in focus. The Swede qualified 21st, but spun out on Sunday



Loitering within tent: Ferrari 126CKs of Didier Pironi and Gilles Villeneuve

SEND US YOUR IMAGES

If you have any photographs that might be suitable for *You Were There*, please send them to: Motor Sport, 18-20 Rosemont Road, London, NW3 6NE or e-mail them to: editorial@motorsportmagazine.co.uk



Juan Manuel Fangio was present to do a demo run in an Alfa 159

Last-minute preparations, with Jean-Pierre Jarier's Osella to the left – he started 18th – and Andrea de Cesaris lined up ahead

You're never too young to begin



Relaxed ambience: polesitter René Arnoux with a modest paddock audience

Michele Robecchi was only 10 when he took a few snaps at the 1981 Italian Grand Prix – and family connections got him into the Monza paddock



McLaren's de Cesaris and, left, John Watson, who crashed heavily in the race



Derek Warwick failed to qualify, but team-mate Brian Henton earned Toleman its first F1 start

PARTING SHOT

MARCH 4, 1976
KYALAMI, SOUTH AFRICA

Niki Lauda – known for mixing serious discussion with witty outbursts – sits front and centre in what appears to be one of the more amusing F1 driver briefings. Something certainly seems to have tickled much of the grid, especially the group of Gunnar Nilsson, Ian Scheckter and John Watson (left). James Hunt (behind Lauda) is enjoying himself, however Mario Andretti (behind Fittipaldi) looks less impressed...

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1971 Aston Martin DBS V8 finished in Signal Red with Cream hide interior in splendid condition throughout. Undoubtedly one of the best currently on offer. **£165,000**



1982 Ferrari Mondial finished in Silver with sumptuous red hide interior and in superb condition both bodily and mechanically. Very realistically priced at **£27,950**



1996 Aston Martin V8 Coupe in Mendip blue with contrasting Parchment hide interior. Only 3 owners from new, 29,000 miles with full Aston Service history. **Only £79,950**



1999 Aston Martin DB7i6 Dunhill Limited Edition in Platinum Silver with black hide interior and fitted with full Driving Dynamics pack from new. 36,000 miles with full Aston history. Very rare collectors car, realistically priced at **£39,950**



1978 Aston Martin V8 Oscar India in Aegean blue with Parchment hide interior. Fabulous motor car with detailed history file and sensibly priced at **£129,950**



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1996 Bentley Continental "R" finished in Peacock blue with contrasting pale grey hide interior. Beautiful throughout and a major hydraulic service just completed. Extremely good value at **£43,950**



1999 Aston Martin DB7i6 Volante finished in Champagne with cream hide interior. 59,000 miles with full service history and in stunning condition. **£29,950**



1968 Aston Martin DB6 automatic, Finished in Dubonnet Rosso with Cream hide interior, 40 years with the same owner. Perfect throughout. **£225,000**



1967 MGB roadster finished in Tartan red with black hide interior. An older restoration with a Heritage Bodyshell and perfect throughout. **£18,950**



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