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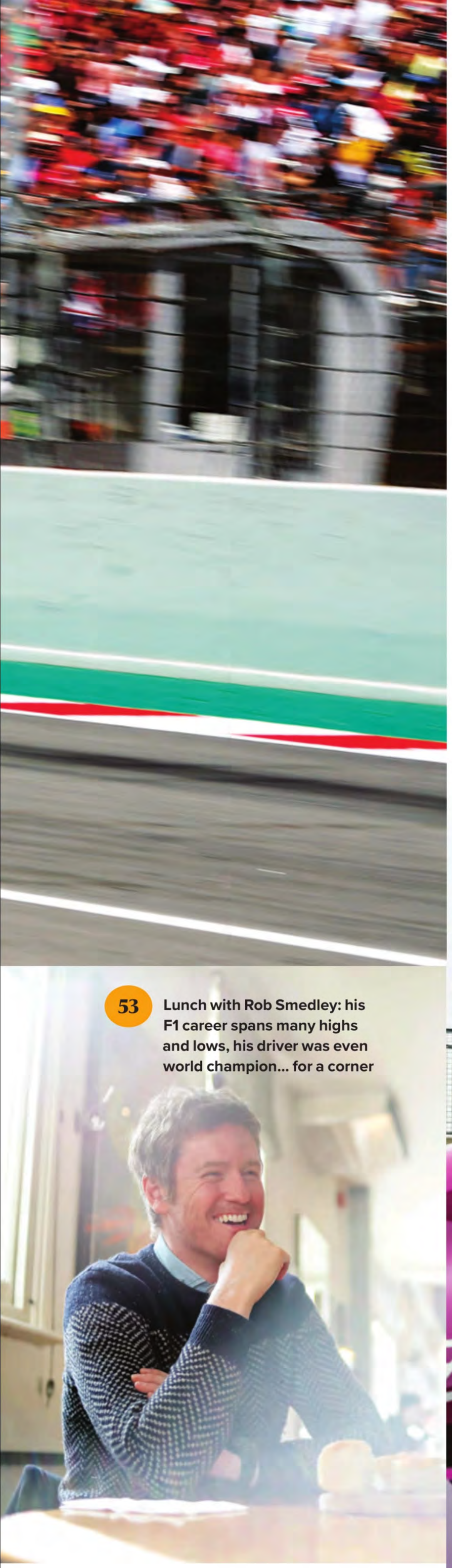
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MOTOR SPORT

THE EDITOR

"Wales Rally GB is under pressure to move somewhere more accessible"

AS LUCK WOULD HAVE IT I WAS AT MOTORSPORT UK'S offices at the end of last month, when the news broke that the British round of the World Rally Championship might be rotated around the country. The source of the story was the commercial boss of the WRC - and it appeared to catch Motorsport UK on the back foot.

As much as I would like to give you a fly on the wall account of what happened at Colnbrook as calls from news organisations came in, I am bound by off-the-record etiquette merely to report that the response was pretty professional as members of staff moved quickly to explain MSUK's position.



The gist of the story is as follows: WRC promoter Oliver Ciesla reasoned that while Britain is one of the big markets for the sport, with decades of tradition, the actual rally is held in an area that is, ahem, not the easiest place to reach. Why not, he continued, explore options around running the rally in various other parts of the country. "Maybe a model inside the UK moving from one location to another. It's an idea that's been circulated recently and it is very appealing to us."

Motorsport UK chief executive Hugh Chambers confirmed that while an agreement is in place to stage the rally in Wales this year and through until 2021, talks had been held about Northern Ireland hosting it in 2020.

Chambers told BBC Wales: "In parallel with our discussions with the Welsh Government, we were also talking to Northern Ireland. We made the Welsh Government aware, and it was a very grown-up conversation. In the event it went to Northern Ireland, we would suspend the contract with the Welsh Government for a year, and the Welsh Government have said they would entertain that." All of which is to say that it looks at least possible and maybe even likely that this year's Wales Rally GB may be the last - at least for a year. If so, it will certainly be going out on a high. The plan to launch the rally in Liverpool to create a sense of drama and pull in the crowds is a sound one, as is the idea to have the opening stage at Oulton Park, which harks back to the glory days of rallying in this country. (If you want a nostalgic blast down a muddy lane, look up the results for the last time the rally visited Oulton - Kankkunen, followed by Delecour, Schwarz, McRae and Vatanen.)

WRGB will also feature a new stage at Colwyn Bay - a resort town - that will bring the sport out of the forests and onto the seafront and high street. It is a welcome change and will hopefully create the sort of buzz that can sometimes be diluted among the trees and hills of the more traditional special stages.

The rally is coming under pressure to up sticks and move to more accessible venues against a backdrop of increased competition from other countries. Both Kenya and Japan are in the frame to be added to the WRC schedule for next year, while this season Chile became the first brand-new rally since 2010 (when Bulgaria made its way onto the calendar).

As new host countries come online, so the governing bodies and money men cast ever more critical eyes over existing rallies. The same thing can be seen in other top-flight championships, including Formula 1. Here, countries such as Azerbaijan and Abu Dhabi have carved out races for themselves and Vietnam joins the calendar from next year. So far F1 has managed to accommodate the new races by expanding its calendar (up from 16 races in 2003 to 21 currently). But with little scope to extend the schedule further, new races will necessitate the dropping of existing ones - a threat also to the British GP, which is still negotiating its F1 contract.

For venues like Silverstone and the forests of Wales, the pressure to put on a good show has never been greater, with many rivals waiting in the wings - some with deep government-funded pockets with which to subsidise an event. This can be good as fans are treated to ever higher standards, but can come at the cost of heritage and established fanbases. And calendars have always changed with races and rallies appearing and dropping off. Like everything else in motor sport, nothing stays the same, everything is evolving.

All the more reason, we feel, for people not to take motor sport events for granted when they have them in their back yard and for organisers to strive always to put on a good show. And, perhaps most importantly, for fans to support the events when we have the chance to do so. You'll miss them when they're gone.

THE LAST WORD THIS MONTH, SHOULD GO TO NIKI LAUDA, WHO died in May aged 70. He was a legend of our sport and as fine and brave a man as ever graced a racing circuit. "A lot of people criticise Formula 1 as an unnecessary risk," he once said. "But what would life be like if we only did what is necessary?"



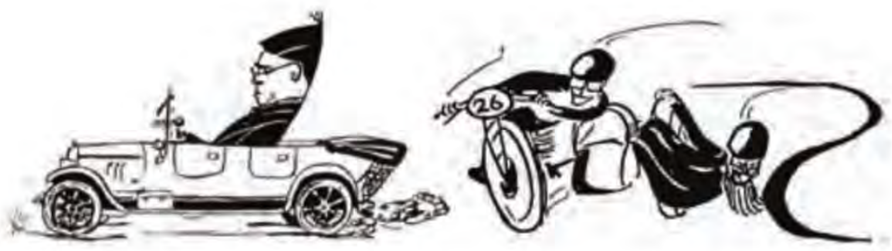
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IN THE SPIRIT OF BOD AND JENKS



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Details matter.



Toyota has spared little thought when distinguishing its new Supra from its BMW sibling, and that includes the design of its logo. The sweeping 'S' on the Supra badging is modelled on the Wehrseifen section of the Nürburgring Nordschleife – a downhill, sweeping section around five miles into the 13-mile lap. Toyota has only confirmed that the 'S' is inspired by the twisting track, rather than the full 'upra'. But there's definitely a hint of Karussell in the 'U'...

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MATTERS *of* MOMENT

Niki Lauda
1949-2019

Farewell to a true one-off

'EXTRAORDINARY' SCARCELY DOES HIM justice. Niki Lauda rarely features near the top when motor sport's all-time greats are discussed, but three world titles put him very firmly in that bracket. Andreas Nikolaus Lauda was an exceptionally fine racing driver - and an even more remarkable human being. His death on May 20 will be felt far beyond the sport he graced.

Perhaps his reputation suffers because of his cerebral, calculating style. He didn't have the overt flamboyance of Gilles Villeneuve, Ronnie Peterson or a young Jody Scheckter, but he understood that winning races was not necessarily the key to securing motor racing's biggest prize. In two of his three title seasons - 1977 and 1984 - he scored fewer victories than some key rivals, yet accumulated more points. Such shrewd methodology contrasts sharply with the kind of financial risks the younger Lauda took to secure himself a seat at motor racing's top table.

Born into a wealthy Viennese family, Lauda had the means as a teenager to purchase a Mini Cooper S, with which he contested local hillclimbs from 1968, and he soon began to taste success in sports and saloon cars. That led to an invitation to race for BRT in the 1971 European F2 Championship - and he also made his F1 debut that summer, in an uncompetitive March underwritten by the Austrian GP organisers, who wanted a local driver on their grid.

For 1972 March offered him a dual F1/F2 programme, which required a significant bank loan - and the first he tried to secure was turned down... because Lauda's grandfather, who detested motor racing, was on the board that needed to approve such deals. Undeterred, Lauda borrowed from elsewhere.

Portrait of the artist as a young man: Lauda's broad, toothy grin was an early trademark

MOTORSPORT IMAGES



Lauda flying at the Nürburgring in 1976, before the accident that triggered his amazing comeback

The March 721 proved hopeless, but Lauda won that season's British F2 Championship and finished fifth in its European counterpart. Late in the campaign, loan still not repaid, he learned that March would be unable to run him in '73, but managed to persuade BRM boss Louis Stanley to hire him on the basis of a deferred payment from a non-existent sponsor. His performances during the early part of the campaign - notably in Monaco - persuaded Stanley to let him keep the drive for free, so long as he committed to a deal for 1974. Except that Enzo Ferrari's interest was also now piqued...

Disentangled from his BRM paperwork, he was free to join the Scuderia - and start repaying debts. He won his fourth race for the team, Spain 1974, was in title contention prior to a late string of retirements and then dominated proceedings the following season, taking five wins in the new 312T.

Back-to-back wins at the beginning of 1976 promised more of the same, but this would be the year that forged the Lauda legend for reasons other than his racecraft. During a season notable for controversies on and off the circuit, he suffered serious injuries in a fiery accident during the German GP and was read the last rites... yet six weeks later he was back behind the wheel, finishing fourth in Italy.

That temporary absence had allowed James Hunt to reduce his championship deficit and the title distilled to a showdown in Japan. After a delayed start due to fierce rain, Lauda completed just one lap before deciding conditions weren't fit for purpose. Hunt went on to take the third place he needed, but Lauda never had any regrets. "As it was starting to get darker, the organisers said, 'Right, we have to race now because of TV.' I thought it was idiotic - why hadn't we started earlier when the light was better, because the rain was no different? This stupidity, because of TV, meant conditions were wholly unacceptable. And anyway, I didn't lose the title because of Fuji - I lost it because I missed three races..."

"It's hard to imagine there will ever be another quite like him"

One year later he would be champion for a second time, but then quit Ferrari - the wrong decision, he later conceded - for two seasons with Brabham, towards the end of which he decided he'd had enough of racing and walked away to focus on his airline business.

By 1982 he was back - persuaded out of retirement by new McLaren boss Ron Dennis, for whom he had also taken the 1979 BMW Procar title. He won the third race of his comeback season, at Long Beach... and from 1984 found himself once again in F1's quickest car, the TAG turbo-powered McLaren MP4/2, alongside Alain Prost. "F**k me he was fast," Lauda said. "I realised I wasn't going to beat him in qualifying and decided I had to try something else. So from Friday I worked on race set-ups and on Sunday I was generally in better shape."



MOTORSPORT IMAGES

Prost won seven races to Lauda's five, but the Austrian took the title by half a point. He would score one more GP victory, his 25th, at Zandvoort in '85, but retired at the season's end to concentrate on his business interests - although he remained a familiar F1 paddock presence (his forthright opinions made him a popular TV pundit).

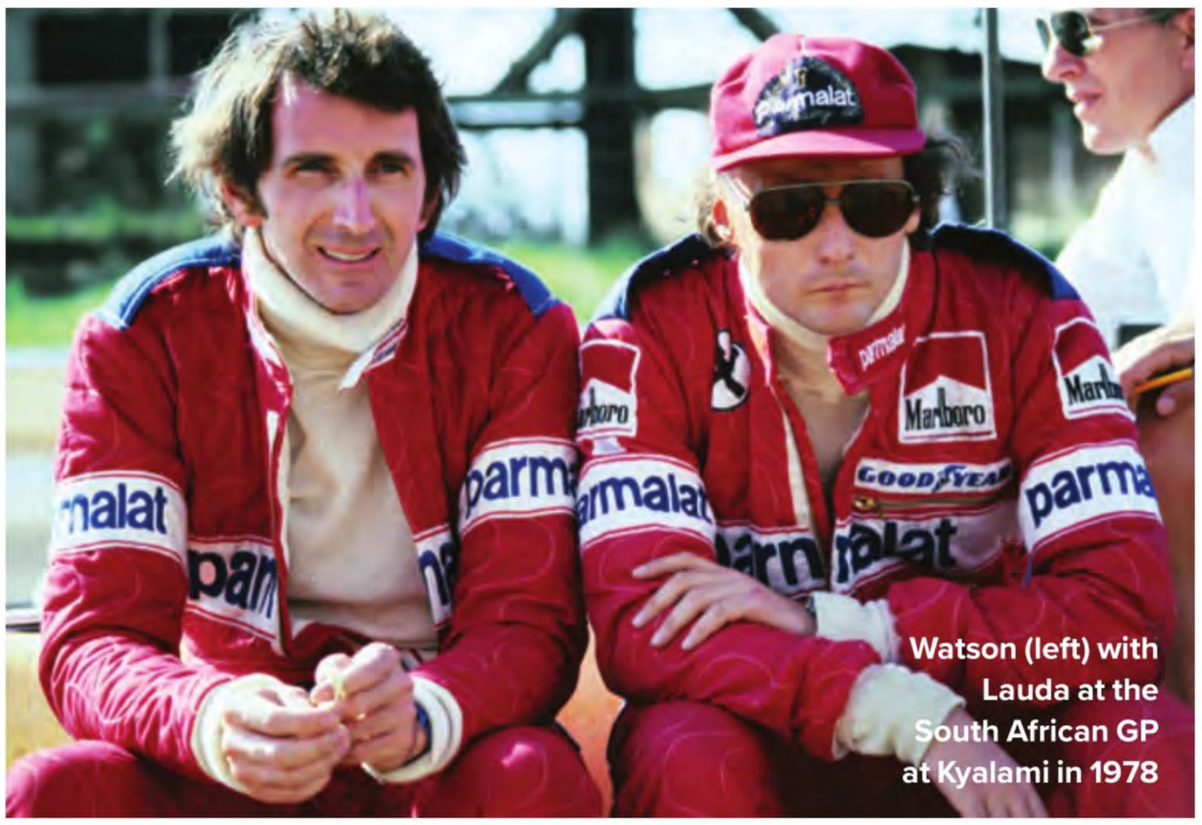
He held advisory or management roles with Ferrari and Jaguar during the 1990s and early 2000s, then returned to the limelight when Mercedes appointed him non-executive chairman of its F1 team in 2012. It was Lauda whose persuasive powers convinced Lewis Hamilton to defect from McLaren - and the fruits of that deal continue to accumulate.

Niki Lauda remained true to the period in which he evolved as a driver. Happy in a comfortable pullover and jeans, he was a refreshing antidote to modern F1's corporate gloss - and a straight question would always receive a straight answer.

It's hard to imagine there will ever be another quite like him.

Team-mate, rival, friend...

Five-times grand prix winner John Watson remembers Niki Lauda



Watson (left) with Lauda at the South African GP at Kyalami in 1978

They raced against each other for many years and together in Formula 1 for three seasons but throughout there remained a strong mutual bond between Niki Lauda and John Watson that defused the competitive tension.

"I think it's a reflection of the era in which we grew up," Watson says. "We first met in 1971, when we were competing in European F2. We were part of a band of brothers, travelling from one event to the next, eating in the same restaurants, staying in the same hotels – much quainter than the horrible big things grand prix teams use today. It was very easy to develop friendships and Niki and I always got along well.

"It was soon apparent that there was much more to him than just natural ability, too – he was obviously quick, but he swiftly established himself as a great communicator, able to tell his mechanics what needed changing. That might sound fundamental, but he had a way of doing it very concisely, using far fewer words than most of us, and it was very effective..."

Lauda and Watson teamed up in F1 for the first time in 1978, with Bernie Ecclestone's Brabham-Alfa Romeo team, and finished fourth and sixth respectively in the world championship. "What I most remember about that season," Watson says, "is the fun we had – and Bernie was very much part of that. Everything would be intensely competitive at the track during the day, but then we'd all go out together for a nice meal.

"It was the same when we were at McLaren in the early 1980s. I'd been there for two or three seasons before he joined – and, obviously, he wanted to take control when he arrived, but that was fine. It was actually very satisfying when I could trigger an outburst of, 'How's f***ing Watson done this?' or 'How's f***ing Watson done that?' I relished the challenge of taking him on and it never affected our relationship.

"Is there a tendency for people to underrate Niki? I think there is. He might not have been as spectacular to watch as some of his rivals, but raw speed is only part of a driver's armoury. Niki was also fiercely intelligent and it was a combination of factors – his speed, his analytical mind, his ability to manage races – that made him a formidable opponent.

"He was absolutely one of the greats."


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Neuville's Hyundai clips a ditch on the exit of a fast right-hand bend, and is launched into a series of high-speed rolls in Chile

Speed and safety combine

THIERRY NEUVILLE'S HUGE ACCIDENT during Rally Chile may have been spectacular, but it also served as a reminder of how far the World Rally Championship has progressed with its safety standards since the days of Group B.

Neuville's Hyundai i20 Coupé WRC was pitched into a series of high-speed rolls after he clipped a ditch during the Saturday morning loop of stages on the May 10-12 event. Despite suffering a cut to his left leg and bruising to his foot, Neuville and his co-driver Nicolas Gilsoul escaped unscathed.

Gilsoul said: "I was a bit marshal and a bit doctor immediately after. We were perhaps only a few centimetres out of line and it cost us big. We were both in a state of shock afterwards and Thierry had some blood coming from his leg, so I told him to lay down and keep his helmet on while I pressed the red [emergency] button and I had to find the fire extinguisher because something was on fire at the back of the car - it was fluid on the brake disc. But the car looked after us. We're very thankful for it."

According to Nicky Grist, who co-drove



W Series leader Jamie Chadwick has secured an F1 development role with the Williams team

W Series' first major export

W SERIES MAY BE WORKING AS intended, with Jamie Chadwick having sealed a deal to become a Williams Formula 1 development driver.

Runner-up to Beitske Visser at Zolder and winner of the first race at Hockenheim, Chadwick has joined Williams' Racing Driver Academy, acting as a test and development driver to support the F1 operation with possible practice session appearances.

W Series remains a tough watch, however, with teething issues mainly down to broadcasting.

The damp surface had drivers locking up at the Hockenheim hairpin in the inaugural race, and the presentation wasn't as slick as the surface - with audio issues and a lack of live timing. Live timing was present for the second race (at Zolder). Belgian Sarah Bovy - given a wildcard entry for her home race - had a torrid weekend as her F3-spec Tatuus broke down on the formation lap.

The race began anyway and the ensuing battle between Visser and Chadwick more than made up for it.


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legends such as Colin McRae and Juha Kankkunen across his 21-year WRC career, the crash illustrated the safety impovements that have been made in the sport.

"If that accident had happened in something like a Group B car, it wouldn't have been good news," Grist told *Motor Sport*. "Group B cars were hugely fast but only had thin aluminium rollcages. They were nowhere near the level of today's cars, which protect you so much better.

"That accident was almost a best-case scenario as rolling down the road dissipates the energy and there were no trees or rocks involved. The cars are now built with a bit of flex in the chassis for times like that, because if they were rock solid the crew inside would take such a beating.

"Helmet technology now is brilliant at absorbing shock, and is up to 40 per cent stronger. Plus you have wrap-around seats that also bolt to the rollcage at the back to ensure they don't move, because if a seat moves the belts can slacken. Plus cars must have door bars and 5-6inches of impact absorbing foam, and then there's the frontal head restraints...

"We have the fastest World Rally Cars ever, and safety, too"

"As a competitor at world level you're programmed to accept the risks. When I was competing at that level I honestly never thought about having a big accident, it was just get your head down and get on with the job, but we know these accidents happen. It's good that the FIA is now involved with the safety aspect, whereas it wasn't so much with Group B. This is why we can now have the fastest World Rally Cars ever, and still enjoy an element of safety."

The inaugural Rally Chile was won by Toyota's Ott Tänak, who moved to second place in the championship behind leader Sébastien Ogier


Only three Type 64s were built, and only this one survives

Could this seminal Porsche also become the most costly?

THREE PORSCHE TYPE 64S WERE BUILT for the Berlin-Rome 1500km road race, but two were destroyed and that race never took place.

The last surviving Type 64, however, was carefully kept by Porsche racing driver Otto Mathé for years and now, after changing hands only twice in seven decades, it's for sale at RM Sotheby's August Monterey auction.

The car was built to satisfy Ferdinand Porsche's racing itch but also to advertise Germany's new car for the masses: the KdF-Wagen. The full story is on *motorsportmagazine.com* but the crux is this: The Type 64 could become the most expensive Porsche to sell at auction, with an estimate of $20 million, because without this, there would be no 356, 550, or 911.



The T-type SSSC2 is back in the UK ahead of a race return; below left our test from 1977



A supercharged single-seater Bentley T-type

READERS CAN SEE how three years of effort has resulted in a big blue single-seater of almost submarine length and profile. I had no inkling of what awaited me at our Surrey test track. Our editor had described it as having some kinship to the Flying Fifteen car, so my curious ware of a true original formula machine of quite unbelievable power, thanks to a supercharger mounted on the aluminium V8! What I found as the sun struck was equally incredible. The front-engined monster is a quite beautifully finished tribute to the development abilities of Lindley. Equipped with large silencers we could shuffl gently along in true Bentley style, former pressure on the accelerator turning "Gently Bentley" into a throbbing beast whose mandatory narrow wheels could not contain the torrents of energy being spin so cautiously over exceptionally slippery tarmac. Very impressive, but what is the point?

Barrington Eastick, a stalwart of the Bentley Drivers' Club, decided in 1974 that the development left in the most popular Bentley racing classic, the highly modified Mk 6-based cars, was limited. He recalls, "people think the BDC runs consist of a lot of snobs with too much money. When I started racing Mk 6s you could pick one up for a £200 or so; now, of course, it's very different. Newcomers must find it much harder to get started than I did ..."

Mr. Eastick decided that the then-current T-type specification could provide the basis for a much faster car: the V8 engine, all that braking and independent suspension were all key factors. Mr. Eastick was fortunate in obtaining the necessary T-type suspension, steering and engine would need expert help indeed. Also BDC rules to cover a T-type were swiftly formulated around the gearbox pattern. The T-type sprint and designer Martin Slater at Victram Francis the car was ready last year.

It was conceived as a single-seater, but has since turned into a dual-seat sports car. The key to the project's success has undoubtedly been its extreme flexibility: everything was designed to ensure that everything would be as simple as possible, and development must dictate.

The basis for the car is a tubular steel spaceframe, with 6 ft. 10 in. wheelbase. The cross-members are used as oil tanks, providing some 6 gallons of oil. The stiff, aluminium panels are screwed on.

At the rear the 1 gallon fuel tank is mounted 5 gear 1:1 layout, which is mounted transversely behind the engine and driven by a Morse chain. The 6¾ litre engine and gearbox are then placed at the rear of the chassis. The Bentley racing car is fitted with a 6¾ litre engine and gearbox, driving through a Morse chain. The engine is placed at the rear of the chassis. The Bentley racing car is fitted with a 6¾ litre engine and gearbox, driving through a Morse chain. The engine is placed at the rear of the chassis.

Bentley's rare formula racer

A UNIQUE SINGLE-SEAT Bentley racing car built in the 1970s and developed with the direct assistance of Rolls-Royce, has been brought back to the UK and fully restored after spending more than 20 years languishing in Florida.

The so-called T-type SSSC2 was created by Barry Eastick, who had the idea in 1974 and took three years bringing the car to fruition. Featuring a 6230cc V8 motor from a standard T-type saloon, Eastick fitted a Roots-type supercharger to provide a healthy 400bhp power output. The car has been recovered by his son Ben who, having shaken the car down, intends to develop it further during the course of the year before racing it in anger next season.

The T-type is built up around a unique spaceframe structure, clad in aluminium panels, but using the all independent front and rear suspension from the T-type/Silver Shadow. It has a four-speed manual gearbox from an R-type Continental, which the younger Eastick acknowledges is probably a weak link in the train, given the torque produced by the blown V8 will be out of all proportion relative to what it was designed to transmit.

Jeremy Walton tested the car for *Motor Sport* when it was new (October 1977), reporting: "If the dead steering and adequate, rather than inspiring, brakes left me little desire to actually race the beast, the memory of that hearty engine is unlikely to fade."

We look forward to hearing it at UK circuits again soon.



The Flying Scotsman could soon be banned from main railways

GETTY

Will the Flying Scotsman run out of steam?

IN MUCH THE SAME WAY THAT STIRLING Moss's name remains synonymous with motor racing, The Flying Scotsman has a similarly strong affiliation with rail travel – even though it was built 96 years ago.

But now one of Britain's most famous engineering feats, a past holder of the world rail speed record as the first locomotive officially to be recorded at 100mph, could be expelled from mainline railways... because of trouble caused by trespassing enthusiasts.

A Pacific steam locomotive built in Doncaster for the London and North Eastern Railway (LNER), The Flying Scotsman clocked up more than two million miles before it was retired from front-line service in 1963, since when it has remained in occasional use – particularly on nostalgia tours. It was during one of these, while it was travelling through the Midlands early in May, that almost 60 regular rail services were delayed for a total of about 17 hours due to fans of The Flying Scotsman breaching boundaries and standing too close to tracks.

Network Rail has said that continued disruptions of this kind could lead to The Flying Scotsman being sidelined from main routes, although it conceded that such a move would only be implemented "as a final resort".

The Flying Scotsman set its world rail speed record in November 1934, while running on the East Coast line.

More than half a century later, during an Australian tour, it also set a record for the longest non-stop run by a steam locomotive, having completed 422 miles.

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MARK HUGHES

"Parts of last year's Mercedes already look clunky next to the W10"

UNINTENDED CONSEQUENCES invariably unfold whenever Formula 1 makes any sort of change. It's inevitable in something so complex. They can be good or bad. The tweak to the aero regs for 2019 was done with the best of intentions, to allow the cars to run more closely together, and there probably has been a slight improvement. But some of that will also be due to the fact that the thinner gauge Pirellis - introduced to reduce blistering - do not overheat so readily when you're close behind another car through a long corner; a positive unintended consequence of the tyre tweak.

But if there's been a negative it's that it seems to have impacted harder on Ferrari and Red Bull than on Mercedes. So just as those two teams seemed to be building up a head of steam, the regulation reset played against their aero concepts and gave Mercedes a further advantage.

This is to take nothing away from Mercedes; its 2019 edge will not solely be down to that. Even after five years of winning, the team has worked away with incredible focus on making the tiniest incremental changes that add up to a significant total. James Allison has mentioned that there are parts of last year's car they believed to be at the absolute outer edges of feasibility in terms of packaging, but they already look clunky alongside the W10. This systems integration between and within the engine and chassis groups is only going to get tighter, too; an all-new digital programme running through both bases has been introduced, to make clearer to everyone the areas on which they need to focus to make the car faster. This is the most potent grand prix team of all time.

But it has been helped by the rule change. Its long-wheelbase, low-rake concept has been more adaptable than the shorter, higher-rake Ferrari and Red Bull.

The simplified front wing endplates demanded this year, with none of the complex array of turning vanes to direct the airflow around the front tyre, led Ferrari to induce the outwash around the wheels by tapering down the wing elements at the outboard ends. There is a natural limit to how much airflow you can usefully direct through the barge boards and underfloor from the inboard end of the wing; there is only so much airflow energy to be squeezed into a limited amount of space. Feed more in and you will lose more performance from the drag increase than you'll gain from any downforce boost. So, with that area being worked to its maximum, aerodynamicists deploy the rest of it outside the wheel, where it usefully prevents the turbulence generated by the wheel from interfering with the downforce-generating flow along the body sides.

With a ban on all those endplate vanes, it's much more difficult to turn excess pressure around the wheel. So now there is a limitation at both the inboard and outboard ends. One solution is to reduce the area of elements at the outboard end - surrendering some direct wing-generated downforce in the process - to help aid that outwash. Which is how Ferrari - and others - have ended up with that type of wing.

"We've had five Mercedes 1-2s at the time of writing. Not what was intended..."

The longer wheelbase of the Mercedes allows for a greater gap between front axle and sidepod and therefore the barge board area has a greater capacity. In which case there has been no need to divert so much airflow in the service of the outwash and therefore no need to surrender the element area at the outboard ends. So the barge boards can handle a greater throughflow, creating more downforce by accelerating that part of the airflow harder, without surrendering downforce from the front wing.

Red Bull, which has traditionally favoured a shorter car, has experienced difficulty from the limitation of the under-nose guide vanes to two per side. The vanes help condition which air will be guided through the barge boards and which to the underfloor. Getting that balance right is crucial to overall aero performance. Airflow generally doesn't like having its direction changed suddenly and has to be coaxed gently or in stages. Hence the previous multiplicity of vanes was useful to Red Bull, given that there was less length in which to change the airflow's direction.

With Red Bull's super-high rake concept, the negative pressure created by the Venturi formed by the angled floor helps pull the required amount of air to the underfloor, leaving the guide vanes to condition the remainder as required. But as soon as the rake decreases - when braking finishes, for example - you can find yourself with insufficient flow being pulled into the underfloor as that Venturi is no longer powerful enough. Two guide vanes may not be enough to cover the different flows required at high and low rakes. In such a situation, you probably need an even higher rake so that the floor maintains an adequate pull on that under-nose airflow even as you stop braking. But Red Bull is limited now in how much rake it can run - because the rear driveshafts cannot run at any more of an angle without putting excess strain on them and the transmission.

So we've had five Mercedes 1-2s at the time of writing. Not what was intended...

Since he began covering Grand Prix racing in 2000, Mark Hughes has forged a reputation as the finest Formula 1 analyst of his generation
Follow Mark on Twitter @SportmphMark



MAT OXLEY

"F1 went so far with aero that cars can't overtake. That's our fear for MotoGP"

MOTOGP'S AERO CONFLICT has been looming since 2016, when Ducati introduced its first multi-winged Desmosedici. Hostilities finally broke out at the start of this season, when Aprilia, Honda, KTM and Suzuki protested Ducati's latest aerodynamics device: a swingarm attachment that, depending on your viewpoint, either creates rear downforce or cools the rear tyre.

Ducati successfully argued that the attachment's purpose is tyre cooling, which makes it legal, even though rival marques produced evidence that it creates downforce, in which case it shouldn't be legal.

Inevitably, Ducati's rivals are now running their own swingarm devices. "It's interesting," said reigning world champion Marc Márquez after trying Honda's attachment. "At brake points you can feel the downforce."

This furore requires that MotoGP must now ask itself the big question: which way to go with aerodynamics - forward, back or stay where it is now? All six manufacturers - Aprilia, Ducati, Honda, KTM, Suzuki and Yamaha - have their own opinions on the subject. This is no surprise, but it is a problem, because in MotoGP it's the factories that must unanimously agree the technical regulations, in accord with rights-holder Dorna, the international federation and IRTA, the teams' association. In other words, there's plenty of horse trading to be done.

Ducati is the keenest on pushing into the future with aerodynamics, which for several decades had been a mostly forgotten science in bike racing.

"It would be a mistake to reduce aero in MotoGP, because aerodynamics is also important on streetbikes," says Gigi Dall'Igna, chief engineer at Ducati Corse. "I think it's important that the manufacturers develop their knowledge of aerodynamics; not only to increase performance, but also to improve engine cooling, rider comfort and so on."

There's no doubt that aero improves performance in MotoGP. Front aero - wing-shaped devices, fairing sidepods and so on - increases downforce on the front tyre; to increase front contact, so that riders can push harder into corners, and to reduce wheelies, so riders can use more throttle out of corners.

"We can add about 10 kilos of load on the front tyre," says Riccardo Savin, Ducati's MotoGP vehicles dynamics manager. "When the front tyre just touches the asphalt, then lifts off it, then touches the asphalt again, then lifts again, the bike becomes unstable and difficult to manage. Aero can help here."

Which is why Austrian company KTM stands firmly on the other side of the debate.

"Of course, aerodynamics makes life easier for the rider," says KTM team manager Mike Leitner. "Without the wings maybe the riders would have to roll off the throttle to keep the front wheel on the ground, but these are the best riders in the world and the more devices you add to the bikes the easier they are for the lesser-talented riders. The bikes will be more difficult to ride without aero devices, but this should be the challenge!

"F1 cars went so far down this road that they can't overtake each other. This is our worry for the future of MotoGP. Now all the manufacturers are working for downforce. Maybe the next step will be: 'how can we design an aero body that disturbs the guy behind at high speeds, so he has to keep his distance?' Where's the end?

"We also have to think about safety. The wings allow bikes to use more acceleration, so they arrive at the next corner faster, so if a rider crashes, he crashes at a higher speed. Already at many tracks we are running out of run-off: Sachsenring, Brno, Mugello.... For me, if a rider has to fight with the bike on the corner exit it looks better and he will arrive at the next corner slower, so it's safer."

"If a rider has to fight a bike on corner exit it looks better"

The other four brands stand somewhere in the middle of the debate, happy to see things stay as they are, or perhaps take a few steps back, but certainly none forward.

"Our opinion is that we want to develop technology that can be transferred to streetbikes, because this is one of the main reasons we go racing," says Takeo Yokoyama, technical manager at HRC (the Honda Racing Corporation). "In the case of aero, we don't think we can convert so much technology to streetbikes. We need to stay connected to the street market, which is why extreme aerodynamics is not the right way to go."

Romano Albesiano, Aprilia's technical director, agrees: "As a technician I like aero, but I would keep things as they are now, with clearer rules, so that costs are limited, but so we can do something, because I think it's good for the fans to see the faces of the bikes changing. When everything was done with electronics it was quite boring - the new bike looked the same as the old bike which looked the same as the previous bike! I think MotoGP needs an aero adviser, perhaps from F1. The key thing is to have a clear idea of where we want to go with aero, then write the rules accordingly."

Dorna is now hosting discussions. The most likely scenario is that MotoGP will keep aerodynamic technology at roughly the current level, but with tighter, better-written rules. But it's not out of the question that all aero attachments will be banned in future.

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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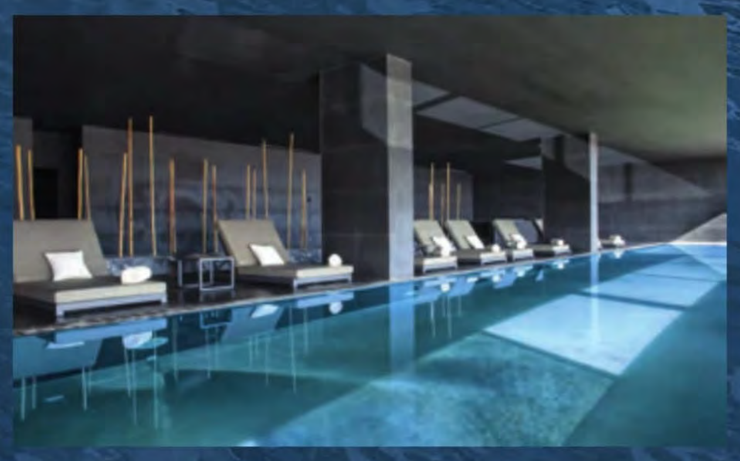
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DOUG NYE

"It was a multi-million dollar accident, all caused by a loose manhole cover"

GROUND-EFFECT RACING CAR aerodynamics can be a double-edged sword. In essence, those airflow-accelerating underfloor surfaces were developed to suck the car's chassis down against the road surface at high speed, therefore enhancing adhesion, traction and cornering grip. The technology has worked incredibly well when the constructor gets his sums and his shapes - and his car balance - right.

Back in 1978-79 at Ketteringham Hall - the home base of Team Lotus - I was shown a Lotus 79 in assembly. As the boys offered up a sidepod, engineer Nigel Bennett remarked "The question is, will it suck?" In practice the answer was absolutely 'Yes', it sucked alright, and driver Mario Andretti rhapsodised about how the car "...feels like it's painted onto the road..."

Now that's fine, as long as the road surface itself stays put, and bits of it don't get sucked up towards the car's underfloor, as opposed to the underfloor getting sucked down towards the road. And so we arrive at what can happen when a piece of road surface, aka a loose drain or manhole cover, is potentially detachable.

If such covers have not been tagged, bolted or welded in place they can obviously pose a truly sinister hazard. The first time I really appreciated this was when a friend returned from a 1960s Angolan GP in Luanda, describing how his practice laps had been punctuated by finding "...blokes on their hands and knees in the middle of the track, welding manhole covers shut."

In more recent times, loose covers of this kind have caused disruption at such circuits as Monaco and Shanghai. So when I saw the unfortunate George Russell's Williams FW42 being eviscerated by an up-edged cover during GP practice at Baku, my instant reaction was twofold: A) Cor! - I hope that missed the poor kid's nethers! - and B) Oh my, here we go again...

Obviously an insecure drain cover can be flicked up by the bounce of contact from a wheel, but the sheer suction effect of a modern racing car's underfloor - despite being only fleetingly applied - can still be truly immense.

Another friend once told me how he'd recently tested a Nissan IMSA prototype. It had the most enormous underfloor area, generating more downforce than he'd ever, at that time, experienced. But what really impressed was more the in-cockpit noise the thing generated.

"I did a slow first lap or two just to find where everything was..." he recalled, "... then went for a time. The turbocharged engine was relatively quiet but the faster I went, this weird roaring, rumbling background noise built up. Even with earplugs it became almost deafening. I felt sure it must be coming from the transmission or a spun wheel bearing. So I pulled into the pits and reported this terrible noise. And they just looked at me, then burst out laughing and said 'Oh that's just the airflow through the underfloor tunnels. Haven't you heard that before?"

"The shattered cover blasted through the Porsche's windscreen"

So then I thought back to September, 1990, and the Mondial Players race - the penultimate round of that year's FIA Sports Prototype World Championship series - on Montréal's *Île Notre Dame* Circuit, or Circuit Gilles Villeneuve. That race was notable for two things - the racing debut of the new 3.5-litre V10 Peugeot 905, and for being stopped by the most catastrophic 'manhole' incident seen yet.

Kenny Acheson's Lola-Nissan R90CK first dislodged an insecure manhole cover on the very fast backstretch. It thudded against his car's undertray, then skated back into the path of Fermín Vélez's Spice SE90C, which also clipped it but continued. French driver Denis Morin's Courage-Porsche C24S was next along, and he hit the tumbling cover hard. The Courage vaulted over it and slithered to rest with its front end and underside completely shattered...

Husky Spaniard Jesús Pareja was right behind, flat-strap in the Brun team's Porsche 962C which he was sharing with Swiss Bernard Santal. Part of the shattered, now bouncing, cover blasted straight through the Pareja car's windscreen - miraculously missing him somehow - but other debris 'did a Russell' to the turbocharged Porsche's underside, slitting its monocoque and puncturing the midships fuel tank.

Spilled fuel instantly ignited into a furious fire, and the Pareja Porsche pin-wheeled along the retaining wall.

In his wheel tracks was his Norwegian team-mate Harald Huysman, who in avoidance crashed the second Brun Porsche 962C into the wall. Pareja then managed to escape unaided from that glittering fireball, but - understandably rather peeved after the incident - he then had an altercation with marshals whose arrival and warnings he clearly deemed inadequate.

The race was red-flagged, not re-started, and the result was declared as at the end of lap 61, so only half championship points were awarded.

That was a multi-million dollar 'manhole cover' crash - and it was also, reputedly, the first race in which Jesús Pareja had worn a full-face helmet. Now there - like George Russell - was a rather lucky boy.

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

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The restoration was undertaken by GTO Engineering and incorporated some of the very best subcontractors in order to take the standard of execution to the highest order, indeed it could be argued that the restoration of 10835 was a turning point in the accuracy of Ferrari restorations in the UK. RS Panels were entrusted to strip and repair (where barely necessary) the body, thankfully it's time spent outside the UK no doubt assisted the integrity of the metalwork. Spraytech then painted the car in period-correct Grigio Mahmoud and genuine Red Vaumol (Bordeaux Red) Connolly leather was sourced for O'Rourke Coachtrimmers to perform their magic. Overseen throughout by noted Ferrari historian Keith Bluemel and assisted by others (including myself on occasion) in order to achieve an exemplary standard without leaving any details overlooked.

10835 has since excelled in every public showing it has been presented at. It's first outing on the show circuit was Europe's pinnacle event; Concorso d'Eleganza at Villa D'Este in May 2011. American journalist Winston Goodfellow, one of the Judges, wrote in Forza magazine in November 2011 that it "was one of the finest four-cams I have ever seen with superb colours, great attention to detail and beautifully walked the line between original and over-restored" he went on to say that "10835 finished just a single point behind the Alfa 33 Stradale that eventually went on to become best of show".

Other appearances include;

- September 2011, National Ferrari Owners Club Concours. Best of Class and Best of Show.
- December 2011/ January 2012 edition of Cavallino magazine. Front cover and subject of the main feature article
- Salon Privé, London 2012. Best in Class and The People's Choice
- Concours of Elegance, Hampton Court 2014. 'Best of the Best' Club Trophy (presented by Prince Michael of Kent)

With the car well-proven on the show circuit it has since been very sparingly enjoyed on the road, weather permitting. Condition can only be described as 'show ready' and in excellent mechanical fettle having most recently been maintained by Bob Houghton Ltd. With Classiche Red Book certification, it is accompanied by a full complement of books (including it's original Warranty card) and tool roll.

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ANDREW FRANKEL

"There are as yet no plans to ban 1950s French snails, so I'll be fine for now"

IT MIGHT BE THAT YOU'VE CAUGHT ME on a bad day, but it seems the future for those of us who enjoy motoring is grim. I know successive generations have said the same thing and we have all managed to have a good time regardless, but the situation we face does now seem to be very different, even if you take into account the almost limitless creativity of engineers to duck around or at least mitigate the worst effects of new legislation.

I've tried, but I just can't get excited by electric cars, I'm afraid. I can see how they can work as functional devices once the range and recharging issues are fixed, but there is nothing about them that appeals to the enthusiast in me and plenty that does not. They make no sound that is of interest to me and their enormous mass compromises everything I enjoy about driving. Those who create them trumpet their astonishing performance while forgetting the link between fast and fun is tenuous at best if, indeed, it is there at all.

Allow me to illustrate. I own a 1950s Citroën 2CV, as does a friend in the same line of business. It's no more than the truth that, between us, we've driven at least one example of every high-performance production road car to be launched in the last 20 years. Last weekend we decided to take the 2CVs for a drive. The following morning he texted me: "Just woke up. Still laughing." I've driven cars worth a million pounds or more, with more than one thousand horsepower, and had far less fun than we did with our two silly old sheds.

There is much solace in this because, as yet, I know of no plan to ban '50s French snails, and until there is I'll always have something enjoyable to drive. And they use so little fuel, I should still be able to fill it up almost regardless of the price per litre.

But as I get older there is a greater comfort to be drawn upon. I've already had over 35 years on the road and, even if I'm spared and still fit enough to be driving 35 years from now, I know at least two-thirds of the miles I will ever do have already flowed under my wheels. Probably closer to three-quarters. I've had my fun, what fun it was and, at least for now, continues to be. But even in this period, life on the road has changed beyond recognition: I look back at some of the things myself and my fellow road test cubs got up to in the late '80s and early '90s with something approaching disbelief. We had a blast. Literally.

It's the person who is today the rabidly enthusiastic 17-year-old, ritually shredding his or her L-plates, for whom I feel sorry. The new cars that populate their future will be increasingly and then overwhelmingly electric. And even if they were enjoyable to drive, I believe motoring for pleasure will become ever more socially unacceptable than it is now and legislation will be brought in to reflect that fact. In fact, it's already happening.

The only answer for those not sold on track days will be cars that can make you cry with laughter without ever going near a speed limit. It's an irrelevance because I'll never, ever sell mine, but I expect to see the values of 1950s 2CVs and their like only heading in one direction.

I'VE DONE TWO RACES IN THE OLD TT Bentley in the last month and come across generally decent driving standards, but with a couple of scary exceptions.

The difference might be that the Bentley was quite competitive in the first race and not at all in the second, so at the latter I was the one being overtaken; but there were at least two instances when I was being lapped where the quicker car not only assumed I'd seen him but also put me in a position where the choice was immediate evasive action or a crash. Which in an open-wheel car on skinny tyres, with no belts or rollover protection and a sky-high centre of gravity, is some distance from my idea of a good time. One of these instances was so close that the chap following was sure I'd been hit.

I wonder what these people think they are doing. There are exceptions, but the overwhelming majority of people who race historics are middle-aged amateurs with expanding bellies and receding hairlines just like mine. And if doing well is so important that you are happy to risk crashing into people you are not really racing, ruining their weekends at best, risking their lives at worst, I think it's probably time you took a look in the mirror.

"I was faced with either immediate evasive action or a crash"

When earlier this year the Duke of Richmond wrote to Goodwood competitors naming those he'd banned, reprimanded or warned for their driving standards, I expected some kind of outraged reaction from the community. On the contrary, the overwhelming body of opinion I heard was that it needed saying. A couple of owners even said they'd consider bringing their cars back to Goodwood again. I'm all for close racing but this is not professional sport, it's just a bit of fun and some seem have forgotten that, if ever they knew it in the first place. Allowances need to be made for cars that are slower than yours and for drivers with a wide range of abilities. Otherwise it will end in tears.

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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JENNIE GOW

"It's very hard to find a reason not to like Charles Leclerc"

When it comes to Formula 1, I think I'm a bit of a jinx. My very first F1 race weekend was the epic Canadian Grand Prix of 2011, which lasted for a record-breaking 4hrs 4min 39.5 sec. Jenson Button eventually won in his McLaren after charging back from last place. It was such a fantastic race that I still remember the press pack, stood by a screen watching the drama unfold, clapping and cheering - we were all delighted for Button.

Fast-forward eight years and I was lucky enough to be at one of the longest single qualifying sessions in F1 history as accidents, red flags and missed opportunities bombarded our senses for almost two solid hours. The sun was even beginning to set by the time Valtteri Bottas took pole position for Mercedes and the world's collective media stood shivering in the shade of the Baku Parliament buildings.

There have been longer sessions - a tropical storm interrupted Brazilian Grand Prix qualifying in 2009, which is officially the longest in the sport's history as the rain poured down and the clock ticked around - 2hrs 41min - but Baku 2019 was right up there.

One of the things I like best about my job is working alongside some pretty awesome journalists and broadcasters. When you're all gathered in a media pen, freezing but huddled together in front of the TV screens watching the action, you all share something very special.

We watched Robert Kubica crash out before he went AWOL for an hour - not even his trainer or any member of the Williams team was able to track him down. The suggestion was that he got lost in the maze that is Baku city centre after a swift check-up at the medical centre, and struggled to find his way back to the paddock. We heard that screech and familiar thud again when Charles Leclerc went off at the same point a session later, and then witnessed Mercedes playing some pretty risky games by running Bottas just ahead of Lewis Hamilton and releasing both into traffic for their final Q3 runs - fascinating to behold. We all live it and love it together, whether you're a Brit, a Brazilian or a Belgian.

The press pack in F1 is immense. At Baku we were sat in a cavernous conference centre in a trackside hotel, which doubles up as the media centre. There's a blend of journalists and photographers from almost every country in the world. A few of them root for their national drivers but, equally, there are some stories that suck you in irrespective of your provenance - and Charles Leclerc's is one of those.

I remember standing in the Baku paddock in 2017, when Charles won an F2 race just days after his father had died... it was at that moment I realised what a special guy he is. The sheer strength of character it took to turn up in the paddock without the man who had always been by his side is hard to imagine.

When Charles crashed in Baku this year, everybody looked at each other with a raised eyebrow and a sense of disappointment. Here's a young man who could so easily have been on pole had he replicated his pace from the earlier sessions. The incident was made worse by Ferrari having new chairman John Elkann watching on from its pit. Is this why team principal Mattia Binotto has said to us that Sebastian Vettel is categorically Ferrari's number one driver? Could Leclerc's qualifying mishap cost him a real shot at taking team leader status from Vettel?

"It was suggested that Kubica got lost in the maze that is Baku city centre"

The fact that Charles was on the radio calling himself "stupid" and then saying he "threw it away" means this is a kid who is honest, frustrated by his mistakes and utterly grounded.

Charles's story, the death of his godfather Jules Bianchi, then his father, and his rise to a Ferrari race seat, perhaps to oust Vettel from the Scuderia and become a future world champion, make him headline news in almost every country. One German colleague told me: "It's very hard to find a reason not to like Charles."

Another man endearing himself to the media this year - a total change from 2018 - is Max Verstappen. I sat down with the Red Bull driver in Baku to chat about all things F1 and he was a revelation. Open, fun and far from last season's angry young man, who threatened to head-butt anyone who asked about his driving style.

It turns out that Max hated school, which isn't a huge surprise. He's gone cold turkey on the FIFA computer game and is now sim racing instead. In fact he recently won a sports car race on rFactor 2 - the Eight Hours of Silverstone, an official esports endurance event in which he teamed up with fellow countryman, World's Fastest Gamer winner and now McLaren simulator driver Rudy van Buren.

Verstappen has modest tastes - he's happy feasting on tomato soup and carpaccio, for instance - and overall he seems to be in a really good place at the moment, both on and off the racetrack.

Jennie Gow has been a staple of the BBC's Formula 1 broadcasting team since 2011, working across both TV and radio

Follow Jennie on Twitter @JennieGow

Is this really a one-horse race?

Despite Ferrari's previous flickers of promise, Barcelona illustrated a harsh reality for Mercedes' main rival. **Mark Hughes** crunched the numbers

FORGET, FOR A MOMENT, CHARLES Leclerc's unfortunate qualifying accident in Baku just as it looked like he was about to dominate the whole weekend and thereby go some way to compensating for the late loss of victory in Bahrain two races earlier. His mishap put in place a set of circumstances that allowed Mercedes to sweep to a fourth 1-2 (Valtteri Bottas ahead of Lewis Hamilton), thereby disguising the competitive state of play between the two teams at that point. Four races in, on pure underlying performance it should have been Mercedes two/Ferrari two.

Instead, Baku just underlined the all-round excellence of Mercedes. With Leclerc sidelined, they locked out the front row through cunning - effectively denying Vettel pole by a bit of choreographed trickery as they all left the pits for the final Q3 runs.

Pulling to the side - ostensibly to practise starts - just as Vettel had followed them out, trying to get their tow, left the German having to do his lap without the powerful slipstream reward down the long straight running alongside the Caspian.

The Mercs then each picked up tows worth 0.3sec. Vettel's untowed time fell 0.2sec short of pole... Before crashing, Leclerc appeared to have had about 0.3sec on Vettel at a track where he always flies. But he seemed just a little too determined to make his mark, to get out of the support role, to shade Vettel - with disastrous consequences. Without that, it looked likely to have been a Ferrari front row lock-out. Instead, it was all silver, Bottas and Hamilton taking care not to touch through the first two turns in a way they wouldn't have done if they'd been in rival teams. Bottas prevailed - and thereby took the win he was denied by a late puncture last year.

Two Ferrari wins from four would, of course, have given a very different perception to the prospects for the season ahead. But even had Leclerc not suffered his electrical glitch in Bahrain, even if Sebastian Vettel had not spun there when dicing with Hamilton and even had Leclerc not crashed in Baku qualifying, there were still some worrying underlying patterns. Worrying for Ferrari, that is.



Bottas avenged unlucky 2018 defeat in Baku, taking his second victory of the campaign

The implications of the 2019 regulations have moved Mercedes and Ferrari further away from each other in how their cars work (*see column, page 23*). Their performance patterns have thereby become much more distinctive and circuit-specific. Ferrari was fast in Bahrain and Baku, but not elsewhere.

So what was it about Bahrain and Baku? F1 teams work a lot with 'circuit sensitivities' and there are some vital clues to be found there. They measure how sensitive each circuit is to power, downforce, drag and tyre grip. There is an enormous variation. Therefore there's a big performance swing between two cars that are strong or weak in different areas.

Using index figures, the table below shows how the tracks up to Spain compared in those sensitivities. The index figures of 100 for Baku in power sensitivity and Shanghai for downforce reflect the fact that they are the most sensitive of all the tracks on the calendar in those measures. It means

CIRCUIT SENSITIVITIES

Power		Drag		Downforce		Tyre Grip	
Baku	100	Baku	85	Shanghai	100	Shanghai	89
Bahrain	90	Melbourne	72	Melbourne	91	Bahrain	78
Melbourne	83	Bahrain	71	Bahrain	74	Barcelona	76
Shanghai	61	Shanghai	56	Barcelona	72	Baku	73
Barcelona	57	Barcelona	42	Baku	71	Melbourne	65

Decisive moment in the Spanish GP, with winner Hamilton getting ahead as Bottas fights to stay in front of the wide-running Vettel

that extra power will find you more lap time at Baku than anywhere else - and that the same increase in power would find you only 57 per cent as much lap time in Barcelona as it would in Baku. Conversely, for a given increase in downforce you'd get maximum lap time benefit in Shanghai and only 71 per cent as much in Baku.

Which is a roundabout way of explaining that the potential pre-Barcelona score of two apiece (if results had followed the actual performance of the two cars) was heavily skewed in Ferrari's favour by the fact that we had just visited two tracks that give a big lap time reward for extra horsepower, one of which (Baku) also heavily favours low drag. The Ferrari has a power advantage over Mercedes and lower drag. The Mercedes has a significant downforce advantage over Ferrari, hence its superiority at Shanghai was no surprise - and it goes some way to explaining its great pace in Melbourne.

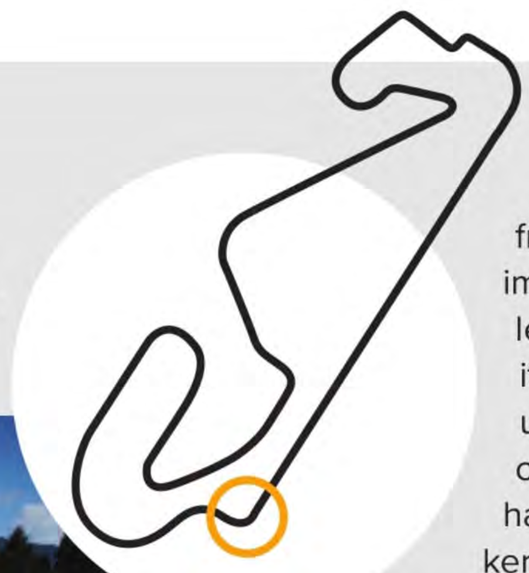
But it's significant that Baku and Bahrain are outliers in the general global demands of all tracks. Which others might suit Ferrari? Montréal, Spa, Monza - that's it.

So with battle renewed around Barcelona, a circuit with a much more 'normal' set of demands, we were set to see a more accurate picture of how the competitive order really stacked up - and therefore a more likely indicator of future performance. Add into that mix a massively powerful upgrade from Mercedes around its barge boards and front wing - reckoned to be worth more than 0.3sec. Ferrari had fewer updates and a small further increase in engine power.

Bottas took his third straight pole - 0.8sec faster than Vettel's third-placed Ferrari. Through the slow turns of the short final sector, the Mercedes was more than 0.6sec quicker than the Ferrari. The latter was taking about 0.1sec out of the Merc in the straight-dominated first sector, where its drag and power were rewarded (but not by anything like as much as in Baku or Bahrain). The Merc's downforce advantage over the Ferrari is at its most extreme in slower corners, but it was more than that: there is something in the W10's rear suspension (and

Trackside View

Turns 1-3, Circuit de Barcelona-Catalunya, Spain





The middle part of a sequence linking the first three corners at the Circuit de Barcelona-Catalunya

As far as technical demands go, there probably isn't a more testing sequence than Turns 1-3 of the Circuit de Barcelona-Catalunya. It has to be considered as one interlinked piece of asphalt because the car never recovers from one turn before it's time for the next.

The right-handed Turn One is approached from 200mph down to about 80 – and in this phase the Red Bull is fantastic, Max Verstappen banging down the gears between turn-in and apex and the car sitting solid as a rock.

The mix of elastomers, air manipulation and neurons seems most improbable from the outside. It's then immediately into the faster left-hander of Turn Two with its tricky camber change and uphill exit. It's tempting to carry a lot of speed in and hang the car out on the exit kerb – where a Williams invariably ends up, so much less grip does it have. But getting too far out there leaves you still fighting Turn Two when you really need to be lining yourself up for the long, ever-faster right of Three. Verstappen can approach it from well left of the track centre – which is farther out than anyone else can get.

But stand on the exit of Three and a fuller picture emerges. Although Verstappen approaches with a better angle of attack – the Red Bull doesn't build much more speed from that point.

Valtteri Bottas, by contrast, can hang on even as he's accelerating harder. Both are flat on the gas, but the Mercedes is ploughing through the tyre scrub way better, with less lock on. The 2019 cars are much more distinct in their behaviour than they have been for years.

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perhaps also in the software for the brake-by-wire) that allows it to maximise the tolerances allowed in regulations that ostensibly ban four-wheel steer. The wheels are not actively steered, but there is a simulation of that - and a breakthrough in how to set this up came from Hamilton's feedback in Baku. It worked devastatingly well through Barcelona's slow turns.

All of which was pretty devastating for Ferrari after the outward hope (albeit frustrated) given by Bahrain and Baku. "Our car's limitations have become clearer this weekend," said team chief Mattia Binotto. "There is an understeer balance and not enough downforce. They have been there at the other races. But how long it takes to address is difficult to answer. It may even be the car concept." It's rather beginning to look as if the momentum built up by the great Ferrari chassis of 2017 and '18 - which were arguably faster than Mercedes more often than not, as an average - has been brought up short by the change in regulations for this year. That and continued Mercedes excellence in every department.

So all that was really left to be decided was which Mercedes driver would win. Bottas had arrived here one point ahead of Hamilton and very much maintaining the momentum his season-opening victory had given him. After also winning Baku, his pole in Barcelona really laid down the gauntlet.

It all came down to a clutch vibration for Bottas at the start - which allowed Hamilton alongside on the run to Turn One. Bottas was planning to try for Hamilton's outside through there, but had to abort that plan when Vettel's Ferrari appeared on his left, squeezing him somewhat. Vettel flat-spotted a front tyre in that moment, allowing Mercedes its Hamilton-Bottas 1-2, and also paving the way for Max Verstappen's Red Bull to take third. Vettel's lock-up also left Ferrari with yet another awkward set of decisions to make regarding moving Vettel aside so that Leclerc could chase Verstappen. It took a while to do so - and later lost Vettel time by delaying moving Leclerc aside when they were on different strategies. The tentative calls were really not the Scuderia's biggest problem, though. Nor F1's... ○

Word on the beat

Rumour, gossip and news from the F1 paddock

● In Barcelona, performing the role of **LANCE STROLL'S** driver coach for the first time, was **JUAN PABLO MONTOYA** (*right*). Stroll crashed his Racing Point heavily at the fast Campsa corner during first Friday practice...



● The logistics of **WILLIAMS'** repairs after Baku – where **GEORGE RUSSELL'S** car was damaged by a manhole cover and **ROBERT KUBICA'S** by a qualifying accident – meant that Russell was in Kubica's old chassis for the Spanish GP, while Kubica was in a new one. Contrary to Kubica's earlier feedback, Russell reported no discernible difference between this chassis and his previous one.

● In Spain **FERRARI** introduced a new more powerful specification of engine, enabled by **SHELL** lubricant advances being introduced two races ahead of schedule.

● Like Ferrari, **RENAULT** also brought a new engine specification to Spain ahead of schedule. This entailed also a new specification of mgu-H. The changes were made in the interests of reliability. Renault Sport's **CYRIL ABITEBOUL** admitted in Baku that corners had been cut during the winter development programme, because the Viry factory tried to make big power gains in a hurry.

● Such is the limited amount of space at **ZANDVOORT** that teams will not be able to take their usual motorhomes to the revived Dutch GP. Instead, smaller purpose-built units will be erected by the circuit, as they are at long-haul races.

● The **FIA** and **PIRELLI** jointly announced in Barcelona that, as of next year, the **FIA F2** series will run with 18-inch wheels on low-profile tyres in place of the current 13-inch rims. This will give feedback to Pirelli ahead of the same change being introduced to F1 from 2021. Mercedes, McLaren and Renault will provide one car each for Pirelli to test the 2021-spec tyres later this season.

● **BRAKES** and **WHEELS** will be standardised in F1 from 2021. The FIA has invited tenders to supply.

● In Barcelona, **MERCEDES** team boss **TOTO WOLFF** stopped short of issuing an outright denial that he would be interested in taking on the role of running F1 for **LIBERTY MEDIA** from 2021 onwards, as had been reported in the week before the race.

● We understand that the farmer who owned the field adjacent to **RACING POINT'S** Silverstone factory has had a rather unexpected windfall as part of Lawrence Stroll's plans to extend the team's base...

● **KEVIN MAGNUSSEN'S** very physical way of moving past **HAAS** team-mate **ROMAIN GROSJEAN,** after a safety car restart in the Spanish Grand Prix, resulted in clear-the-air talks between them and team boss **GÜNTHER STEINER** after the race. They'd been set for a 7-8 finish, but ended up with a 7-10.



Better late than never

Toyota's new Supra has been a long time coming – and nearly didn't happen at all. **Joe Dunn** finally got behind the wheel



THE OBVIOUS QUESTION ABOUT the launch of a new Supra is, what took Toyota so long?

It's been 17 years since the last version of the Japanese sports car, and in that time a lot has changed in the sports car market, not least the arrival of the Porsche Cayman and Alpine A110. For most, such a lull - and such competition - would make it an uphill task to drum up interest in a new model. But luckily (or as we shall see, perhaps unluckily) for Toyota, that hasn't been a problem.

That's because the Supra name has taken on a cultish life all its own. First seen in 1978 when it was given to more powerful versions of the Celica, it morphed into its own distinct model which quickly joined the Skyline and NSX in the pantheon of modern Japanese classics - a position it cemented with a starring role in the first *Fast and Furious* film and in Sony's *Gran Turismo* game.

Toyota has opted for the tagline, "The Legend Returns" and given its gestation period there may be a hint of relief as well hyperbole in it. So, there was a palpable sense of occasion and expectation in Spain when this fifth-generation Supra was finally set loose on public roads for the first time.

Like its forebears it is powered by a three litre, in-line six fitted with a single twin-scroll turbocharger that produces 335bhp and 369lb ft of torque. It's coupled to an eight-speed automatic transmission sending power to the rear wheels; 0-60mph takes 4.3sec, top speed is 155mph. The standard model costs from £52,695; the high-spec 'Pro' costs a punchy £54,000.

So far so Supra, although there are now only two seats rather than the old 2+2 configuration. It also feels a far smaller car than it used to - more an out and out sports car rather than the large grand tourer feel of the third generation.

The styling is smooth without being bland, with a nifty double bubble roofline. From the front - even without the Toyota badge - the car is undeniably Japanese. You could see a Mazda or Honda in the raised wheel arches and bulging bonnet if you squinted - but it is the shadow of another car brand that hangs heavier over the Supra. And that's because it has been jointly developed by BMW.

Chief engineer Tetsuya Tada takes up the story: "At the launch of the GT86 [in 2012] I received a call saying I had to go to BMW's HQ. Someone would meet me and my mission was to discuss a joint vehicle. Nothing was said about what car it would be but I instinctively knew it was Supra."

Despite sounding like the opening of a Jack Reacher thriller, the ensuing plot was anything but predictable, involving changes at the top of BMW and much negotiation about the car's character. But the result was a collaboration to create the basic architecture of the Supra and the BMW Z4 convertible. Toyota stresses that once these foundations had been agreed, there was no more communication between the two teams. The fact remains, though, that the engine, gearbox and some fixtures and fittings are pure BMW.

This has caused a great deal of anguish among some aficionados who claim the new Supra is a simulacrum, missing that all-important Japanese character - one journalist even went so far as to dig up the parts catalogue in order to prove how BMW the car was. But for most normal people, and if you take the Supra simply on its merits, it is a brilliant car that is hard to fault.

With a short wheelbase and wide tyre track plus low centre of gravity, the Supra is epically good to drive quickly. Perfect 50/50 weight distribution between front and rear



The Supra thrives on a B road, with strong handling and great acceleration



It may have BMW underpinnings, but the new Supra does enough to set itself apart

"The effort to bring Gazoo Racing more closely into the Toyota firmament is significant"

has been achieved by pushing the three-litre power unit as far back towards the driver as possible, and means the car feels perfectly planted and alive at the same time.

On the road the Supra is surprisingly refined. Acceleration is smooth, the eight-speed semi-auto flicking decorously through the ratios. But the steering is the real revelation: point the car into sharp bends and it responds crisply with a pinpoint accuracy, finding its line and sticking to it with all the tenacity of a politician on *Question Time*.

With virtually no body roll, the racing-style seats keep the driver reassuringly snug and in optimal position to make the most of the Supra's handling talents, while visibility is excellent for such a low-slung car. The Supra is even better on the Jarama circuit. It's a challenging track - hosting the Spanish GP several times between 1968-1981 - but it was here that the best of Supra was to be found. The more power you feed in, the better the steering and grip become.

And the Supra's racing pretensions are not to be scoffed at. Toyota has already revealed a GT concept version and plans a single-make racing series in the near future (although it is unlikely to come to the UK).

The car is also the first Toyota to be built entirely by the Gazoo Racing team - the umbrella group that runs the brand's successful WEC and WRC programmes. In fact, briefly last year Toyota found itself holding a world motor sport double having won Le Mans and the WRC makes' title. The GR tag is set to be rolled our further across the Toyota range incorporating a GR Sport label, and a more hardcore GRMN.

The effort to bring Gazoo Racing more closely into the Toyota firmament is significant. Toyota hopes it will be able to second engineers to Gazoo in order for them to learn new skills, such as the flexibility and quick decision making that are second nature to racers. Of course, it will also publicise the company's motor sport programme to a wider audience. The days of winning on Sunday, selling on Monday may be gone, but it seems a little motor sport stardust remains a valuable marketing tool.

Not that the Supra will need it. Despite its high pricing (our road test of the 1986 version has its price as £15,298) and its controversial mixed parentage, it is one of the best sports cars on the market today.

And worth the 17-year wait.

TOYOTA GR SUPRA PRO



- **Price** £54,000
- **Engine** 6 cylinder, 2998cc turbo
- **Power** 335bhp@5000-6500rpm
- **Weight** 1495kg
- **Power to weight** 224bhp per tonne
- **Transmission** 8-speed auto
- **0-60mph** 4.3sec
- **Top speed** 155mph
- **Economy** 34.5mpg • **CO_2** 170g/km
- **Verdict** Simply superb

Difficulty of the drop top

More money, slower and less boot. But plenty of headroom...

AT THE RISK OF REPEATING myself, I've never bought into the big, fast convertible way of thinking, and this new Bentley Continental GTC illustrates the reason why. I'm actually a big fan of the coupé Conti because it's just the kind of raffish car I think Bentley should be making.

But the convertible? Well, it's not quite as attractive, not quite as fast, quite a lot heavier and while its roof is sufficiently well insulated for Bentley to be able to claim it's as quiet as the coupé, I'm still always aware there is fabric and not metal covering my head. Yes, the car is structurally stiff for a convertible sitting on quite a long wheelbase, but it's still nothing like as stiff as the coupé and on certain poor surfaces when you're driving it hard, it shows. It costs £16,000 more and you lose a third of your boot space.

And for what? The ability to drive a 207mph car with the roof down. Of course you can always make a case for it, because riding along on the vast wave of torque provided by that mighty 6-litre twin-turbo 12-cylinder motor with the wind ruffling what remains of your hair is a never less than thoroughly pleasant way of passing the time. But for me not only does the GTC lose a shallow but broad swathe of the outstanding GT's abilities, but a chunk of its charm too. *Andrew Frankel*



Continental GTC isn't as pretty as the hard-top, nor is it as fast or fun

BENTLEY CONTINENTAL GTC

- **Price** £176,000
- **Engine** 6.0 litres, 12 cylinders, turbo
- **Power** 626bhp at 5000rpm
- **Weight** 2414kg
- **Power to weight** 260bhp per tonne
- **Transmission** eight-speed double clutch, four-wheel drive
- **0-60mph** 3.8sec **Top speed** 207mph
- **Economy** 20.2mpg **CO_2** 317g/km
- **Verdict** Coupé all day, every day

The shape of things to come

With hotter versions on the way, is the 330i misplaced?



I AM SURPRISED. THIS IS NOT THE direction that I thought BMW would take with this car. This new 330i is currently the fastest new 3-series on sale, but only because the range is so new. Regardless of what the name suggests, there's only a two-litre four-cylinder motor in here; there's a six-cylinder 3-litre M340i on its way this year and, of course another new M3 to come. Which is why I expected the 330i to be a middle of the road kind of machine.

It is anything but. It is a sports car merely wearing the clothes of a four-door saloon.

I miss the sweet howl of the six-cylinder engine, but there's no doubting the ability of this raw and rorty four to get the job done. But it is the way the car handles that sets it apart from anything that might fancy itself as a rival. This is the best balanced, most deftly damped car of this kind there has been. Larger though it is, this is a car that's aiming to capture the same sort of audience which raved about the E30 3-series 30 years ago.

But this approach is not without its downsides too, particularly the suspension settings which are challengingly firm on less than the smoothest of roads.

My advice when you test drive it is this: don't just be seduced by how dynamic and engaging it feels. Think about how easy it will be to live with too. If that and the strange instruments don't put you off, there's precious little else here that will. *AF*

BMW 330I M SPORT

- **Price** £39,165
- **Engine** 2.0 litres, 4 cylinders, turbo
- **Power** 255bhp at 5500rpm
- **Weight** 1545kg
- **Power to weight** 164bhp per tonne
- **Transmission** eight-speed automatic, rear-wheel drive
- **0-60mph** 5.8sec **Top speed** 155mph
- **Economy** 41.5mpg **CO_2** 134g/km
- **Verdict** Sportier that you'd ever think

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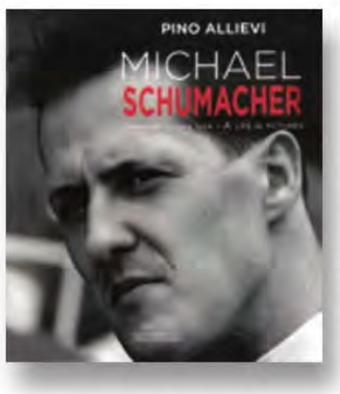
Ferrari's favourite son

James Allen on an emotive and honest insight into Michael Schumacher's career



Schumacher's achievements have yet to be rivalled in Formula 1. His seventh world title came with Ferrari in 2004. He took a total of 91 race wins across his grand prix career

MOTORSPORT IMAGES



MICHAEL SCHUMACHER A LIFE IN PICTURES
Pino Allievi
Published by Giorgio Nada, £44
ISBN 978 88 7911 714 2

OPENING WITH AN emotional foray into Michael Schumacher's tragic skiing accident, which sent shockwaves into the motor sport world that continue to ripple to this day, *A Life in Pictures* sets its stall out early to be different from the plethora of alternative Michael Schumacher-themed titles out there.

The irony of a man who lived his life at 200 miles per hour, only to succumb to tragedy at less than 20, does not go unnoticed. It serves as a sombre reminder that these seemingly superhuman drivers are very human indeed. Author Pino Allievi - a reporter with *La Gazzetta dello Sport* throughout Schumacher's entire career, with intimate access to the Ferrari bandwagon - approaches the devastating tale with care and respect, and a clear personal sadness.

Written in both English and Italian, the book combines evocative trackside imagery from Schumacher's glittering career with stories of the man's life, both personal and professional, which reveal so much more about the person under the helmet.

The book deals with many elements of Schumacher's career - from choosing his finest individual races to breaking down his relationships with team-mates like Eddie Irvine and Martin Brundle, and delving into his rivalry with Ayrton Senna. As its title suggests it's crammed with imagery, from his unrivalled seventh world title campaign to his formative DTM and Le Mans escapades with Mercedes. When discussing specific races there's also the detail of having the official race programme covers included, which is a nice extra touch.

Pino Allievi has many personal encounters with Schumacher to draw on. His first was fortuitous, bumping into Michael in a restaurant in Geneva. Allievi innocently asked how he was feeling after a recent crash. Not in the mood for an interview, Schumacher was curt, but after Allievi explained that he was in town for the Geneva motor show, his demeanour changed entirely: "I'm really sorry, I didn't mean to offend, I'd forgotten the show was tomorrow. I'm even supposed to be there! How did you find this restaurant? You know the food's great? Maybe if we finish at the same time, we can have a drink?"

Cautious of those he didn't know but genial and generous to those he did, this was Michael Schumacher in his prime.

Delving into the earlier days of Schuey's F1 career, Allievi peeks behind the curtain of the glamorous F1 circus to reveal the trials and tribulations that all F1 drivers must face in order to make it to the top; which at times are not very glamorous at all.

We get an insight into the many obstacles that stood in his way, be it race politics, personal struggles or financial difficulties - unlike many drivers, Michael came from nothing, a point that Allievi makes on more than one occasion.



Special attention is given to Michael's relationship with other drivers, be they team-mates or rivals. The portion dedicated to the rivalry between Schumacher and Senna, which started with a shunt at a kart race in the '80s and picked up again when the two faced off for the first time in F1 in 1991, is illuminating. Allievi's fast-paced storytelling matches the speed and ferocity of the driver it describes, and wonderfully illustrates the heartbreaks and elations that no F1 campaign would be complete without.

We are also treated to insights into the



"The accident in Belgium sent Michael into a fit of rage, screaming, 'If I get hold of you, you're dead!"

heated conversations that drivers had behind closed doors, each accusing the other in the event of an incident on track. Of course, racing drivers rarely operate in grey areas in these situations...

A Life in Pictures is by no means a love letter to Schumacher; at times Allievi holds a mirror up to some of his more controversial moments. A jarring example of this is the infamous crash with David Coulthard at the '98 Belgian GP, which sent Michael into a fit of rage, storming into the pits yelling "If I get hold of you, you're dead!"

It also questions whether his choice to return to racing with the then mid-field Mercedes team in 2010 was a good one.

Despite these occasional troubles, Schumacher respected and cared for other drivers, checking up on them after crashes, asking after their families or - in the case of childhood karting rival and future team-mate Jos Verstappen - going on holiday with them.

A Life in Pictures pays tribute to Schumacher not only as an immensely talented driver, but as a truly good man. His charitable contributions and love for others are highlighted and celebrated, and we get the sense that Allievi wants the seven-time world champion to be known as so much more than just his titles.

As he points out, an infinite list of people who have worked with or near Schumacher can claim to have known him. That may be true from the track, but there are few who truly knew him in any other way. His book connects us with those who did, and depicts an empathetic, generous, sometimes complicated but always genuine character.

All through these tales of winning and woe, *A Life in Pictures* weaves in sometimes previously unseen and fascinating images that illustrate life of a man who went on to become arguably the greatest of all time.

Translated from Italian, the occasional grammatical error crops up in the English segments, but not enough to distract you from the picture that Allievi is painting. Occasionally some of the images come across a tad grainy, but overall the quality is good.

Throughout the journey, Allievi shows nothing but respect and at times, speaks with a sense of awe about the man he openly admits he considers to be the greatest.

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60 Jaguar E-types await handover in 1961. But it wasn't all glamour for Britain's car industry

The industrial revelation

Britain's automotive industry has enjoyed boom and endured bust, **Gordon Cruickshank** reads an intriguing history covering both

SOMETIMES IT TAKES AN OUTSIDER to see the wood when the experts are inspecting the trees. That's the position of TV producer and novelist Peter Grimsdale - not a regular motoring writer but a life-long car enthusiast who presents a wide-ranging portrayal of Britain's recovery from war strife to top nation on wheels.

It celebrates Mini and E-type, Lotus and Jim Clark equally, but highlighted against a background of industry mismanagement, distrust of innovation and a fear of flash. In a chapter headed 'No style please, we're British', Rover chief Maurice Wilkes rejects a design "because it's a head-turner and we don't make head-turners. We like to make vehicles which are not noticed..."

Against this was the exuberant American influence - disastrously aped by the Austin Atlantic, yet heavy-handedly imposed by GM on Vauxhall - which made home-grown fare look stodgy, costly loss-makers. E-types and Minis were game-changer designs, but they were the exceptions. Stepping back further than we regulars tend to, Grimsdale frames the successes within a grey, debt-saddled make-do-and-mend Britain, which morphs triumphantly into the jet set, Swinging London and Minis winning the Monte, then subsides into the strike-torn 1970s and the collapse of the home car industry. Yet those grim 1950s allowed disruptors to thrive; Grimsdale places Cooper and Chapman four-square in this mire in which committee-run BRM floundered, and yet a racing lead emerged that this country enjoys still. Similarly Rover, creating an entire new market sector with the Range-Rover. This is about rebels and visionaries - and their disappearance.

The background detail impresses - that Malcolm Sayer busked in France and studied wind-shaped dunes in Iraq, that Moss once worked as a waiter called Toni, that Ian Fleming encountered an actual Aston loaded with trick gadgetry, that Tony Vandervell besieged a US firm for six days to do the deal that would make his fortune and lead to Vanwall. With references to Stafford Cripps, 19th-century designer Christopher Dresser and the comparison of Colin Chapman to Michael Caine's *Italian Job* character this is an unconventional history, but it's absorbing.



HIGH PERFORMANCE: WHEN BRITAIN RULED THE ROADS
Peter Grimsdale
Published by Simon & Schuster, £20
ISBN: 978 1 4711 6845 1

FOR THE LATEST MOTORING BOOKS GO TO
www.hortonsbooks.co.uk

RGS ATALANTAS

Alan Shattock

Few Atalantas remain – because there weren't many made, so this is a niche reminder of how a struggling pre-war marque which combined big American V12s with a fine chassis was taken on by enthusiastic racer/engineer Dick Shattock. Written by his son, the book tells of his first special and his aim to offer an innovative kit of parts so others could build variations, as well as his pioneering GRP bodyshells, including for the first TVR.

RGS Atalantas scored modest successes, often under Shattock himself, but didn't become another Lotus. Containing complete histories of every known car, it's a fine feat of research, well illustrated, but the first-hand recollections stop it being too dry – for instance the trip to Switzerland three-up in a luggage-laden Heinkel bubble car. And like the author, I'd love to know if their 35ft-long Silverstone slot track still exists. **GC**

Published by Matador, £39
ISBN 978 1 789016 680

FORMULA 1 THE KNOWLEDGE

David Hayhoe

The author has a history of producing motor racing compendia and this, the second edition of a series first published in 2016, is as detailed as its forebears – if not more so...

The planet's evolution means that statistical reference books tend to be obsolete by the time they are printed, as the internet updates rather more swiftly than ink, but this is divided into 1263 sub-sections covering trivia from 1950 onwards and includes topics such as 'banned from racing', 'consecutive points-scoring seasons', 'podium in all but one race of a season' and, obviously, 'F1 drivers who have competed in the Olympic Games' (Ben Pon, briefly a grand prix driver and now a successful vintner in California, was part of the Dutch clay pigeon shooting team in Munich 1972, for instance).

Not the kind of thing you'll want to read on the 7.24 from Orpington to London Victoria, but worth a gentle amble while you're cradling a brandy globe of an evening. **SA**

Published by Veloce, £55
ISBN 978-1-787112-37-7

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THESE A3-SIZED PRINTS ARE FAST BECOMING A FAVOURITE in the *Motor Sport* office, both due to their funky visual appeal and their range of customisable options. Each one uses 1.25mm thick ultra-black mount board laser-cut into the shape of your favourite circuit, with an accent colour then placed behind to bring the effect to life. You can choose from five UK tracks - from Brands Hatch to Oulton Park via Goodwood - and others such as Spa, Le Mans and Monza. Then there's eight background colours to choose from. You can have them freestanding, framed or in front of a lightbox to really bring it to life.
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Mini has a wonderfully varied history. Having started life as a tiny, cost-effective runaround, the cars have since found success on rallies, circuits and even cross-desert endurance racing. LEGO's newest offering in its Speed Champions range is this reimagining of two eras of famous Minis. The first is the 1967 Cooper S, which Rauno Aaltonen and Henry Liddon used to win the Monte Carlo Rally that year – a year after Mini's controversial disqualification when the team locked out the podium! The second is the BMW Mini-era Dakar buggy, based on the distinctly not-mini Mini. It comes with four mini figures, a pit garage and 481 pieces.
£44.99, shop.lego.com



OMP ONE ART RACE SUIT

Tired of white pinstripes on a blue race suit? OMP has perfected a printing method for its racewear which allows you to apply any graphics, sponsor logo or image you want – even photographs – without affecting the fire-retardant qualities. Its newest offering, called One Art, is also the first race suit to pass the FIA's latest and toughest regulations, demanding higher-than-ever heat resistance, yet can carry images from neck to ankle.
From £990, ompracing.com

WOW WALL ART

If your walls are a bit empty and British racing green won't clash with your curtains, then WOW Design has a suggestion – printed flat panels depicting doors or bodysides of famous racing cars, from Lotus 49 to Mansell Williams via Rothmans Porsche 962, Monte Carlo Mini and Gulf Mirage. Printed on lightweight foamboard they're easy to hang, and at 3-5ft in size, depending on model, they'd cover up a lot of dull wall. Small versions available at £25.
From £85, wowwallart.co.uk



IXOOST ESAVOX

iXOOST has a strong history in creating bonkers automotive-themed sound systems. This one, the EsaVox (no, we have no clue what that name means either) has been made in partnership with Lamborghini and uses original Lambo bits like genuine exhaust tailpipes together with swathes of carbon fibre and even Lambo's fighter-pilot-inspired ignition switch. It comes in a range of colours, and uses two tweeters, two 6.5-inch speakers and a downfiring 10-inch subwoofer. You can hook your iPod (or similar) up via Bluetooth or analogue connections. Just find a good permanent location for it, because it weighs 53kg...
£21,900, iXOOST.it/en/store



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Bought a BMW X3 recently and intend to use it for more than just the school run? Well, if you wish to be truly sporty, or at least look like you are, then why not add this electric mountain bike to your options list. Designed by American cycling manufacturer Specialized, it boasts a lightweight aluminium frame with an integrated battery and electric motor, designed to either supplement your pedalling power or do all the work while you relax and tinker with its Bluetooth connectivity. You can even charge it direct from your X3. *£4995, shop.bmw.co.uk*



MEMORABILIA, PETROLIANA

One man's junk is another one's treasure. Why not lubricate your wallet?



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mattsautomobilia.co.uk



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The grounds of Goodwood House echo to the sound of race engines for a weekend

The ultimate party

Goodwood is the answer to Glastonbury for motoring fans as the Festival of Speed attracts the stars of the sport

July 4-7, Goodwood

MINI BREAK

THERE IS NO OTHER FESTIVAL that celebrates the great and good of motor sport like the Goodwood Festival of Speed.

And this year, Formula 1 returns to the festival with six teams and a number of current drivers. Nick Heidfeld's 20-year-old record of 41.6sec still stands, but if the Volkswagen I.D. R Pikes Peak conqueror can shave two seconds off its 2018 hillclimb, we could see a new overall record.

Another anniversary being celebrated is the 1969 Le Mans 24 Hours, won by Jacky Ickx and Jackie Oliver in the John Wyer Ford GT40, and both Ickx and Oliver will be reunited with their GT40, driving it up the hill.

Tributes events will be held for Michael Schumacher as well, with the likes of Mika Häkkinen and Damon Hill present alongside sports, touring and F1 cars from Schumacher's incredible career. The festival also marks 25 years since his first F1 World Championship.

It all fits into the theme: 'Speed Kings - Motorsport's Record Breakers'.

Major changes to this year's event include a change of location for the Supercar Paddock, which moves next to the start line of the hill. A new live-action arena will be set up as drifters, stunt drivers and motorcyclists thrill the crowds at the Cathedral Paddock.

LOCAL KNOWLEDGE

- **HOW TO GET THERE** Trains run from London Victoria, Brighton or Portsmouth to Chichester. Or drive towards Chichester and follow signs to parking. Expect traffic from mid-morning.
- **ALSO GOING ON** The Goodwood Revival takes place on September 13-15, a step back in time at the nearby Goodwood Motor Circuit. Tickets sell out fast for this one, too.
- **DON'T MISS** Hop on a tractor or hike up the hill to reach the Rally Stage featuring rally cars, like Group B machines, around an off-road trail.

The future of motoring and motor sport will also be explored with the FoS Future Lab, showing the latest cars and technology. Last year, driverless series Roborace starred alongside JetPack Aviation, whose pilot made its first European flight at the event.

The Duke of Richmond said that last year's event "enjoyed record attendance", and around 4 million visitors have attended the festival in the last 25 years. Book early, as the festival sells out quickly. Four-day passes start from £169 for adults and Saturday passes from £70 - both are in high demand.

Thursday is the cheapest day, with £39 adult tickets available, but you'll want to catch the weekend's shootout action. Tickets are available on *ticketing.goodwood.com*.

MASTERS HISTORIC RACING

June 8-9, Donington Park, UK

Masters Historic Racing features sports cars, pre-66 GTs, classic Formula Ford and the Dunlop Saloon Car Cup in a packed weekend. Admission is just £12 for a day – bargain.

LE MANS 24 HOURS

June 12-16, Le Mans, France

The World Endurance Championship 'Superseason' ends with this endurance epic. Fernando Alonso will bow out for Toyota, which surely has the LMP1 win sealed, but who will prevail in the GT and LMP2 classes?



BTCC: ROUND 5

June 29-30, Oulton Park, UK

Oulton Park welcomes the British Touring Car Championship, featuring three BTCC races on the Sunday and support series such as British F4, the Porsche Carrera Cup and more.

STELLA ALPINA

June 28-30, Italy

This historic rally takes competitors across difficult roads in the Italian mountains, beginning in Trento and crossing seven Alpine passes with timed trials and speed trials. There's a special class for Ferraris.

MOTOGP: ROUND 8

June 28-30, Assen, the Netherlands

MotoGP returns to 'The Cathedral' as Assen celebrates its 70th anniversary. The fast, flowing circuit hosts one of the most competitive MotoGP grids ever as Marc Márquez aims for a sixth title.

MORE JUNE EVENTS

June 9	INDYCAR, Texas
June 9	FORMULA 1, Canada
June 13	WRC, Italy
June 16	MOTOGP, Catalunya
June 23	FORMULA 1, France
June 23	INDYCAR, Road America
June 23	NASCAR, Sonoma
June 30	FORMULA 1, Austria

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A Le Mans legend on your wrist

British brand Bremont's new tie-up with Jaguar celebrates the continuation of the iconic D-type sports car

BRITISH WATCH MAKER BREMONT might be best known for its aviation-inspired creations – but founding brothers Nick and Giles English, pilots both, are also enthusiastic about wheels.

Between them they count various old Land Rovers, Porsches and several motorcycles among their collections, although the Jaguar E-type roadster inherited from their father is probably the car they hold most dear. It was partly that affection for the marque that led to a partnership with Jaguar where Bremont created a dashboard clock for the C-X75 concept of 2010, before being commissioned to produce clocks for Her Majesty the Queen's entire fleet of 'leaping cat' vehicles.

In 2014 Jaguar built six 'continuation' versions of the Special GT E-type (commonly known as the 'Lightweight') to add to the 12 made in 1963 in order to complete the originally intended run of 18. Bremont producing six unique, white gold chronometer watches that were made available only to buyers of the six cars – but the design, which featured a dial based on the look of an E-type rev counter, went on to spawn an entire range of Jaguar-themed limited edition watches that are respectively known as the MKI, MKII and MKIII.

Following news that Jaguar Classic will make 25 continuation versions of the legendary D-type racing car to bring the number built to a round 100, Bremont has, (naturally) whipped-up a watch to go with it. A D-type produced 300bhp from the 3.4-litre engine, so the watch will be limited to 300 examples, each with a dial in the blue of the Le Mans-winning Ecurie Ecosse team.



An inner tachymeter bezel can be used with the chronograph counters to make speed and distance calculations, while the winding crown is decorated with the tread pattern of a period Dunlop race tyre and topped with an enamelled heritage Jaguar logo.

Flipping over the hardened steel 43mm-diameter case reveals a sapphire crystal back which affords a detailed view of the chronometer-certified movement and its self-winding rotor – in the form of a beautifully executed miniaturisation of a D-type steering wheel.

Add a classic perforated strap in blue leather and the result evokes the mighty D-type in a sufficiently subtle way that it should appeal to many more enthusiasts than just the tiny number who are fortunate enough to actually own a Le Mans legend.

Bremont Jaguar D-Type. £5495.
Bremont.com



LE MANS FANS WILL BE FAMILIAR with Rebellion Racing, a team backed by the Swiss watch brand that launched in 2008 to make high-end watches. It has expanded its offering to include more affordable pieces – such as this Twenty-One three-hander marking Rebellion's first year as official timekeeper of the Tour Auto classic car event. The watch is supplied on a rubber and leather strap in the red, white and blue of the French 'tricolore'.

Rebellion Twenty One Three Hands Tour Auto. £2650
rebellion-timepieces.com



MAY'S MILLE MIGLIA ATTRACTED a selection of Zagato-bodied cars thanks to 2019 being the centenary of the Italian coachbuilder. As the official sponsor of both the Mille Miglia and the Scuderia Zagato racing team, Chopard unveiled a centenary Zagato watch which is available in just 100 examples. The 42mm chronograph has a distinctive cuff wrist band inspired by the thick leather straps once used to lash down sports car bonnets.

Chopard Mille Miglia Classic Chronograph Zagato 100th. £5560
chopard.com

Precision is written by renowned luxury goods specialist Simon de Burton

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THE RACER

Pit talk from the HRDC

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Stefan (left) and Martin Donnelly shared an Elise together in the Lotus Cup UK series back in 2014

RACING LIVES

Martin & Stefan Donnelly

THE DONNELLY NAME IS A Northern Irish motor sport institution, having spanned 13 Formula 1 grands prix, sports car racing at the highest levels, the British Touring Car Championship (briefly) and graced many club racing paddocks. The family even has a prestigious annual Formula Ford 1600 event in its honour at Kirkistown. Defying death in a horrific accident at Jerez in 1990 cost Martin his F1 career, but he returned to club racing, is chief instructor for Lotus and helps out on the issue of driving standards at high-profile events, like the Goodwood Revival meet. His eldest son, Stefan, surprisingly only began racing in 2014. Not surprisingly, it was in a Lotus...

MARTIN: Dad was a hard-working man. His release was motor racing. When I was born, he arrived during visiting hours at the hospital with a bunch of flowers for my mother, and asked what sex I was. She said, 'Pick the child up and see for yourself.'

So he picked me up, holding me in a muslin; when he put me back he'd slipped a shark-nose Ferrari into my arms. So it was my destiny to go racing.

When things fell apart, after my big accident, [Donnelly came close to losing his life, at the 1990 Spanish Grand Prix while driving for Camel Lotus] it didn't just end my career in F1, it ended my earning potential. I missed out on millions. Which in turn meant that, once Stefan came along, I was never going to be in a position where I'd be able to afford to pay for him to race.

So the only way I could help him get into a racing car was through my friend Paul Golding. Paul organised the Lotus Cup UK, and offered me his car, with no test or entry fees. To begin with, Stefan was about two seconds off my pace. But towards the end of it, he was just a few tenths off and keeping me honest. Then came the crash. I was in another car that weekend, and when I came around, I could see the car pinned against the pit wall with its rear-left wheel up in the air, and it looked serious. My heart just sank and I thought, 'Oh God, Stefan!' and didn't know if I could stop or what to do. Then as I passed again, a guy from the pits gave me a big thumbs up, telling me he's okay.

The trouble was, his book work and studying was starting to suffer and we needed sponsorship to continue. Now that he's working in law, hopefully one day he'll have his own name above the door.

I'm also doing my bit for his younger brother, Owen. He's 14, and has been

karting. We'll give him a go at Ginetta Juniors, but I've said to him, 'Get your education, earn your money, and then go racing'.

It was Stefan's former girlfriend who suggested he rethink his career path. She was studying in law, and told him that during a recession, you wouldn't need a sports physiotherapist or nutritionist to race cars but you'd always need a lawyer or solicitor.

After he had got his degree from Loughborough, we took him out for dinner, and he told us he wasn't going to use his degree. It was hard for me, personally, because he went through Wymondham College, and university, and came out with no student loan, all funded by me and his mum, and that was quite difficult. I suggested he give it a year or two, but he said no, I'm going to do a law conversion course. But it was the right decision.

Yet it's kind of ironic that he has ended up wanting to specialise in sports contract law. In my day, those things were informal.

My big break came down to playing things fast and loose. Eddie Jordan wanted me to leave F3 in the middle of a season and switch to his team in F3000, but he was charging £30,000 for five races.

My sponsor at the time, Frank Nolan, had died from a heart attack and nobody other than me and his family knew he hadn't made a will. The court froze the bank accounts. EJ didn't know that. So I signed a contract and just got my head down with the driving. EJ kept hassling me, 'Marty, Marty, where's me feckin money?' Luckily I had two wins, two seconds, a pole and a lap record, and then I was on the market, and within four months EJ was paying me, for the following season, £50,000. That gamble paid off massive.

These days, I see all the old 'Rat Pack' every December. We've got Dumfries, Brundle, Warwick, Soper, Bailey, Herbert, Blundell, and we'll drink, drink, drink, and tell great stories. We were all great mates back in the day, but even so, when you put your helmet on to race against those guys, you knew there were no favours.

Since 2005 I've been involved with the Lotus Academy. In a way, that gives me my motor sport fix. We teach guys how to drive quickly but safely. Through that, Stefan and I are off to America this summer. We're going to Boston, to the Lotus Drivers' Club, and I'm doing an after-dinner speech, then the following day we're coaching at a track. Stefan sorted it, and it will be great to spend time with him. Then again, he only lives three miles away and we meet for a beer and a burger most Mondays!



Martin Donnelly was a rising star of grand prix racing and joined Lotus in 1990 after successful F3000 campaigns, which included wins at Brands Hatch in 1988 (inset) and '89



STEFAN: "Some people might say that you're born into motor racing. That it's almost a curse; a calling that you will do everything to answer. But I was pretty philosophical about racing. I enjoyed it, but deep down I always knew I would do something different.

Dad is known as the fun guy in racing, someone who never takes himself too seriously. But mum [Diane Donnelly, now separated from Martin] always says he was horrendous to be around when he was racing.

The moment a race weekend started, he had all these superstitions. He could only get in the car from the right, and out on the left; the same with pulling on his gloves. And if one strap wasn't facing the right way, he'd have to undo them and start all over again. Some people would be bitter about what happened to him. But he knows it wasn't meant to be. Senna's death put things into perspective.

He tells me, 'I was never going to be the driver Senna was. He had all the money and championships he could want, but he's not here today and I'm still here and I have you, Charlotte and Owen.' I think that brought a bit of closure for him.

"I was never going to be the driver Senna was, but he's not here today"

That's not to say he didn't still love motor racing. For my third birthday, my granddad made me a makeshift go-kart with a Honda engine, but mum was having none of it and wouldn't let me drive it until I was four.

So for my fourth birthday, I got given a helmet. At the time, dad was running Martin Donnelly Racing (MDR), and they were based at Snetterton. About 100 yards from the workshop there was a little skid pan, and it was perfect for having a little bit of fun.

Dad laid out a crude circuit on it, and I used to go down there, after school. He'd get on the team's scooter, and we'd race around the circuit together.

Racing stopped when I went to boarding school. I wanted to attend Wymondham College for the sport, but we were outside the catchment area, so boarding was the only way I could get a place there.

When you're brought up around motor sport, that's all you want to do. At that point in my life, I wanted to be a racing driver. However, I was too young to appreciate what they'd been through or achieved, and couldn't quite grasp why Dad didn't want me to get involved in a serious capacity.

He always quotes this line: 'It's the wrong way to riches.' And my mother, for obvious reasons, was absolutely beside herself when I got into a racing car. She had extremely strong views about me and motor sport.

When I raced in the Lotus Cup UK and Elise Trophy [in 2014/15], I shared the car with Dad in the first year during all the one-hour races. Mum couldn't stand to be

around. She had to take herself off, and would only emerge toward the end of the race if things had gone well.

There was one incident, at Brands Hatch, where the pole-man stalled and as I went left, the car to the left of me went right, and we pincered each other and went into the pole man, piling into the wall. It was a heavy shunt. My car was pinned against the wall, with one of the other cars against my left side, and I couldn't get out, but I was perfectly fine. Mum had been watching from the paddock grandstand, saw the whole thing unfold and went into complete panic, as the ambulance pulled up, doctors



Martin and Stefan (pictured at Rockingham) regularly do coaching work together, and catch up over a burger and a beer

swarmed around me - and of course, all she could see was that I wasn't getting out. She didn't come to a race circuit after that.

I studied Sport and Exercise Science, and the objective was for me to get into top levels of motor racing, as a strength, recovery and nutritionist expert. But I soon began to have doubts. I loved driving, but I didn't want to work in the industry, especially giving drivers massages, preparing meals, doing their diet plans and working on training.

I'd always been interested in law, and found I could do a conversion. So I threw myself into it. It's important that aspiring sports people elevate things beyond a handshake and a gentleman's agreement. That may have worked in my dad's day, but it's a more professional environment now.

I will be racing in my grandfather's memorial race - the Martin Donnelly Trophy - at Kirkistown this September. Aside from being a Donnelly in the race, I'll also be driving a Crosslé 32F which is the first FF1600 Dad raced. The car will be liveried exactly like his original one. Dad's coming to watch. It'll be special. *James Mills*

Follow James on Twitter @squarejames



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Chronographs have a legendary status in the horological world - from racing iconic cars, to scaling the highest peaks and most famously landing on the moon, it's a watch built for adventure. The new Mechanical Chronograph collection has been developed with the Swiss Made ETA 2894-2 Elaboré movement at its heart, to produce a refined and shallow-profiled 39mm case.

Our watches are inspired by the halcyon era of watchmaking, when interesting colours and contrasting textures were combined with the very best craftsmanship. Each of the dials is rich in three-dimensional detailing to accentuate the Farer design aesthetic, whilst the use of unique colour combinations create a bold and contemporary statement.

FARER.COM



LYNDON McNEIL

Smedley looks forward to sea bream at Branca, Oxford. He is presently taking a break from F1 engineering after an 18-season stint

LUNCH WITH

Rob Smedley

He worked with a young Fernando Alonso, turned down a job with Ferrari... and then became one of the team's key engineers. **Simon Arron** meets a football fan who fell in love with Formula 1

TO A KID GROWING UP IN 1970S Middlesbrough, Formula 1 might as well have been a parallel universe. "I come from a working-class background and motor racing wasn't the most obvious thing to follow," Rob Smedley says. "My whole family was into football, massive Middlesbrough fans, but during the 1980s my dad started getting into F1. I'd noticed it in the background on TV, but thought it looked incredibly dull. And then in 1987, he asked whether I fancied going to the British Grand Prix. I said, 'OK, so long as we take a transistor radio to listen to the football scores.'"

To hear how Smedley, 45, morphed from uninterested teen to one of the most prominent Formula 1 race engineers of his generation, we meet at Branca, Oxford, where he selects char-grilled sea bream with spinach and new potatoes. "It's part of my bid to stay healthy," he says, before pausing momentarily and adding, "Actually, I'll have a half of lager, too..."

That Silverstone weekend had an unexpected effect. "It was like a switch," he says. "The noise, speed, colour... I'd never known anything like it and was immediately hooked. There were no electronic passes for the F1 paddock in those days, but there was a bloke on the gate so it was still hard to get in. We ended up clambering over the fence



near Copse and then sneaked through a gate into the pits - all part of my very first taste of motor racing. Somebody eventually spotted us and we were just being challenged when one of the Leyton House March mechanics came out and said, 'Hang on, they're my guests' at which point security walked off. The mechanic took pity on us, then showed us around the garage and I decided there and then that I wanted to work with F1 cars. I see F1 as the pinnacle of a marriage between art and engineering. It's functional, it's about performance - but the cars' intricacy makes them things of great beauty. Even today I can see art in them."

He took the first steps towards his future by hanging out at RS Karting, a shop in the centre of Middlesbrough. "I went along to discover how the karts worked and that progressed to helping out at race weekends, as a result of which I got the chance to assist other drivers - and I was getting paid for it. I'd been doing paper rounds and all sorts, then found I could work as a kart mechanic and earn £80 per weekend, probably five times what I'd been making before. This looked like a career worth pursuing..."

Having obtained A-levels in maths, physics and computer science, he moved on to study mechanical engineering at Loughborough and spent his summers working 12-week shifts at Reynard Racing Cars in Bicester. "I'm sure I got that chance because of the stuff I'd done previously," he says, "I wasn't exactly involved in the key decisions, but I was gaining experience."

So much so that company chairman Adrian Reynard offered him a full-time role upon graduation, though Smedley opted instead for a position with Pilbeam Racing Designs, where he worked on various projects - including Peugeot's 406 touring car, the Pilbeam MP84 sports-prototype and one of the final Ford Escort RS Cosworth rally cars, for M-Sport. "Mike Pilbeam asked me to do quite a lot of work on the Escort," he says. "Front and rear suspension, stress calculations, engine installation... I'd been

LUNCH WITH *Rob Smedley*



Smedley, left, with Alonso, winner Massa and Schumacher after the Brazilian's maiden F1 win in Istanbul

MOTOR SPORT IMAGES





attuned to single-seaters and touring cars, then I was taken to a rally test in Kielder Forest with Juha Kankkunen. As I was going to be doing calculations for the structural elements, Mike said, 'I think it would be an idea for you to get a first-hand idea of the loads involved.' So I sat alongside Juha in an older Group A car and soon realised I needed a bit of a rethink about how strong the car had to be."

Towards the end of 1998, Smedley spotted an F1 opportunity - an advertisement for a job with Stewart GP. "I was hired," he says, "but things didn't go terribly well. I was working on Johnny Herbert's car, which seemed to be the second-string effort. The race engineer and I were both new to our roles, but he had less track experience than I did and we just didn't get on, so I left quite quickly.

"Then a job came up with Williams Touring Car Engineering, to work on Jason Plato's Renault Laguna as design and data engineer. But it's like anything. If you go along and get stuck in, you start doing one job and end up doing about 10 others. After I'd been there a month, the team manager said, 'We've been trying to sort out this sequential gearbox, but can't get our heads around it - would you take a look?' I did some calculations and worked out that the timing on the shift mechanism was all wrong, so I redesigned it and that was a great project because it gave me a proper understanding of how gearboxes worked. It turned out to be a fun year, but then Renault decided to quit the BTCC and we were all laid off. Such is motor racing..."

Smedley found refuge in Heist-op-den-Berg, Belgium, as a race engineer for Team Astromega in the FIA Formula 3000 Championship. "Our technical team was led by Chris Murphy, the former Lotus F1 designer, who was going to look after Fabrice Walfisch, notionally the number one driver. Chris asked me to look after our second signing, whoever it might be, but that was fine - I was just happy to have a job. We went to a pre-season test in Barcelona, where I was supposed to look after Robert Lechner, a promising Austrian, but that fell through and I was told I'd be looking after some Spanish kid who had just arrived - that was my introduction to Fernando Alonso."

"I'd never seen such a raw talent as Alonso – and I haven't since"

This was a big leap for an 18-year-old with a single season of car racing under his belt - during which, admittedly, he'd won the Formula Nissan title - and Smedley admits he didn't expect too much. Any notion that this might be a low-key campaign was, however, swiftly dispelled. "We had some data from a previous test," he says, "and on old tyres Fernando almost immediately went quicker than we'd previously managed on fresh rubber. I thought something must be wrong, but he looked pretty impressive so we sent him out on new Avons and he knocked 2sec off our time from the previous test. I'd never seen such raw talent - and I haven't since."

Alonso became ever more effective as the season progressed. He qualified and ran third at Magny-Cours, until sidelined by a broken fuel pump, finished second behind champion Bruno Junqueira in Budapest and then absolutely walloped the field in the seasonal finale at Spa. "Before that race," Smedley says, "Fernando and I went to Spa because he wanted to take me around a circuit to show how things looked from his perspective, so I could understand. It was a real light-bulb moment. We were in a BMW touring car with a passenger seat and I was able to watch the way he used the brakes and steering to balance the car. It made it easier for me to understand exactly what he wanted when we were looking for a set-up - and ever since then I've done that as much as possible. I decided I couldn't be a truly effective race engineer without an intimate understanding of how somebody drives."

Within a matter of months, both would be in F1, Alonso with Minardi and Smedley

with Jordan. "I was really enjoying F3000 and its camaraderie," he says, "but when Jordan offered me a data engineering role I thought, 'It's F1 and my last foray didn't go well, so...' I'd been there eight months when I got the chance to become a race engineer. I did a few grands prix with Heinz-Harald Frentzen and Jean Alesi at the end of 2001, then worked with Giancarlo Fisichella from 2002. We had a great relationship from the outset and, at the end of that season, Williams offered me the chance to engineer Juan Pablo Montoya. That was a bit weird, because I'd gone from being made redundant by Williams to being head-hunted by its F1 team, but this business has always been like that. I had a chat with Patrick Head, which was great. He said, 'I've heard good things about you, so I'd like to employ you before you become too expensive!'

"Schumacher was relentless and had so much humility, too"

"At the same time, Ferrari had been in touch and offered me a role with the race team, but those conversations didn't last too long because what I really wanted was to join its test team. People thought I was mad, but I hadn't been in F1 for very long and felt like I was going up the pinball table a bit too quickly. I wanted to step back and learn my craft, which at the time was with a top test team. But I was ready to join Williams... until Eddie Jordan scuppered it. When I told him I was leaving, he did this big, dramatic thing, getting down on one knee, 'I'm not asking you to stay, I'm begging you for the good of the company...' I know you look back and regret certain things, but I was still pretty much a child back then so did another year with Jordan."

The campaign included an unlikely victory in a chaotic, rain-hit Brazilian GP at Interlagos - which the FIA initially failed to recognise, having misinterpreted the timing data - but overall it was clear that Jordan's best days were behind it. When Ferrari approached again at the season's end, this time with the offer of a job on the test team, he accepted.

"It was as though I'd walked away from an F1 team and entered a different category - F1-plus. It was a real eye-opener to see how the whole machine operated. The amount I learned, the amount of work we were doing, the level of science... It was the making of me - and an absolute honour."

It was also an opportunity to work first-hand with Michael Schumacher.

"He was relentless," Smedley says, "and had so much humility, too. One of the biggest misconceptions about Michael is that he was arrogant, which is a brilliantly bad description. If you actually worked with the guy, you'd have seen a truly humble man. Behind the wheel he was an animal, which is why he has those seven gold medals around his neck. He didn't achieve that by being the nicest man in western Europe. He's a machine and made some questionable decisions, but don't let that define him - allow his brilliance to do that. Within the team he was just one of the lads, a hard-working cog in a huge organisation.

"He'd win a race by a ridiculous margin and 36 hours later he'd be with us at Fiorano, in the truck at 7am for a meeting. He'd make a point of shaking everybody's hand and thank them for all the effort that had gone into the previous weekend. That's a side the general public very rarely got to see."

EARLY IN 2006, SMEDLEY'S ROLE within the team changed. "Technical director Ross Brawn and I often used to catch the same flight from Gatwick to Bologna," he says, "but when we landed he'd disappear with his driver and leave me to my own devices. Then, one day, he asked whether I'd like a lift to the factory. I thought, 'This is probably going to be a bad conversation - why would stratospheric Ross want to talk to me?' Anyway, he began to tell me that he wasn't happy with the way things were going for Felipe Massa and would I be interested in engineering him. I was good mates with Gabriele Delli Colli, who had been looking after Felipe, so I felt a twinge of disloyalty, but somebody was clearly going to take over and there was never subsequently any issue between the two of us.

"It was already Monday and we were flying to the Nürburgring on Wednesday, so I didn't have much time. The situation had deteriorated to such an extent that the team wasn't sure it had made the right decision by signing Felipe - it was my task to find out. It was difficult to see the real Felipe at that point, because he was so nervous. He'd had a few bad results and couldn't sit still, kept coming out with random comments, 'I need to win a race, I need to beat Michael', stuff like that. I told him he just needed to calm down...

"For that first race it was really just a matter of getting him through the weekend, which is all I did. I told him to get back to basics and enjoy himself; he could clearly drive racing cars, but this was just a bigger, better team. I had to learn where his trigger points were, and work out how to use them. The team was obviously very Michael-centric, as it should have been, but once Felipe understood I was on his side, I soon started to see a change and he finished third, behind Michael and Fernando. I remember Ross giving me a hug and whispering in my ear, 'I knew you'd do it' - and there's no better validation than that. Ross has kind of been my F1 dad, someone I respect hugely.

"It was just a matter of building from there. I had to get Felipe back to basics technically and psychologically. He had to forget any lofty ambitions until he had the basics in place - which at that stage he didn't. He was properly quick, but would struggle to string 10 laps together in a race. You can't inject talent into a driver, but I knew he had that and we could deal with the other bits."

Massa scored his maiden F1 victory that summer in Istanbul, helped by Alonso's Renault splitting the Ferraris during the pitstops and protecting the leader against any imposition of team orders. "Afterwards,"





"Felipe, Fernando is faster than you – do you understand?" Germany 2010, before the swap

Smedley says, "I went to the debrief and thought there would be euphoria, but the attitude was more, 'Why didn't Michael win?' Everyone was really gracious for Felipe, but the main feeling was that we might be letting Michael's title chances slip away, because those were points he should have had. The reality is that we should have swapped the two of them around before the stops, but we didn't. Felipe drove a great race, though, absolutely flawless."

SCHUMACHER'S RETIREMENT AT the year's end brought Kimi Räikkönen into the team - and Massa compared well with the Finn, particularly in 2008 when he established himself as Ferrari's main title hope. Had Lewis Hamilton not gained one position during the final moments of the season-closing Brazilian GP, indeed, Massa would have been crowned. In reality, the title was lost as a result of several incidents - mistakes in the first two races, engine failure a couple of laps shy of victory in Budapest, a bungled refuelling stop in Singapore - but the last few seconds



Smedley is in no rush to return to an F1 team, but points out that he will when the time is right

at Interlagos came to define the season.

"It wasn't all that emotional from where I was sitting," Smedley says, "because when you're at the heart of it all you're simply doing a job. You can see all this mayhem going on in your peripheral vision, but it's only when work has finished that it sinks in.

"I think Felipe's dignified post-race reaction enabled people to see the real him, someone who was a fierce competitor, who had been every inch Lewis's equal throughout the campaign but knew how to take defeat. He did himself a lot of favours that day. If he had won the title, would he have been held in any higher regard? Would it have changed anything? I don't think so."

Massa again appeared the more effective Ferrari driver in 2009, but his season ▶

Smedley and Giancarlo Fisichella worked together at Jordan in 2002-03

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ended brutally in Budapest, when a stray damper spring from Rubens Barrichello's Brawn struck him squarely on the crash helmet. The Brazilian suffered serious head injuries that sidelined him for the season's balance.

"I think he hit the radio button when he slumped in the cockpit," Smedley says, "so we could hear him groaning and that was very distressing. It took a while to fathom out what had happened. I was worried that he'd had a heart attack or something, until we saw images that showed impact damage to his helmet and more information began to come through. Then they put up privacy screens around the car, so you begin to fear the worst. It was one of those moments when you start to question why you're involved - a question I asked myself for a while after that. I've had good relationships with drivers since then, but I vowed I'd never again develop as close a bond with anyone as I had with Felipe. He's one of my proper mates - an annoying little s**t at times, but also a true friend.



As a young lad, Smedley admits he considered F1 'dull'. A visit to Silverstone changed all that

"I stayed with him for a couple of days, then came back to Budapest at the end of the week - by which time he was out of his induced coma. We knew he'd be all right, although we obviously didn't know whether he'd drive an F1 car again. But I didn't care about that; I just wanted to know that my mate - son, husband, brother, father-to-be - was going to live. When I walked in, he looked at me inquisitively, then a smile spread across his face and he said, 'Jean!' He kind of knew who I was. He said, 'You're something to do with racing, aren't you? Right, I need to be ready for the next race, in Valencia, so I must get back in the gym in a few days.' His head was the size of a beach ball at the time, and dark blue in parts..."

He would be fit to test by October, little more than two months after the incident, and Ferrari prepared a two-year-old car for him to try at Mugello.

"The whole world wanted to see Felipe back," Smedley says, "but [team principal] Stefano Domenicali had a business to manage. As soon as Felipe had completed his first run I gave Stefano a call to tell him there was no difference - you could see ▶



Elation and surprise – Massa celebrates in the principality

Ferrari's unlikely Monte Carlo pole

Felipe Massa said he'd never felt comfortable around the streets of Monaco, but the telemetry told a different story

The look on Felipe Massa's face wasn't so much joy as bewilderment. He'd first contested the Monaco GP in 2002 and had recorded one podium finish, but it was never a circuit at which he'd felt wholly at ease. Yet now, in 2008, he'd stuck his Ferrari on pole on a day when he'd hitherto looked unlikely to challenge. Rob Smedley was his engineer – and a few firm words played their part.

"After we'd started working together in 2006," Smedley says, "Felipe told me, 'Look, I'm not very good at Monaco – that's just how it is.' So after that year's race, I did the usual analysis and came to the conclusion that he'd been talking bollocks. If you dug into the data, you found he could potentially run at a similar pace to Michael Schumacher. It was there, but he just hadn't put it all together. It was the same the following year, against Kimi Räikkönen.

"For 2008 we came up with a different way of setting up the car and Felipe was immediately quick, but the one place he couldn't get right was Ste Dévote. He seemed to have more grip turning in there than he did at Casino Square, yet he was braking earlier. Before Q1 we had a conversation and he was a little bit better, but not much. He came back saying it was impossible to brake any later into Ste Dévote, so just before Q3 I said, 'I know what the problem is – it's you! You're scared to brake late.'

"His next lap was the same, about 0.2sec down on Kimi through that one corner – and again he claimed he couldn't brake any later. He said, 'I will if you want me to, but I'll end up in the barrier...' At that point I wandered over and grabbed him by the scruff of the neck. I said, 'D'you want to let the whole of f***ing Brazil down here, because you're f***ing letting me down?'

"Felipe then flicked down his visor, lit up the tyres... and subsequently braked 32 metres later into Ste Dévote. I'm fairly sure he was trying to prove that he *would* end up in the barrier, but then he realised, 'F**k, I've got through.'

"That was it – pole position."

LUNCH WITH *Rob Smedley*

that from the telemetry. We knew he'd need a bit of rehabilitation, but that just required a few days in a racing car."

One thing that had changed was his team-mate's identity. The underperforming Räikkönen had been dropped with a year of his contract remaining, to make way for Smedley's former charge Alonso. Massa returned for the 2010 Bahrain GP and outqualified the Spaniard, but Alonso passed him through the first sequence of corners and a template for the future was defined. "Nothing was explicit for Felipe," Smedley says. "He didn't have a contract specifying that he'd be number two, only that he'd have equal treatment. But things can unravel quickly if you have an inkling that the team isn't completely behind you.

"There were a few times when he wasn't allowed to win, but mostly he was beaten because he just couldn't get on terms with Fernando – and that was because he had too much stuff going on in his mind."

The main flashpoint occurred during the 2010 German GP, when Massa outmanoeuvred Alonso at the start and continued to lead until receiving a radio message that became a seasonal catchphrase: 'Felipe, Fernando is faster than you – do you understand?' How uncomfortable did Smedley feel having to deliver it?

"Well he's a mate and I wanted him to win," he says, "but there was a clear team plan and my contract – and payslip – had 'Ferrari' written on top, nothing else, so I was fine with that, but I became infamous overnight. I appeared on every BBC news bulletin – including Radio 4. I was now this 'controversial' British engineer. It was all a bit weird. Most of the negativity was directed at Ferrari, but I was in the middle and wished I wasn't. Ferrari could have done better that day, ditto Fernando and Felipe. None of us could say, 'Yes, we all behaved perfectly.' If we had, there wouldn't have been so much fuss."

"I appeared on every BBC bulletin... including Radio 4"

The Smedley/Massa partnership continued at Ferrari until the end of 2013, when both departed for Williams. "Having been with Ferrari when things were really good," he says, "I perhaps wasn't as enamoured as I might have been with its latest engineering direction. Plus, there was a pull to return to England because the kids were at an age when senior school was looming. I'd probably seen the best of Ferrari and could leave, like Ross, as one of the few Englishmen to have worked a long spell there without being sacked.



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Smedley spent five seasons at Williams, which he believes suffered from lack of investment

"Williams seemed an interesting project. I agreed terms before Felipe did, but they needed a driver and I suggested they talk to him because I knew he'd score as many points as the car was capable of getting – and if you look at 2014-15, he did. He brought solid professionalism and a wealth of experience.

"The team clearly needed a lot of work. We instilled lots of new engineering practices, but the next part of the journey was R&D investment and that never happened. If you want to be a true constructor, you have to have that level of investment or you'll be left behind, regardless of how good your people might be. I don't want to talk about particular individuals, but it's clear some bad decisions have been taken for the team to be in its current position. It's a real shame."

He left at the end of 2018 and is now doing some consultancy work for Formula One Management while awaiting fresh opportunities. "I wanted some time out with my family, because they've been neglected for a long time, but F1 will always be the same burning passion, just as it was when I was a kid. If I find something I want to do on the engineering side, then I'll go and do it."

One final question, has he ever fancied putting his accumulated knowledge to the test behind the wheel? He laughs loudly. "I did buy a kart when I was younger," he says, "but I only raced it a couple of times, once at Langbaurgh, where I think I seized the engine, and once at Felton, where I spun at the same hairpin on every lap.

"I like to understand how drivers operate, from squiggly lines on the telemetry graphs, but that's about it."



CV **BORN: 28/11/73, MIDDLESBROUGH, UK**

- **1995-98** Engineer, Pilbeam Racing Designs
- **1999** (briefly) Stewart Grand Prix with Johnny Herbert, (mostly) Williams Touring Car Engineering with Jason Plato
- **2000** FIA F3000 race engineer for Fernando Alonso, Astromega
- **2001-03** Data & race engineer, Jordan GP
- **2004-05** Ferrari test team
- **2006-13** Ferrari race engineer for Felipe Massa
- **2014-18** Head of vehicle performance, Williams F1
- **2019** Consultant to Formula One Management... while awaiting future engineering opportunities

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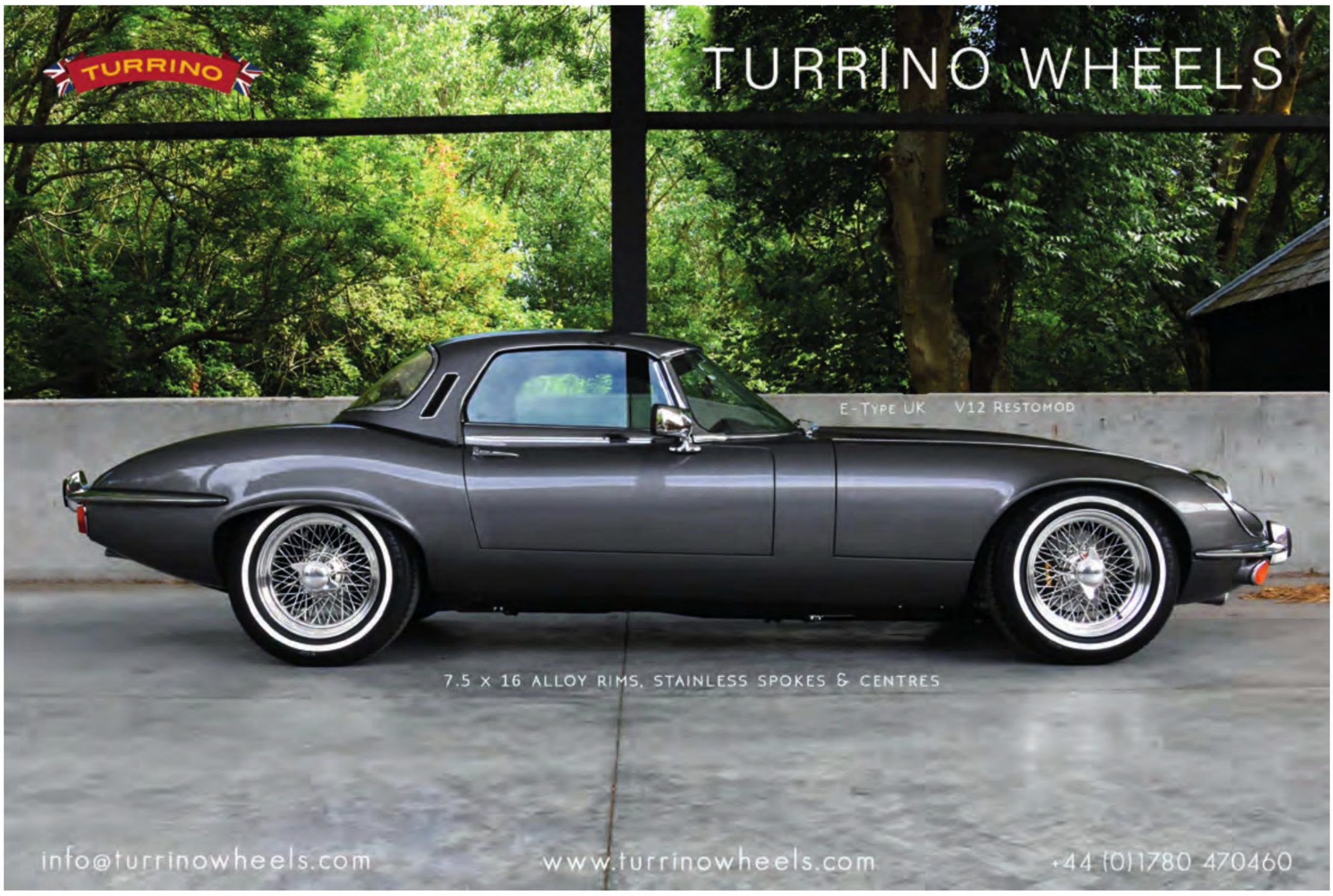
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LETTERS

WHAT A FINE APPRECIATION OF 'Gentleman' Jim Russell in your June issue, accompanied by a great photo. I was a Jim Russell Racing Drivers' School pupil from 1967, and I am sitting in the fourth car back in the Ford Motor Company shot you used.

I remember this day well - it was wet, and all we wanted to do was get out there and drive, but the FoMoCo photographer seemed to take forever.

When I had my initial trial it was with Lotus 51 Formula 3 cars, but by the time I returned for my first lesson they had been fitted with 1600 Ford Cortina engines, and Formula Ford was born. Jim used the Lotus 51s for training - and for the inaugural FFord race at Brands Hatch in July 1967 - until Alan Taylor delivered the first of the Russell-Alexis chassis. Russell had his own cars built, rather than pay for a minimum of 50 that Lotus's Colin Chapman demanded, and Alexis used a Hewland gearbox rather than Lotus's unreliable Renault.

Also in the photo behind the first car are suited school manager Colin Campbell, next to Jim's brother-in-law mechanic Ralph Firman, who went on to found Van Diemen. Jim was a great tutor, and kick-started my racing career. My intake included Ian Ashley, Claude Bourgoignie and John Jordan and, as I graduated in 1969, a young Brazilian by the name of Emerson Fittipaldi was just joining...

MARK COLE, BUCKINGHAM

Mark Cole, pictured here, recounts his memories of Jim Russell's school in 1967



GETTY

I READ WITH GREAT INTEREST AND nostalgia the article on the Lotus 19 - chassis 953. Although only aged eight in 1961, memories of this model Lotus are still quite vivid to me. Your piece brought back many fond recollections of attending race meetings at Mosport Park with my dad.

In 1961, Mosport Park had just been constructed and the Player's 200 race held in June was the first major race to be held at Mosport and more significantly, the very first sports car race in Canada to receive international recognition. Stirling Moss was brought over to drive a light green Lotus 19 Monte Carlo no7 and in qualifying smashed the lap record by a full 5sec. He went on to win in a very convincing way the next day. So impressive was the performance of Moss that weekend that people started referring to Mosport (correctly referred to as the portmanteau of 'Motor' and 'Sport') as Moss-port, a reference still used by many people to this day! The wonderfully smooth driving style of Moss and his beautiful Lotus definitely left a lasting impression on me and cemented my interest in motor sport.

It is unclear to me if the car Moss drove in the Player's 200 that weekend at Mosport was chassis 953 [as we featured] but if it is, I wanted to let you know that both the Lotus and his performance played a very significant role in the history of Canadian motor sport.

BILL WILCOX, ONTARIO, CANADA

FOLLOWING THE ARTICLES ABOUT THE tragic events of Imola 1994 (*Motor Sport*, May 2019), I'd like to relay my experiences of that period.

By April 1994 I was still a young engineer working around my native East Anglia, but I had been offered an opportunity at TOM'S GB: a short-term trial updating the design of a spec-formula car. I was due to start on the first day after the bank holiday weekend.

I was therefore still 'on the outside, looking in' as I watched the sad events unfolding at Imola, but would be very much 'on the inside' thereafter.

Arriving at the office for my first day I was inevitably a little nervous. I remarked that it was perhaps an unfortunate week to begin my involvement in the industry, which was generally agreed. The mood was a little sober. I later discovered some of the people I was working with had been close to both Roland Ratzenberger and Ayrton Senna.

During development of the update package for the spec-formula car, added side cockpit protection was introduced, entirely due to the events that occurred just weeks before. What started as a brief programme of work experience became a significant part of my career, and I spent 14 years at the facility in Hingham, and enjoyed victory with the Bentley Speed 8 - but I will always remember when I began my career there, because of that fateful weekend.

MARTIN CUTTING, VIA EMAIL

WHILE I THINK THAT 112MPH IS more than sufficient, I have to agree with Andrew Frankel's comments in the May issue regarding Volvo's planned top speed limit. As Volvo says: "the goal is that no one is killed or seriously injured in a new Volvo by 2020". The minute they can guarantee and assume full responsibility that no one will be killed in a Volvo travelling at less than 112mph, I will be impressed. As long as they don't, I see it as a cheap publicity stunt.

RAIMUND FEIN, VIA EMAIL

YOUR LATEST ISSUE WAS, AS EVER, A bloody good read! And that includes the 'Heroes of Le Mans' feature. I was extremely pleased that your 50 greatest drivers list was not based on statistics alone, but that heroic endeavour was also part of the selection process.

However, I was surprised that Luigi Chinetti was not included. His record at Le Mans speaks for itself; 11 starts, 3 wins (1932,1934,1949). The 1949 win was Ferrari's first and he was at the wheel for 23 hours!

MARTIN TOMLINSON, DUXFORD

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THE BRUNDLES AND A BIG CAT



Dad, can I borrow your car?



The Brundle name and the monstrous Jaguar XJR-12 made Le Mans history together in the early 1990s. Now, 29 years on, they're reunited as Martin takes the wheel again, with his son Alex in tow. **James Mills** was there

The look on Martin Brundle's face the minute he walks into the garage at Silverstone is a picture. There's an instant flicker of recognition. The same reaction as meeting an old friend.

That's exactly what's happening here. These two haven't seen each other for 29 years, but today is the unexpected reunion. The moment is made even sweeter by the presence of Alex Brundle – Martin's son and current FIA World Endurance Championship racer – who's come along to get a feel for his father's past. He's getting the chance to jump into his father's seat and relive a key moment in the family's racing legacy.

The old friend waiting for them is the Jaguar XJR-12. It's unquestionably one of the finest racing Jaguars ever built, and it's a car that's been kind to the Brundle family.

Moments after 16.00 on Sunday June 17, 1990, Martin's dream of winning Le Mans came true with this model, but not actually this exact chassis.

Jaguar's Le Mans success in 1988 had kick-started a fevered wave of interest among fans back home. After years of German domination, the Union Flag was flying on the top step at La Sarthe again. And for 1990 the stakes were even higher as four major manufacturers – Jaguar, Nissan, Porsche and Toyota – were vying for victory during perhaps the ultimate iteration of the power-hungry Group C era.

Brundle had started the race in XJR-12 chassis 990, the very car we have here. It was his lucky car, an evolution of XJR-9 chassis 588, the machine that had powered him to the 1988 FIA World Sports-Prototype Championship. But it's an ironic twist that it let him down in France, and it was only a late and controversial team shuffle that saved the dream of a British driver winning Le Mans in a British car that year.

After leading for about seven hours, the big V12 of chassis 990 overheated. Its water pump had slipped a drive belt, and the number 1 car had to be retired. But Tom Walkinshaw, the driving force behind TWR and a father figure to Brundle, had a plan up his sleeve.

He deliberately kept just two drivers – Jaguar's successful IMSA pairing, John Nielsen and Price Cobb – running back-to-back stints aboard the number 3, while third driver Eliseo Salazar sat in the garage. With more than 50,000 British fans having travelled to La Sarthe to cheer on the home-grown Jaguar team and its home-grown star Brundle, Martin was ushered straight into Salazar's seat when his own car retired – and subsequently took the chequered flag to cement the dream result.

It might sound harsh, and it was on Salazar, who effectively walked away from sports car racing there and then, but there was logic behind it. Brundle was not only ▸

"We used to laugh about hassling Formula 1 cars around the track"



Jaguar XJR-12 chassis 990 led at Le Mans in 1990, and finished second in 1991. It had been 29 years since a Brundle last drove it

Jaguar's fastest driver, but he was also one of the most mechanically sympathetic. With number 3 already nursing a dropped fourth gear, it made sense for Brundle to safeguard the car rather than the more erratic Salazar.

But regardless of the intra-team politics, Brundle was finally able to appreciate the words of John Wyer: "Winning at Le Mans is worth all the other world championship rounds put together."

Brundle would return to the cockpit of an XJR, this time the 14, for a handful of races in 1991, and then he and Jaguar parted ways. Now, 29 years later, he and chassis 990 will take to the track together again.

Martin's relationship with Jaguar's Group C cars goes right back to the beginning, and the XJR-6. He was the first driver to get behind the wheel, during its inaugural test session, at his home circuit, Snetterton.

Over time, he'd go on to become the most successful driver in Jaguar's Group C racers, along with Eddie Cheever. But Cheever never counted a world championship title or a Le Mans win among his successes.



Tom Walkinshaw, left, was like a motor sport father figure to a young Brundle, right

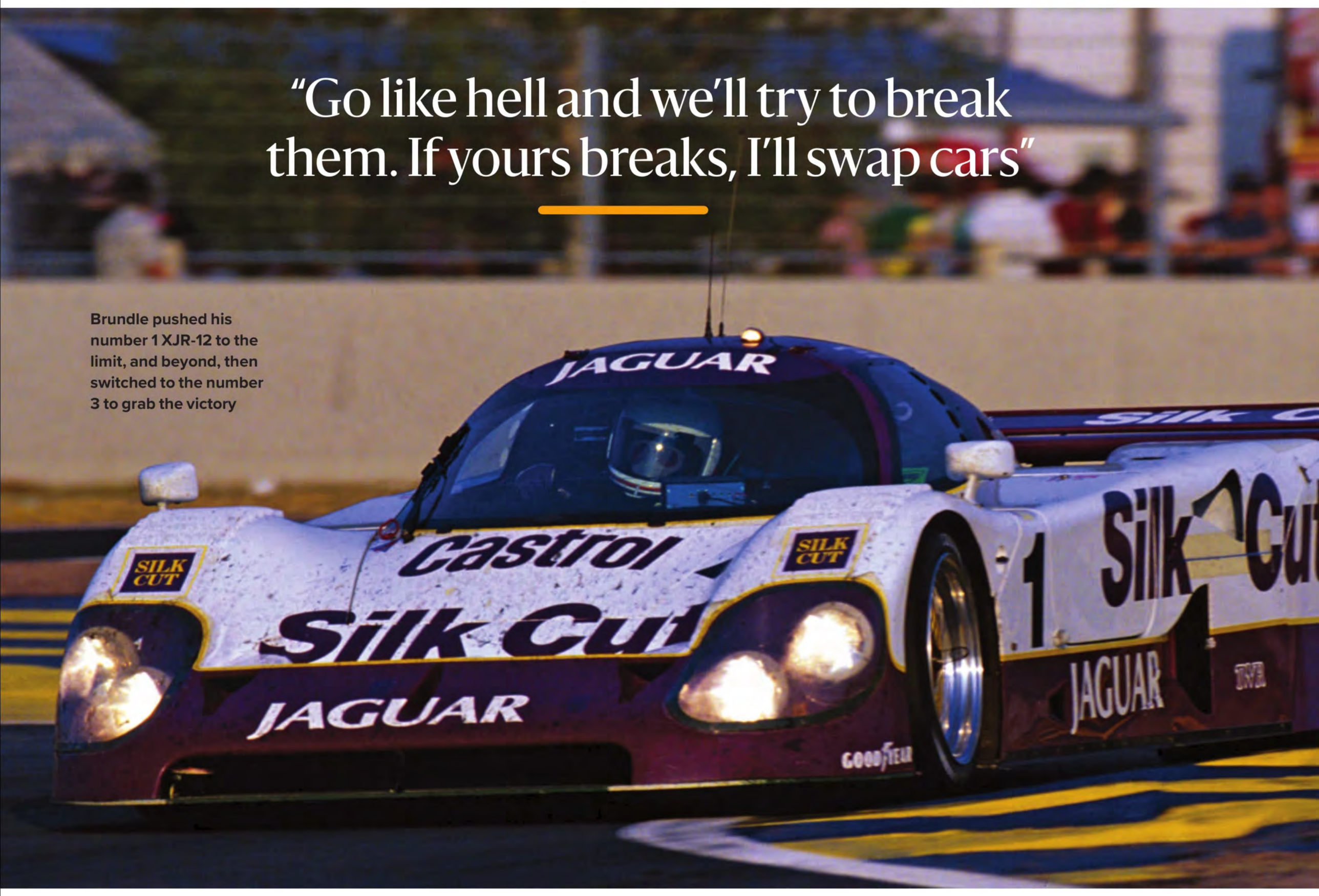
Today XJR-12 990 wears its number and colour scheme from 1991, and Brundle is excited to be reunited with it. Forget the Benetton and McLaren Formula 1 offerings he's driven since; the big cat is his favourite racing car of all time.

"I'm two months off my 60th birthday, and this is like an early birthday present!" he says, eyes twinkling and smile widening.

Brundle enthuses about the performance of the Group C racing machines. At test days, they could mix it with F1 cars. "Derek Warwick used to laugh about how he could latch onto the back of an F1 car and hassle them around the track. The F1 drivers couldn't believe it." Martin's son, Alex, shakes his head in awe.

The reunion came about after I interviewed Alex, also a professional racing driver, for *Motor Sport*. A throwaway question, just before ending the interview, would sow the seed for this story. "Have you ever driven any of your dad's old race cars?" I asked. Aside from a Formula 3 Ralt (*Motor*

"Go like hell and we'll try to break them. If yours breaks, I'll swap cars"



Brundle pushed his number 1 XJR-12 to the limit, and beyond, then switched to the number 3 to grab the victory

Sport, August 2013), Alex hadn't tried any and said his favourite cars from his father's era were, without question, the Group C Jaguars. The family used to own an XJR-6, but it sat in the garage, sadly neglected, and after three years of it gathering dust Martin sent the car off to a better home. "It would be my dream come true to actually drive one," Alex told me.

The detective work began, diaries were juggled and eventually, Martin, Alex and the generous Gary Pearson, owner of the Jaguar XJR-12, were all able to be in the same place at the same time, a BRDC members' track day, held on Silverstone's Grand Prix Circuit.

The highlight of the occasion, Martin says as he arrives, is the chance to see Alex in the car, and find out what a modern-day sports car driver thinks of the Group C era.

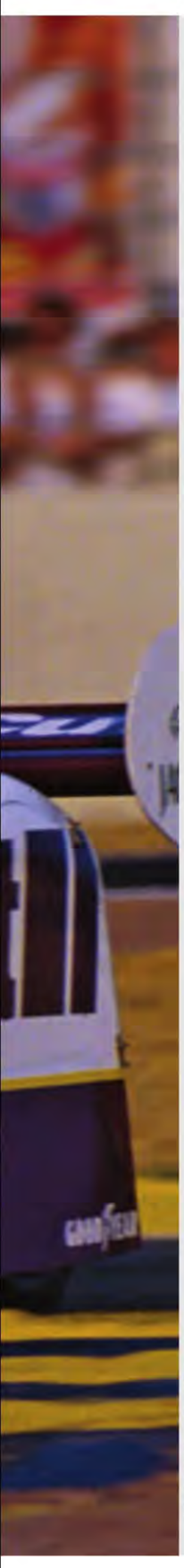
The two had travelled separately to Silverstone - Martin just a day back from returning after the Chinese Grand Prix, Alex fresh from round one of the European Le Mans Series - but had spoken en route.

"To be honest," says Alex, "I was so excited this morning, I gave Dad a ring on the way here. They [sports cars] are a lot more 'jump in and go' now. We have all of the electronics systems and everything. You still have to be on top of it, especially around Le Mans, but it's different.

"I looked at the fastest time the Le Mans-winning Jaguar did, with the chicanes in place [1990 heralded the introduction of chicanes on the Mulsanne straight] and it was 3min 37sec. Last year, the fastest LMP1 car managed 3min 17sec. But it's all about downforce now. I think in terms of power and torque the Jag's going to be impressive."

Sure enough, Martin recounts how it was possible to pull away from the pits, in fifth gear, by slipping the clutch. "It only had five gears, so losing one in a race was never a massive problem," says Martin. Alex laughs: "If we do a gear now, I'd be getting a call along the lines of 'Box! Airport!'"

WALKING AROUND THE car, the enclosed rear wheel spats, low-hanging, low-drag Le Mans-spec rear wing and Silk Cut purple and white branding bring memories flooding back. Memories of rising to my feet in the grandstand before Paddock Hill Bend, at Brands Hatch, in awe of the noise of these spectacular beasts; of wandering around the paddock, breathing in the fumes of high-octane fuel and pricking your ears every time a wheel gun whirred; of leaving in the traffic after the Silverstone 1000km, in the passenger seat of my dad's ◉



MOTORSPORT IMAGES

The master's plan

The work ethic of Tom Walkinshaw was the stuff of legend. He was one of the great tacticians, as he showed in 1990

Tom Walkinshaw was key to Jaguar's return to racing in the 1980s, persuading the factory to take on a campaign in the European Touring Car Championship, with the XJS in '82. He also convinced John Egan, the firm's chairman, to allow TWR to create a Group C car from scratch, rather than develop the US-spec XJR-5.

He hired Tony Southgate, handing the F1 designer a brief to create a Kevlar-reinforced carbon-fibre monocoque that would form the basis of the XJR cars. For 1988, all five of the XJR-9s had been examined in a wind tunnel to ensure they'd reach 240mph. But reliability was a constant worry, especially the gearbox. Jan Lammers somehow managed to drag his car to victory jammed in fourth gear, but Brundle wasn't so lucky, retiring with a cylinder-head failure.

When 1990 rolled around, bad luck almost haunted Brundle again. The XJR-12 he shared with David Leslie and Alain Ferté led but, at 07.00 on Sunday, a drive belt slipped off the water pump pulley and that was that. Except, it wasn't.



Price Cobb (left), Brundle and John Nielsen celebrate their win... Eliseo Salazar didn't

Walkinshaw had made a pact with his star driver. The two had formed a close bond ever since an eager Martin wrote to Walkinshaw in 1979, asking for a drive in the BMW County Championship.

"Tom's plan was for us to drive flat out and draw the Porsches out," says Brundle. "There were so many, so he was like, 'You go like hell and we'll try and break them.' Then he said, 'And if your car breaks, I'm gonna keep your spot in the other car' which I think he forgot to mention to poor old Eliseo Salazar!

"I jumped in the other car, run by TWR USA. But that was missing a gear – fourth – and its front brakes had glazed over by that point, so it hadn't got much in the way of retardation. But we got that to the end. I think by the finish I'd done a dozen hours of racing in total.

"The car was overheating. The radiator [in the nose] as you can imagine would get full of debris and rubber, and I'll never forget Tom, with a bucket of water, throwing the water through from the other side of the rad to try and clear it. So then steam would just envelop you."

The first and second Jaguars could barely cross the finish line before being swarmed by many of the 50,000 Brits who'd come to see their home team show the rest of the world how it was done. All you could hear were tens of thousands of fans singing the national anthem at the top of their voices.

"There was one guy," recalls Martin, laughing, "who was wearing a Union Flag and, apparently, nothing else. Every time we came past, he waved the Union Flag. I'm pleased to say I didn't see him! They were glorious times, and we had the history of the C-type and the D-type behind us. And in 1988 Jaguar had knocked Porsche from the top spot after six or seven years of dominance."



Big 7-litre V12 felt a bit like a pendulum behind the driver, but did allow for venturi tunnels

See Martin drive his Le Mans winner at *motorsport magazine.com*

"You'd be doing 200mph on three wheels... and with no brakes"

Saab 900 Turbo 16S, and chasing after one of his friends in a Ford Sierra Cosworth; of pinning Jaguar and Porsche posters, free with motor sport magazines, to our garage wall, next to my battered Zip kart.

The interior of the XJR-12 looks simple by today's standards. The suede-trimmed Momo steering wheel may be quick-release but there's only a solitary red button, for the car-to-pit radio. Ahead is a Stack analogue rev counter, plus a pair of temperature displays for oil and water. To the left are switches for the lights, wipers and indicators, and to the right sits the exposed gearlever and linkage, the electrical master switch and a wheel to adjust the brake balance.

"I think what Alex would be shocked by is how little safety there is in the car," says Martin, peering in. "I'd sit in the fixed seat, and would be packed, because John Nielsen was a big bloke - Super John, the Viking! - and if we were racing with Jan Lammers he'd have a great big packer, so he could see over the steering wheel and reach the pedals, because he's a little fella. And that was it. No HANS device, no head protection. Nothing.

"If you look at it according to today's standards, and consider a big crash, you'd think you're guaranteed to die. Yet Win Percy had a mother and father of an accident [early in the morning, in 1987]. Down the Mulsanne he had a tyre blow. We had these sensors linked to flashing lights in the cockpit, that were meant to tell you if you had a puncture, but after five laps or so they would flash continually, so we all ignored them.

"I used to just watch the rev counter. If the revs are down, it means you've got a puncture, because the tyre starts to grow and grow as it gets hotter and then goes bang. At which point, as Win suddenly found out, it takes the right-rear corner, brakes and aerodynamics with it. So now you're doing about 220mph, because there were no chicanes back then, on a three-wheeler with no downforce and no brakes.

"I came across it and his accident went on about the best part of a mile. He walked away from that, partly thanks to the third, higher guard rail; then Win climbed over the fence because he didn't feel very well, and they couldn't find him."

It's not pure luck that Percy walked away from such a big one. Designer Tony Southgate (see sidebar) was proud of the fact the carbon tub was so strong that they couldn't accurately measure its rigidity on existing rigs at the time. It was literally off the scale.

Percy tells a good story about what happened next. Walkinshaw was obsessed about the fact that the drivers would jump out of the car having forgotten to release the radio plug from their helmet, which would break the cable. Once Win had made his way back to the pits, he found Tom and said, "Good news! The cable's fine. The bad news is that it's all that's left of the car!"

WHAT ABOUT THE stories about the weight of that 7-litre V12, and how the car's handling was dominated by the mass behind the driver? "Yeah," says Martin, "the V12 is a very big engine. You definitely do feel its weight. The engine's centre of gravity is very important. I remember we tried a 48-valve head with this engine, at Brands Hatch, and although it had a load more power it proved to be slower because it altered the centre of gravity."

The car's aerodynamic performance was also the stuff of legend. "I think we V-maxed at about 240mph," recalls Martin. "It's all fine, until it's not..! Very lazy gearing, long-legged. The Le Mans-bodied cars gather speed really quickly, because they are so slippery through the air.

"Down the Mulsanne you had the tramlines [depressions] in the road, from the trucks, and when you had to cross the crown of the road for the kink, you'd take it flat but really had to think about it, especially in the middle of the night."

Another problem was inadvertently caused by the car's advanced aerodynamics, designed to suck the car to the floor when cornering. If the floor wasn't fitted exactly how it should be, the drivers would quickly know about it.

"I'd go out," remembers Martin, "come back, and say, 'The floor's not right.' You could feel it straight away, because you'd go into a corner and be like, 'Whoa! The floor's not right' and the team would say, 'The floor's fine' and you'd say, 'No it isn't' and then they'd get under the car and be, like, 'OK, yeah, the floor wasn't quite right.' As soon as it was perfectly aligned, the car would just hunker down."

The XJR-12's carbon-fibre cell was cutting edge at the time, but lacks many driver safety systems compared with modern cars

The Le Mans-spec Jaguars ran low rear wings and trimmed-back aero to cut through the air, which made acceleration brutal

"You have this grumbly old engine until 4000rpm, and then the exhaust note just takes over"

MARTIN ELECTS TO DRIVE the Jaguar first. Pearson, owner of number 35 for the past 12 years, runs it only very occasionally but has performed a crack test and fitted a new set of Goodyear Eagle slicks for today. All being well, it should be just the way Martin raced it in period.

After settling in and adjusting the straps, everything seems second-nature to him. He flicks three toggle switches, for the ignition, injectors and fuel pumps, then another for the starter motor.

The noise is something else. Martin waits patiently, revving the engine - BRAP! BRAP! BRAP! - before the signal is given to set off and follow our camera car for one lap. Running at about 50mph, the car sounds as frustrated as its driver probably feels. As I signal to pull into the pits, Martin's finally free, and he's gone, the V12 howling while the fat rear slicks begin searching for grip.

The crowd of onlookers grows each time he passes the pits; apparently faces are pressed up against the windows of the BRDC clubhouse, too. The V12's exhaust crackles on the overrun into Copse, before the XJR-12 hauls away into Maggotts, its engine note carrying on the wind.

Now he's back. And he's a happy bunny. "Amazing! I was getting too happy and too comfortable, so I thought I'd better come in. It feels exactly like it used to, so well done Gary [Pearson]. All the mannerisms are the same. I could have been pulling out of the pit lane and joining the Silverstone 1000Kms.

"You've got that grumbly old engine until about 4000rpm, then the exhaust note takes over, then it gathers speed like crazy - the Le Mans-spec cars are so quick.

"It can rev to 7500rpm, but today we're running at six and a bit, but that's enough - we're not trying to win a 1000k. But I tell you what, that's plenty fast enough down the Hangar Straight. It gets up and goes.

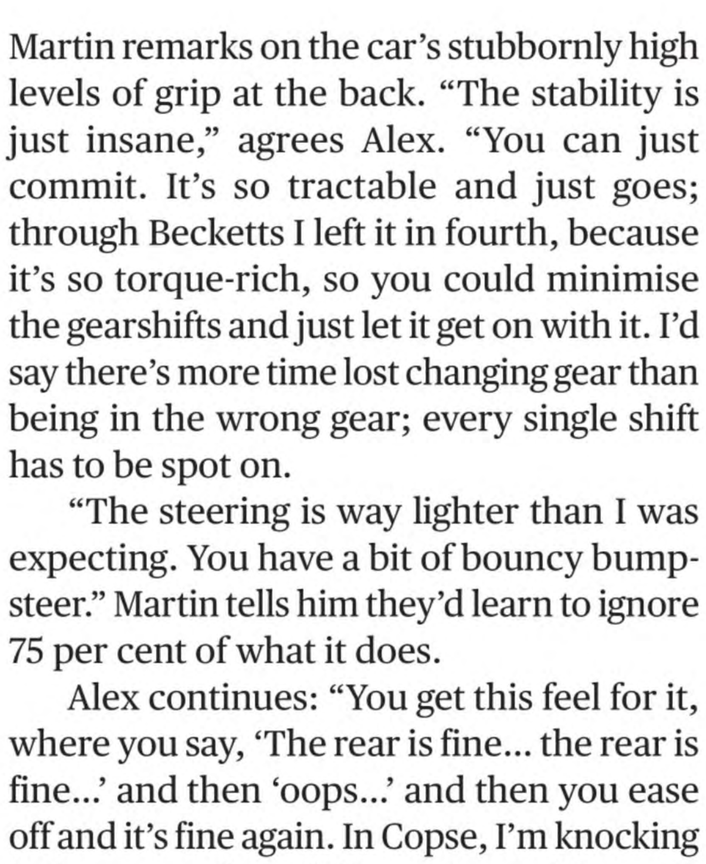
"It's got a good front end on it. I think Al will be pleasantly surprised. I would think what will mildly terrify him is how binary and physical it is to drive, and how much it moves about."

Alex is next. He fires through four laps, immediately piling on the speed and bringing a 'that's my boy' smile to his old man's face. When he rolls back down the pit lane, we look at our watches; he's got another 15 minutes of running time. He doesn't need to be told twice. The fuel level is checked and off he goes.

By the time he returns, Alex has enjoyed 10 of the most memorable laps of his life. Martin looks at him, the pride welling up, then jokes that his lad looks about 12 with his helmet on. (He's 28.)

Ever the professional racing drivers, the two set about analysing the car's behaviour.





"Are you sure you know what you're doing, Dad?" Alex looks on as Martin reacclimatises

Martin remarks on the car's stubbornly high levels of grip at the back. "The stability is just insane," agrees Alex. "You can just commit. It's so tractable and just goes; through Becketts I left it in fourth, because it's so torque-rich, so you could minimise the gearshifts and just let it get on with it. I'd say there's more time lost changing gear than being in the wrong gear; every single shift has to be spot on.

"The steering is way lighter than I was expecting. You have a bit of bouncy bump-steer." Martin tells him they'd learn to ignore 75 per cent of what it does.

Alex continues: "You get this feel for it, where you say, 'The rear is fine... the rear is fine...' and then 'oops...' and then you ease off and it's fine again. In Copse, I'm knocking it down one from fifth, and you drive out, and you always know exactly where you are with the car, pushing past the understeer and finding the balance.



Winning ingredients

Designer **Tony Southgate** reveals some of the engineering that helped to make the Jaguar XJR-12 great

CARBON-FIBRE MONOCOQUE

These cars are heavy – nearly 900kilos – and they go monumentally quick, so you had two fundamental problems. First, the structure to carry everything had to be very, very stiff, and on top of that it had to be safe, because places like Le Mans had the drivers exceeding 200mph four times a lap. It was so stiff that we couldn't torsion test it. Each monocoque cost £50,000, compared with £10,000 for aluminium, and the tooling to cure the material was bloody expensive. The safety of the structure was proved after Win Percy's huge 200mph crash on the Mulsanne. He wrote me a very nice letter after that, thanking me for making such a strong car. It had literally saved his life.

ENGINE & LAYOUT

Tom Walkinshaw said I could do anything I like, so long as the car used Jaguar's V12. That was a challenge, because it was an enormous thing. Allan Scott and I had to get it lowered down. It was powerful and reliable, eventually reaching 740bhp. I had to push the engine as far forward as possible, literally almost touching the driver. I created a recess in the monocoque. That helped get the weight toward the centre.

THE WEAKNESS

Porsche had a race-designed engine and gearbox. We had an off-the-shelf gearbox, and it was about 50 per cent reliable – if you were lucky. It was easy for the drivers to make bad gearchanges, knock the corners off the dogrings. In 1988, at Le Mans, Jan Lammers' car ended up doing the last hour in fourth gear. We made it by the skin of our teeth.



REAR END

The biggest breakthrough in aero by far was the rear wing. All the German cars had long, dramatic-looking tails for Le Mans. I chopped away at ours over time, and found I could cut it right off and start the rear wing directly behind where the tail finished, very low. It interacted as though it were part of the tail, extracting the air from the Venturi tunnels underneath the car more efficiently.

AERODYNAMICS

The Porsche 962s dominated. They were quick and reliable. I looked at the car closely to find any weak links. It was obvious it was flimsy under the bodywork, and the aerodynamics weren't all that, because of the flat engine layout that Porsche was wedded to. I even tested models of the 962 in the wind tunnel. So I created the huge Venturi tunnels, which the narrow base of the V12 allows you to do, added an extra wing to the nose and introduced the short tail. I had calculated how much drag we could run at and still achieve 240mph at Le Mans. We had 50 per cent more downforce than the Porsches, and before the 1988 Le Mans, we took all five cars to MIRA to check they could achieve 240mph.

'The visibility is impressive. And the braking performance is also surprisingly good, with no issues. But it always feels a bit light across the front axle."

"The problem was always getting enough grip at the front," agrees Martin. "But once the venturi [aerodynamic tunnel] was set up right, it would just stick. You know you've got a big lump behind you, but it's not dominating, is it?"

"No, but when it's going, it's going. You really have to get right on top of it..."

"Because it's a big pendulum behind you."

"Yeah, but I can see why they would settle the rear right down for the long-distance races, and use the spool differential. Without it you couldn't cope with it being all flighty. It was awesome. I've met one of my heroes."

What insight has this given Alex into the previous generation of racers? "For drivers of dad's era, the constant management of the car in a race means your mind must have been gone by the end. I guess, as you test and run more and more with the car, you'd understand its foibles and some of that stuff starts to become second-nature. But the constant management of the gearbox, clutch, throttle and how much driving they take is always going to be there."

The noise of the V12 isn't as loud as he was expecting. But a noticeable difference between the Group C Jaguar and a modern LMP car is the absence of any resonance through the chassis.



Alex says rear grip is impressive, until you push too hard and the car can really make you work

"The main issue I found was the stiff throttle pedal. If that happened now to me, in a 24-hour race, my legs would be ruined," laughs Alex. But he's not joking.

Martin reckons it wasn't much lighter than that in the day: "The thing is, you're pulling the throttle slides of 12 cylinders, and it's got a damper on it, and I think that's what you're feeling. They'd only get worse as they wore, too."

The Brundles are made up about the reunion. Martin's wife Liz Brundle joins her boys and asks how it went. Pearson cracks a smile for the first time in the day, not because his multi-million-pound machine is back, in one piece and in full working order, but because the car hasn't disappointed either Martin or Alex.

"If the throttle in my LMP car was this stiff, my legs would be ruined"

SPENDING A DAY IN THE COMPANY of this magnificent machine transports me back to an era before Instagram and smartphones with video cameras. To a time when you wouldn't view racing through the distance of social media. You'd pack your things, get the sandwiches out of the fridge and set off at an ungodly hour to join the thousands of motor racing fans giving their undivided attention to the live spectacle of a world-class motor race.

We could pick a favourite and cheer them on. Jaguar, Porsche, Sauber-Mercedes, Peugeot, Lancia, Mazda, Nissan and Toyota; they were all there, wheel-to-wheel at speeds of up to 250mph.

To witness man and machine battling it out, for 1000kms, six, 12 or 24 hours, was humbling. There were no computers, selectable driving modes, variable traction control or telemetry. Just the driver, their skill and their stamina.

Sure, there were unsung heroes. The team bosses, like Walkinshaw, who persuaded the car makers to throw their brand into the gritty domain of Group C racing. And the engineers, like Southgate, who created cars that drivers didn't just race, they formed a bond with. But it was the men, the pilots, and their machines, that we cheered on.

We still do. But the machines... well, let's just say, they don't make them like they used to.



Two generations of Brundle survey the technology of the 1990s Group C era

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Flat out in our own back

Many overlook just how much of a challenge Silverstone's Grand Prix Circuit is, especially during this record-breaking era of Formula 1. **Robert Ladbrook** speaks to the experts ahead of the season's first real high-speed test next month.

IT'S EASY TO GET COMPLACENT ABOUT the British Grand Prix as just being another fixture for the travelling Formula 1 circus. But Silverstone represents so much more than that when you recount the facts.

For instance, were you aware that the former airfield in Northamptonshire is the third-fastest circuit to host grand prix racing all year? Only the straight-dominated Monza and the legendary Spa-Francorchamps tracks outstrip the average lap speed of Silverstone's Grand Prix loop.

Lewis Hamilton set the current race lap record in 2017, with a 1min 30.621sec effort. That's an average speed of 145.4mph across the 3.66-mile lap. Take the cars in qualifying trim and you can lower that to 1min 25.892sec - also Hamilton, from last year. That's an average of 153.4mph. In other words, an average lap speed faster than most road cars can hope to attain in a straight line.

As technology in F1 has progressed, so has the challenge of Silverstone. Among the plethora of modern-day 'Tilkedrome' circuits that now populate the calendar, Silverstone is something of a dinosaur - but it's all the better for it. It's an old-school flat-out thrash, and still represents a true test of grand prix drivers' bravery and ability to become one with their car.

Silverstone today is actually not far from the challenge it was historically, and that's largely down to the development of the cars. In its second iteration using the RAF airfield's perimeter road from 1949, cars would commonly use the two highest gears for every corner bar one - the Bridge chicane - making the track an ultra-fast test. The venue's major redesign in 1991 aimed to make it more challenging and gave us the current Maggotts-Becketts-Chapel complex. The changes did slow cars down, before technical progress sped them up again.

The rise of aerodynamics, suspension and tyre technology had a profound effect on cornering speeds, and this current generation of F1 cars is the fastest ever when it comes to fast and flowing circuits. The V10 generation of 2004 still ▶

yard

MOTORSPORT IMAGES



A master at home: Lewis Hamilton regularly finds a way of raising his game at Silverstone

MOTORSPORT IMAGES

"You must have huge trust in the car, and complete commitment"

holds some lap records, but the current crop is unbeatable at venues like Catalunya, Spa, Interlagos, the Red Bull Ring and Silverstone.

The Silverstone layout changed to the current 'Arena GP' configuration from 2010, when the lap was increased by 759 metres and the old Bridge-Priory corner combination became obsolete. Cars have developed in a relatively short time, too. Take 2016, as an example. During the last year of skinny tyres and trimmed wings, Hamilton's pole lap for Mercedes measured an average of 147.6mph, nearly 6mph slower than he managed last year. To put that in context, if he'd done the same lap last year, he'd have started stone last, behind Sergey Sirotkin's Williams. Such is progress.

"The thing that stands out about Silverstone is its sheer high-speed nature," says Karun Chandhok, who has raced on the circuit in everything from Formula 3 to GP2, F1, LMP1 and 2, and even Caterham and Peugeot 306 school cars. "You have huge average and top speeds and there are a lot of forces going through the cars, drivers and tyres. With the level of downforce and the wider tyres the cars have gone to now, many of the turns are completely flat out. It's become a real power circuit again. The fact that drivers now can take Copse flat in top... that's amazing. And even for the technical sections like Maggotts and Becketts, they're flat on entry and for the middle part of the complex, then basically just lift before the final part because the cars have so much drag from the extra aero and they use that to slow them down. Many don't even touch the brakes. It's amazing to watch.

"For myself, that run from the old start-finish line, through Copse, Maggotts, Becketts and up to Stowe is one of the greatest high-speed challenges on the F1 calendar. You must have complete trust in the car and complete commitment. If you're not on top of the car as a driver, you'll struggle. Silverstone isn't a place where you can go and just expect to get a lap time, you really have to work hard for it."

SILVERSTONE IS THE FIRST RACE on the calendar that subjects the drivers and cars to such extended levels of cornering force. Your car might be quick in a straight line, but if it's lacking downforce or balance, or your driver is lacking feel and confidence, then Silverstone will expose those shortcomings.

"No matter what you're driving around Silverstone, you'll find its limit," says Anthony Davidson, who raced on the old Silverstone layout for Super Aguri in F1,

Your weekend planned

Motor Sport's guide to getting the most from your British Grand Prix experience

WHERE TO WATCH

This year's race takes place on July 12-14 and Silverstone has changed beyond measure since it hosted its first event more than 70 years ago. In 1948, the Royal Automobile Club International GP took place on what was effectively a figure-of-eight layout, with cars thundering towards each other from opposite ends of the same runway, drivers protected from 300mph closing speeds by a few oil drums and the odd straw bale. That was a bit of a stretch even by the primitive safety standards of the day and the track soon evolved to adopt a clockwise route around the converted airfield's perimeter.

By reputation, the original, sweeping Woodcote Corner was one of the sport's finest, but that would be lost to grand prix racing following the pile-up in 1973 – and the layout has altered since.

In '73, Ronnie Peterson qualified his Cosworth-powered Lotus 72D on pole at an average speed of 138.102mph; last year, Lewis Hamilton capitalised on his Mercedes W09's hybrid sophistication to conjure a 153.422mph Saturday best – a figure comfortably eclipsed in 1985 by Keke Rosberg, whose Williams FW10-Honda had more power than the team's dynamometer could measure. He averaged 160.924mph, despite Woodcote long having been diluted by a chicane; irrespective of format, Silverstone has always been a showcase for the spectacular.

MOTOR SPORT'S TIP *Wherever you watch, make a point of visiting two of the venue's longest-standing vantage points – Copse and the Maggotts/Becketts complex, especially when the cars are in qualifying trim. In aerial view, Copse looks like a fairly tight right-hander... yet F1 cars take it at about 185mph. In eighth gear. Similar momentum is maintained at Maggotts/Becketts, where it's not so much the speed that captures the imagination as the rapidity of the accompanying directional changes.*

CAMPING

There are numerous options around the circuit and the village with which it shares its name. Since 2010, Woodlands (*silverstonewoodlands.co.uk*) has been Silverstone's official campsite, with pitches, hot showers and live music within an easy stroll of the track. Prices start at £85 per adult; check *campingf1.com*, *silverstonecampsites.co.uk* and elsewhere for alternatives.

MOTOR SPORT'S TIP *Potentially a touch raucous for the casual racegoer, but perfectly suited to hardcore enthusiasts that enjoy lively banter with those of like mind. Archaeological evidence suggests a current* Motor Sport *staff member first committed to British GP canvas as long ago as 1977, when three-day admission cost £16 (including camping), although they might have lied slightly about their age. The ambience was engaging back then and hasn't changed a great deal in the interim.*



Some incredibly passionate, and patriotic, fans can be found camping at the British Grand Prix



WEEKEND BLOWOUT

For those seeking the ultimate grand prix weekend experience, you'll have to possess deep pockets. Two passes to the F1 Paddock Club – the ultimate hospitality featuring unlimited food, champagne and regular driver appearances – complete with accommodation at the nearby Hilton Northampton will set you back around £8500 for two people over the weekend. But that package only boasts transfers to and from the circuit across the three days by road. Pah!

Why not book yourselves transfers via helicopter, skip the traffic, arrive in style and leave everybody below wondering about your celebrity status.

A host of companies offer transfers by air during the grand prix weekend. Estimates obtained by *Motor Sport* suggested an extra outlay of £3640 + VAT per day for two people to fly in and out from Northampton. So, if you're happy to shell out the total of around £22,000, you probably won't get better, barring being chauffeured to the track by Lewis Hamilton himself...

ALSO STARRING...

Although Formula 1 dominates the schedule – with three hours of practice on Friday, another hour on Saturday ahead of qualifying and then about 90 minutes of racing to sign off the weekend – it doesn't have a monopoly. The meeting also features the FIA F2 Championship, FIA F3 Championship, Porsche Supercup and two 25-minute non-championship events for cars that usually compete in the Masters Historic F1 series (for grand prix machinery that was active between 1966 and 1985).

Away from racing, Craig David spearheads Saturday evening's on-site concert – which is included in the price of entry – and Sunday's Grand Prix Party will be a post-race fusion of live music and driver interviews.

MOTOR SPORT'S TIP *At many Formula 1 meetings, there is a tendency for the crowd to dwindle in the slipstream of qualifying's conclusion... and to filter in long after action has commenced on Sunday. Such tactics are not recommended. F2 precedes F3 on Saturday afternoon – and might well provide some of the weekend's most entertaining action. The cocktail of ambitious young drivers in cars with limited electronics, 3.4-litre V6 engines and more than 600bhp is traditionally effervescent – and there will be a repeat performance on Sunday morning. F2 cars are louder than the F1 hybrids, too. Bottom line? GP tickets aren't cheap, even at entry level, so it's wise not to miss a single second of anything...*



The post-race concerts are a big draw, with star guest appearances

TICKETS

Adult prices start at £50 per head for general admission on Friday, rising to £579 for the most coveted grandstand perches... and more than £5500 for three days in the Aston Martin Red Bull Racing paddock club suite. Some areas sell out well in advance; check *tickets.silverstone.co.uk* for availability, grandstand locations and a full range of prices

MOTOR SPORT'S TIP *A three-day general admission pass (£190 for adults, £95 for 12-16s, no charge for those aged 11 and under, although tickets must still be ordered in advance) offers the best blend of value and flexibility. Silverstone has a rich vein of spectacular corners; why restrict yourself to one alone?*

and won on the modern track for both Peugeot and Toyota in LMP1. "Getting to feel a car on the limit is what this sport is all about, and Silverstone is one of the only tracks left that really stretches an F1 car's legs. It's like Spa, or Suzuka.

"Silverstone has actually kept up with the development of F1. At places like the Hungaroring you could argue that the cars have outgrown the track and the racing suffers because of that. Silverstone always highlights a good car and a good driver. You have to be so brave in the high-speed stuff and have a good feel for the intricacies of the car stepping out. You are always over the grip limit through the fast bits, whether you're in an F1 car or a Volkswagen Golf, and it's not changed much. I was there as a kid for the 1987 British GP with Nigel Mansell versus Nelson Piquet and their battle into Stowe and how they approached it, and it's still much the same.

"The cornering forces are hard to contemplate, even in LMP2 the g-forces are big. And you don't just get them in one direction as a driver, because there are multiple changes through places like Maggotts/Becketts and Abbey/Farm. I can't imagine what it feels like with today's cars... it was unbelievable in a 2005 Honda! But today's cars produce so much more downforce and the speeds they are carrying are far greater.

"In terms of preparation, I'd always up my neck training before Silverstone. There are certain tracks where you know your neck will take a pounding, so you wouldn't train for places like Monza or Budapest, but Silverstone is so physical. Today, if you did 20 qualifying laps, you'd see fatigue kicking in and see the athlete becoming the dominating factor of performance, not the car. It's one of the highest cornering-energy tracks on the calendar and the driver really does make the difference in the races."

SINCE THE DAWN OF THE TURBO-hybrid engine era, Mercedes has been the dominant force at Silverstone, with Hamilton winning four successive races from 2014-17 and only Sebastian Vettel's Ferrari interrupting the streak with his victory last year.

Andrew Shovlin is the chief race engineer for the Mercedes-AMG F1 Team. He says that Silverstone can present a tricky challenge when it comes to setting up a car to a driver's liking.

"One of the big challenges is that so many of Silverstone's corners are big change of direction combinations, such as Maggotts/Becketts, Abbey/Village or Brooklands/Luffield," Shovlin says. "If you have a car that's on the nose and oversteering, your driver will have to deal with a lot of sliding and will likely overheat the rear tyres and get poor corner exits. Whereas if your car is understeering then they just won't make it round the longer corners. You really need a stable car that you can load some front-end on without the rear suffering too much. It's those high-speed changes of direction that really test a car and highlight any weakness.

"Because so many turns are coupled together you also have the knock-on effect that any problem at the start of one sequence is multiplied by the end, so the time loss can be massive if the first apex is bad.

"The fact that many of the corners are now flat in these high-downforce, high-grip cars has changed the engineering challenge, and it's also made them very tricky for drivers. Take Copse, which is absolutely full throttle now, and the driver has to turn in at the exact right moment and get the car placed perfectly both mid-corner and on exit, all when travelling at huge speed. Drivers need to know that they can commit and give it everything and that the car underneath them will stick and behave consistently and predictably. If a team has less downforce, they'll need a very brave driver as they'll always be wondering in the back of their mind what the car will do when they turn it. Silverstone has a way of sorting the very good drivers from the good ones." O

Home advantage, or disadvantage?

Andrew Shovlin has worked with two British champions, having engineered Jenson Button during his title-winning 2009 season with Brawn, as well as Lewis Hamilton



Hamilton and Button have had differing fortunes at their home GP. While Hamilton has racked up five wins – the joint most in history with Alain Prost and Jim Clark – Button never managed even to step on the podium, having finished fourth three times – in 2004 with Honda and 2010 and '14 with McLaren.

"You can often find that a driver's bogey track is their home grand prix, and I can understand that, but it's never been like that with Lewis," says Shovlin. "He's incredibly good at getting the balance between a car that can look after the tyres when it has to and get him around the lap with plenty of speed and grip. Silverstone just suits the way he drives, especially in the race as he can switch from tyre preservation to pushing on the limit so well.

"You can also feel it when Lewis is putting a good lap together as the crowd cheers every purple sector. Lewis draws a lot of energy from that and he's got an amazing ability to turn that pressure and weight of expectation into a positive.

"With Jenson it was just pure bad luck and a different set of circumstances; 2011 epitomised that. He was in the fight, never put a foot wrong and then his wheel fell off after his final pit stop. We were all sat there hoping it would be his day, but it just wasn't to be. Then during the Honda years, and even with Brawn [once the other teams had caught up with its double-diffuser design] we never went to that race with the right car to go and win it. When you don't have the right package and still have that expectation of a 100,000-plus home crowd it doesn't make for an easy weekend."

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THE RICHEST PEOPLE IN F1

Racing all the way to the bank

There has never been more money swirling around the Formula 1 paddock and it has changed our sport in ways that could barely be imagined a generation ago. But where does it come from, and who has the deepest pockets?
By **Christian Sylt** and **Caroline Reid**

FORMULA 1 HAS ALWAYS BEEN a playground for the rich. Long before the current era of corporate billionaires, fans were entertained by aristocratic racers such as Prince Bira of Siam and Wolfgang von Trips, or playboy heirs like Revlon's Peter Revson. But modern F1 seems to be attracting more of the ultra-wealthy than ever before and, as *Motor Sport*'s first ever F1 rich list shows, having a billion dollars in the bank won't even get you into the top 10.

The list is about more than simple voyeurism, peering into people's private businesses. The money that is listed here has had a direct impact on grand prix racing. Whether this is for better or worse is a discussion that can be had at another time, but the effect of multi-million dollar investments on the sport has ensured that it is a world away from the less glitzy days of a generation ago. So who holds the purse strings - and where did all the money come from?

There are 11 billionaires directly involved in the series at present, from Red Bull linchpins like Chalerm Yoovidhya and Dietrich Mateschitz, to John Malone - the boss of F1's owner Liberty Media. All bases of the sport are covered.

Bernie Ecclestone may be the first name that springs to mind for many people when they think of F1 billionaires, the sport's former supremo is in the reckoning here, and is certainly also in with a shout for the title of 'richest F1 driver' due to his unsuccessful attempts to qualify for both the 1958 Monaco and British grands prix.

The richest man ever to qualify for a Formula 1 race, pasta heir Paolo Barilla, doesn't make the list despite his reported billion-dollar fortune, as the focus is only on people currently involved. So Ecclestone, who is still F1's chairman emeritus, makes the grade, but famous figures such as Ron Dennis, Paddy McNally, Roger Penske or Michael Schumacher do not because they no longer have active F1 roles.

The line-up covers drivers, team owners, circuit bosses and executives from across F1, but only includes those with a current involvement. Indirect team owners who are rarely seen at the races are discounted, so Yoovidhya - who often attends grands prix wearing a Red Bull Racing team shirt - is included, but H&M retail tycoon Stefan Persson, who ultimately owns a stake in the Alfa Romeo Sauber team but rarely attends the races, is not.

The figures are estimates based on extensive research gathered by the authors for their *Formula Money* F1 business reports. They cover sources including company documents, local and specialist news reports plus the authors' own archives valuing team acquisitions and driver salaries.

Family wealth is given in cases where it is not possible accurately to divide it between closely related individuals.

The list does not include the bosses of sponsors, as their F1 involvement is indirect, or famous racing fans. So even though they are regulars in the paddock, billionaire Cirque du Soleil founder Guy Laliberté and the world's fifth richest man Carlos Slim do not appear.

At $350 million, the entrance bar is set so high that the list does not include several famous faces - Sir Jackie Stewart and Sir Frank Williams are not wealthy enough to make the grade, for instance - although, unsurprisingly, several team owners do feature in the rankings.

Of course, some modern drivers also make the cut, thanks to huge wage packets combined with lucrative sponsorship deals combining into a few hefty personal fortunes. There are currently no women on the list, except where they are included in family wealth.

Perhaps surprisingly the most common nationality on the list is American. It might be an early sign of the direction in which the sport is heading under Liberty Media as it expands its reach into fresh territories.



20

Kimi Räikkönen

$350 million

Alfa Romeo driver
Age: 39 Nationality: Finnish

At the age of 39 and with the 2007 world championship to his name, Kimi Räikkönen is the most experienced driver on the grid and has a record most of his rivals will never come close to matching. The Finn is a cult figure among F1 fans due to his laid-back style, which has spawned an array of merchandise including a book of haiku and mugs featuring his famous words "Leave me alone. I know what I'm doing." He used to have an apartment in Monaco but has since swapped it for a $19 million family home in Finland - the most expensive in the country.



19

Sebastian Vettel

$360 million

Ferrari driver
Age: 31 Nationality: German

Four times world champion Sebastian Vettel might not have the celebrity lifestyle of counterparts Kimi Räikkönen and Lewis Hamilton, but his enviable track record has given him a comparable fortune. Paid an estimated $40 million annually by Ferrari, he is the second highest-earning driver on the grid after Hamilton. He guards his private life tightly and, unlike most drivers, has no social media accounts. He prefers to live away from the razzmatazz in a spacious farmhouse in the remote Swiss countryside.

"Hamilton owns a $26 million jet and two $40m Manhattan penthouses"



18

Fernando Alonso

$460 million

McLaren team ambassador
Age: 37 Nationality: Spanish

Double world champion Fernando Alonso was the highest-paid driver in history during his time at Ferrari, commanding a salary estimated at $40 million a year. It hasn't always been so easy for the Spaniard, who started his career with perennial backmarker Minardi in 2001 - albeit under the guidance of influential manager Flavio Briatore. He has invested some of his fortune in business ventures such as the Kimoa clothing line - a current McLaren sponsor - a karting complex in Spain, and his own esports team, although a cycling team he backed failed to get out of the blocks. He owns a luxury condo in a Dubai skyscraper, where apartments sell for up to $16 million.

17

Lewis Hamilton

$525 million

Mercedes driver
Age: 34 Nationality: British

With an estimated salary of $50 million plus bonuses, this year Lewis Hamilton has finally surpassed Michael Schumacher as the highest-paid driver in the history of Formula 1. With more than half a billion dollars in the bank he is the richest current driver on the list and, with five world championships in his trophy cabinet, there is good reason.

His rise to F1 stardom is the stuff of legend. Picked up by McLaren's Ron Dennis as a young kart racer, he was brought up through the team's junior programme and made his grand prix debut in 2007 before becoming world champion a year later. Starting out on a pay packet estimated at about half a million pounds, he hit the mega pay league in 2016 when his $50 million from Mercedes became a new record for the sport.

Hamilton is a famous face even to non-F1 fans and is known as much for how he spends his money as how he earns it. Often seen hanging out with celebrity friends such as Rihanna and Justin Bieber, he owns a $26 million Bombardier jet and two $40 million Manhattan penthouses. Other luxury acquisitions include Prince's gold Fender Stratocaster, for which he paid $78,000.



As well as becoming one of the world's richest athletes, Lewis Hamilton is also one of the most distinctive

MOTORSPORT IMAGES



16

Greg Maffei

$615 million

Liberty Media chief executive
Age: 58 Nationality: American

John Malone's right-hand man Greg Maffei is not only one of the richest men in F1 but also one of the most powerful. Maffei was the chief financial officer of Microsoft before he joined Liberty Media in 2005 and has also been a company director for Starbucks. Most of his vast fortune has come from salaries and bonuses. In 2012 he was the third highest-paid chief executive in the United States, with total pay of $391 million. He is a big supporter of the Republican party and donated $250,000 to Donald Trump's inauguration celebrations.



15

John D Idol

$650 million

Racing Point shareholder
Age: 59 Nationality: American

John D Idol was CEO of Donna Karan before he put $100 million into fashion brand Michael Kors in 2003 - an investment that has paid back four times over. He remains the company's chairman and chief executive and is said to have been instrumental in its success. Last year he masterminded Michael Kors' $2.1 billion purchase of Versace, following on from its $1.2 billion acquisition of Jimmy Choo. It has made Idol one of the biggest forces in world fashion and his fortune is likely to grow over the next few years.

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Gene Haas decided to enter F1 in a bid to expand his business interests

14

Gene Haas

$750 million

Haas team owner

Age: 66 Nationality: American

Given the relatively poor track record of American teams in Formula 1, many onlookers were sceptical when the Haas team got the green light to enter the championship, in 2016. Since then Gene Haas has proved them wrong and with a fifth place in its third championship in 2018, his squad is the most successful completely new F1 team for 20 years.

In 1980 Gene Haas set up engineering company Haas Automation with just two employees, but now it has annual sales of more than a billion dollars. After sponsoring NASCAR teams for several years, he launched his own stock car team in 2002, which became Stewart-Haas in 2009 when American megastar Tony Stewart invested in the operation. Haas has steered the team to two NASCAR Cup titles and dozens of race wins.

He launched his F1 team with the aim of building the profile of Haas Automation internationally. The company already has a 50 per cent share of the CNC tool market in the US and he wants to expand around the world by marketing its links with F1's space-age engineering feats. Haas is a big supporter of charities for sick and disadvantaged children and in 2001 set up the Gene Haas Foundation to raise money for good causes.



13

John McCaw Jr

$900 million

Racing Point shareholder

Age: 68 Nationality: American

John McCaw Jr has been a team owner for less than a year, but he has long-standing motor sport connections. Like fellow Racing Point investor Lawrence Stroll, he is an avid Ferrari collector and in 1998 spent $40 million buying eight Ferrari road cars from none other than Bernie Ecclestone. The collection includes a $10 million 330 P4. McCaw made his fortune in telecoms and, with his brother Craig, he built his father's cable business into early mobile phone operator McCaw Cellular, which in 1993 was sold to AT&T for $11.5 billion.



12

André Desmarais

$1.58 billion

Racing Point shareholder

Age: 62 Nationality: Canadian

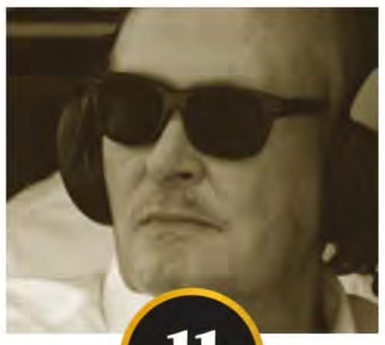
André Desmarais has been around the rich and the powerful for most of his life. His father Paul took control of Montréal-based investment company Power Corporation in 1968 and, through a series of strategic manoeuvres, became the richest man in Canada. On his death in 2013 the fortune was divided, with André getting a significant stake. He and his brother Paul Jr are currently Power's co-chief executives and he is known for his philanthropy, funding university scholarships and other local charities.

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11

Mansour Ojjeh & family

$1.75 billion

McLaren shareholder
Age: 66 Nationality: Saudi Arabian/French

Son of the legendary Saudi arms trader Akram Ojjeh, Mansour and brother Abdulaziz own 14.7 per cent of McLaren through their TAG Group. Mansour became an F1 fan after visiting the 1978 Monaco GP as a guest of Williams. He subsequently sponsored the team before moving to McLaren, where he took a stake in 1984. Outside F1 he was the mastermind behind the rise of TAG Heuer, which he sold in 1999 for $800 million. He owns a $110-million Californian ranch and is often pictured hanging out with high-profile friends.



10

Michael Latifi

$2 billion

McLaren shareholder
Age: 57 Nationality: Canadian

When Michael Latifi's investment company Nidala bought a 10 per cent stake in the McLaren Group for $260 million last year, it drew attention to a businessman who had previously kept under the radar. Born in Iran, Latifi moved to Canada as a child and eventually set up a food processing empire. Latifi is known in Canada for his Sofina Foundation, which hosts a prestigious annual charity golf tournament. The precise size of Latifi's fortune is hard to pinpoint, but educated estimates indicate that he is likely to be worth at least $2 billion.



9

Ong Beng Seng & family

$2.1 billion

Singapore GP boss
Age: 75 Nationality: Singaporean

Ong Beng Seng – or OBS as he is known in F1 circles – made his name in Singapore property, so he was the perfect backer for the city state's GP when it joined the calendar in 2008. F1 brings about 80,000 people each year to Singapore and many of them stay in Ong's hotels, eat in his restaurants and shop in his luxury goods stores. His wife Christina is an oil heiress, known as the Queen of Bond Street, who owns a stake in luxury leather goods brand Mulberry. Their other assets include Singapore's Ferrari dealership and the Hard Rock Hotel in Bali.

8

Lawrence Stroll

$2.6 billion

Racing Point shareholder
Age: 59 Nationality: Canadian



Lawrence Stroll, left, shares a few words with Mercedes Formula 1 boss Toto Wolff

As one of the world's richest F1 fans, it was almost inevitable that Lawrence Stroll would eventually become the owner of a team. His motor sport history dates back long before he bought into Force India last summer – and before his son Lance joined Williams the year before. As a young man, Stroll took over his father's management of the Pierre Cardin licence in Canada before he won the highly lucrative rights to market Ralph Lauren in Europe. He subsequently invested in Tommy Hilfiger and Michael Kors, building both brands from obscure labels into global icons. An amateur racer and owner of Quebec's Circuit Mont-Tremblant, Stroll funded his son's racing career before leading the consortium that bought the former Force India team for $120 million last year. It was the culmination of a lifelong ambition. Stroll's business interests have helped fuel his love of cars. He has a vast collection of classics including a Ferrari 250 GTO and a rare 1967 Ferrari 275 GTB/4S NART Spider, which he bought for $27.5 million. He is also the proud owner of a $200 million yacht that has a glass-bottomed swimming pool.



7

Silas Chou

$2.7 billion

Racing Point shareholder
Age: 73 Nationality: Hong Kong

Lawrence Stroll may be the most prominent Racing Point shareholder, but he isn't the richest. That honour goes to his business partner, textiles tycoon Silas Chou. One of the most powerful men in fashion, with a network of mills, factories and design studios across Asia, Chou reportedly made a $1.3 billion profit from selling his stake in Michael Kors in 2014 and another $500 million from selling the Chinese licensing rights to the fashion brand back to its parent. He has worked with Stroll since they invested in Tommy Hilfiger together in 1989.



6

Piero Ferrari

$2.8 billion

Ferrari shareholder and vice chairman
Age: 73 Nationality: Italian

The only surviving son of Enzo Ferrari, Piero Ferrari has a 10 per cent stake in the car company and owns 13 per cent of shipbuilder Ferretti. Piero's mother was Enzo's mistress, Lina Lardi, and his father did not publicly acknowledge him until the death of his wife Laura in 1978. Piero had been working incognito at Ferrari for several years by then. He inherited from his father a love of engineering and worked for the road car division of the car company before joining the racing department in the mid 1970s.

5

Bernie Ecclestone & family

$4.95 billion

F1 chairman emeritus
Age: 88 Nationality: British



Bernie Ecclestone – racer, businessman, team owner, wheeler-dealer & billionaire

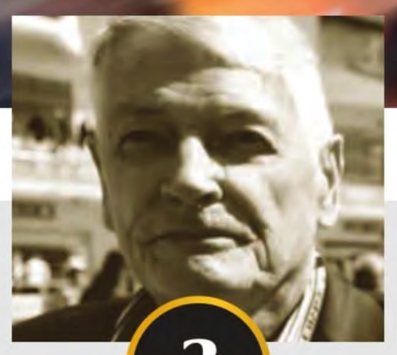
Bernie Ecclestone might not rule Formula 1 any more, but he remains one of the richest people involved in the sport. The son of a trawlerman, Ecclestone worked his way up from market trader to owner of one of the UK's biggest car dealerships before he turned his sights on F1.

After a spell as a driver manager, with Stuart Lewis-Evans and later Jochen Rindt, he took over Brabham ahead of the 1972 season and quickly became the driving force in the F1 teams' commercial struggles against the FIA. His masterstroke came in 1981, when he engineered the signing of the first Concorde Agreement, the document that committed all the teams to race and made it easier to sell F1 as a product to TV stations around the world.

By 1995 he had become the world's highest-paid executive with a salary of $85 million and, at the end of the same year, he was awarded full control of F1's commercial rights operations by the FIA. Over the following two decades he sold stakes in his rights-holding companies, enabling his family to cash out to the tune of more than $4 billion. During his time in the sport he has done deals estimated to be worth almost $25 billion.

When Liberty Media bought F1's commercial rights from CVC in 2017, Ecclestone exited his role as chief executive but continues as chairman emeritus. Unlike many billionaires, he doesn't have an extravagant lifestyle. He lives in an apartment above his Knightsbridge office and has the milkman deliver direct to his door. He is rumoured to go around his home switching off lights in empty rooms, to save on electricity.

This is the modern world – from humble beginnings, Formula 1 has morphed into a business playground



3

John Malone

$8.4 billion

Liberty Media shareholder and chairman
Age: 78 Nationality: American

Liberty Media founder John Malone is rarely seen in the paddock, despite his company's purchase of F1 in early 2017. But although unfamiliar to many F1 fans, he is well known in the world of business – and for good reason. As well as heading up Liberty, he is the United States' largest landowner with 2.2 million acres, including more than five per cent of the state of Maine.

Malone's big break came in 1973 when he rescued US TV channel TCI from bankruptcy. Within just eight years he had turned it into the biggest cable operator in the country. He launched Liberty Media in 1991 as a division of TCI, which held the company's least successful ventures. However, it soon became the most important part of the business. Today the Liberty empire owns stakes not only in F1 but also in companies such as Virgin Media, ITV, the TripAdvisor travel website and the Atlanta Braves baseball team.

Malone also owns four hotels and a castle in Ireland, the home of his ancestors, as well as a string of ranches in the States (including a 290,000-acre New Mexico facility). He has been called both the 'Cable Cowboy' and 'Darth Vader', a nickname given to him by Al Gore.



4

Finn Rausing

$6.4 billion

Alfa Romeo Sauber owner
Age: 63 Nationality: Swedish

Reclusive Finn Rausing sits on the board of Alfa Romeo Sauber's mysterious parent company Islero Investments, after he led a consortium of wealthy Swedes in the acquisition of the team in 2016. He is most famous as a member of the family that owns Tetra Laval, the world's largest food packaging company, which made its fortune from a patent on the foldable cardboard cartons commonly used for milk and orange juice. Rausing grew up at a time when Jo Bonnier was making a name for Sweden in Formula 1 and his passion for motor sport has never left him.

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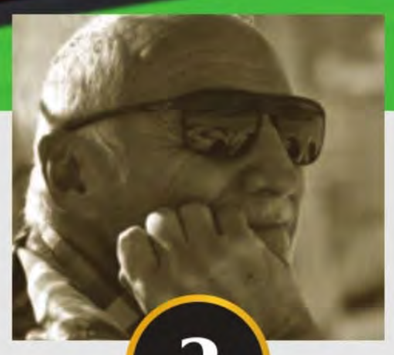
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Once a fairly minor sponsor, Red Bull has been in Formula 1 as a team owner since 2005



2

Dietrich Mateschitz

$14.1 billion

Red Bull owner

Age: 74 Nationality: Austrian



1

Chalerm Yoovidhya & family

$22 billion

Red Bull owner

Age: 68 Nationality: Thai

It's more than 30 years since Red Bull was first seen in Formula 1, when the then-unknown energy drink brand negotiated a small sponsorship deal with Gerhard Berger. Times have changed since then and Red Bull today sells almost seven billion cans worldwide each year, making founder Dietrich Mateschitz and his business partner's son, Chalerm Yoovidhya, the richest people in grand prix racing.

With an estimated wealth of $22 billion, Yoovidhya and his relatives are the richer half of the partnership. They own 51 per cent of Red Bull plus a majority stake in the drink's lucrative Chinese operations, as well as other assets including a pharmaceuticals company. It was Chalerm's father Chaleo who invented the formula for the popular drink and made it a success in his homeland.

On a visit to Thailand in 1987, Mateschitz tasted the drink and approached Yoovidhya Sr with a plan to market it worldwide. They each took 49 per cent of the company, with 2 per cent given to young Chalerm, who inherited the rest with his close relatives upon his father's death in 2012. The Yoovidhya fortune has not helped the family avoid controversy. Chalerm's son Vorayuth is currently on the run from Interpol over a fatal hit-and-run accident.

Mateschitz, the brains behind Red Bull's striking extreme sports marketing campaigns, is the more familiar face to F1 fans. He owns an island in Fiji and a large collection of vintage planes, which are displayed at Red Bull's state of the art Hangar-7 complex in Austria.

But his main love is sport and he has driven Red Bull to buy five football teams, a hockey club and the Austrian GP's host venue, the Red Bull Ring.



The racer's instinct: Nick Heidfeld takes it to the edge to score the fastest ever time on the hill

IMAGES

Controlled EXPLO



See Nick blitz the Goodwood hill at *motorsport magazine.com*

It's a hillclimb record that's stood for 20 years and is the jewel in Goodwood's crown. But, as **Ed Foster** reveals, this could be the year it is finally beaten

THE SUN WAS FINALLY SHINING DOWN ON GOODWOOD PARK after a couple of days of wet weather. The McLaren MP4/13 with a young Nick Heidfeld on board sat with tyre warmers on, ready to climb the 1.16-mile course.

"I was down at the bottom of the Hill with Nick," remembers former McLaren team principal Martin Whitmarsh, "and I think I was the last one to speak to him. He was young [only 22 years old at the time], trying to make his way into Formula 1, and I remember it distinctly because I did something that was pretty irresponsible. I leant in to speak into his visor and said, 'look Nick, this is more dangerous than it looks - there's a crowd, some straw bales, some flint walls, take it easy'. And then, just before he flicked his visor shut, I said, 'but make sure you don't get beaten'."

Seconds later, the marshals pushed him onto the startline, the revs rose on the Mercedes-Benz V10 power plant and the young German disappeared down to the first corner. "As he went round that first corner," says Whitmarsh, "I remember shuddering, and thinking, 'what have I done?'"

That 1999 record run is unbeaten, but this summer at the Festival of Speed (July 4-7) VW is returning to try and take his crown. Having done a 43.86-second run with Romain Dumas at the wheel last year, the team has been away and developed its electric ID R car further.

OSION

HEIDFELD'S GOODWOOD RECORD

Goodwood's now-famous hillclimb traces its roots back to an event organised by the ninth Duke of Richmond, Freddie March, in 1936 for the Lancia Car Club. It was a one-off event, but over 50 years later, the current Duke of Richmond (then the Earl of March) was keen to bring racing back to the circuit, which hadn't held a motor race since 1966. The Festival of Speed ("I didn't like the name at the start, it sounded like a drugs party," admits the Duke) was launched as a tester to see if there was an appetite for motor sport at Goodwood. It was predicted that 2-3000 people would turn up to the first event in 1993, but on the day 25,000 people poured onto the site, many of them not paying, having trampled clean over the fencing. Indeed, there were so many more people than Goodwood had planned for, the team had to find handbags to collect the cash in. These were then unceremoniously dumped in the back of a Ford Granada.



MOTORSPORT IMAGES

Jumping out after his run, Heidfeld was calm despite the excitement everywhere else around Goodwood



It was still a low-key affair, though, and the sight of modern Formula 1 teams didn't appear until the second year in 1994. Ron Dennis sent the McLaren-Peugeot MP4/9 with Martin Brundle as the driver and, sure enough, he was fastest up the Hill in 47.80 seconds. "Yes, we did timed runs from the start," says Whitmarsh. "Inevitably, when you got there in those days, there was a lot of focus from the other cars to beat the F1 car. In the first year it was reasonably relaxed, but we were obviously keen, and the competitiveness came out of us. We had to be quickest. Year on year, that escalated, and it reached that point in 1999..."

Rumours of special gearboxes being built floated around the paddock, but Whitmarsh is adamant that nothing of the sort was done. "We geared it for the event, but it wasn't a bespoke gearbox. By that stage we were using tyre warmers - it had escalated quite a lot! I remember watching Martin that first year and thinking 'the problem with bringing racers to a great spectacle is that it's going to bring the out worst in us'.

"We used to run the car soft for extra traction, and it would have had a Monaco setup with lower gears and maximum downforce. There weren't parts made specifically for the Goodwood run, they were all from the quiver of componentry you had available anyway."

BACK TO THE RUN: THE DUKE OF Richmond was already waiting in the Top Paddock, ready to congratulate the winner of the timed runs, but remembers it well, just from watching it on the big screens. "The lights went green and *newoooow*. It was electrifying. You knew as soon as you heard those revs that something was going on. He was taking it right up to the rev limit in every gear, it was absolutely screaming. The whole place went quiet."

"You know," says Heidfeld, "I don't remember Martin telling me to get the record just before my run. He did tell me afterwards that he was pretty worried..." Heidfeld had been fastest in 1997 and 1998 with the previous McLarens, but this particular year wasn't going so well. "The thing that was different in 1999 was that we weren't the quickest up until that final run. The quickest was Bernd Mayländer in a Mercedes-Benz CLK-GTR. We just wanted to be quickest ◉

GOODWOOD FESTIVAL OF SPEED HILLCLIMB MAP

To cover the 1.16-mile hillclimb in

41.6sec

Heidfeld averaged

100.375mph

He crossed the finish line at

141mph



THE TOP FIVE TIMES SINCE 1993

1. **NICK HEIDFELD 41.6s,** *McLaren MP4/13 (1999)*
2. **GRAEME WIGHT JR 42.90s,** *Gould GR51 (2003)*
3. **ROMAIN DUMAS 43.86s,** *Volkswagen I.D. R Pikes Peak (2018)*
4. **JUSTIN LAW 44.19s,** *Jaguar XJR-8 (2008)*
5. **JUSTIN LAW 44.40s,** *Jaguar XJR-8 (2009)*

- Juan Pablo Montoya referred to the hillclimb as "the narrowest, bumpiest, least grippy course" he'd ever driven. On Heidfeld's record run, you can see the clouds of dust the MP4/13 is kicking up

- The hillclimb was originally going to run from the stables, down to the house, and then left up the hill. Former FISA circuit inspector Derek Ongaro told the then-Lord March that it would have been way too fast and dangerous...

- The hillclimb course is now lined with over 3800 straw bales

- The Festival of Speed is the biggest green-field-build site in the world

and at that moment we weren't, so there was a situation. That was also different for me, because up until that point... That was the only time I thought 'OK, now I have to beat the other guy and push a bit more, I can't just go and have some fun'. It was a different mindset for me."

The MP4/13 was dancing all over the Tarmac from the moment it left the line, and it looked very much on the limit. "Yes," remembers Goodwood historian Doug Nye, "he was visibly going like hell!" Long-time Goodwood commentator Marcus Pye was down at the startline for the run. "We were very much aware of what we were watching. I guess there was an air of expectation about it. I have stood on that startline for years and the fact that Nick shot away with absolutely no fuss, there were no spinning wheels, we knew: this is business. It was snaking all the way to the first corner; it was snaking all the way past Goodwood House. Near the top of the Hill, I can see it now, it sends shivers down my spine, the revs were stratospheric, and the car was darting around. It was a magnificent run; it couldn't have been any better. And we've seen nothing like it since."

"It wasn't totally on the limit," admits Heidfeld. "The biggest issue that day was that it was the first time it had been dry all weekend. Obviously, you didn't have many chances to practise, you just went up a few times during the weekend. Being the first dry run, you had no markers, and you didn't really know where the limit was. You have a bit of memory from the last couple of years, but I couldn't be totally on the limit. From the inside, it didn't feel as mad as it looked. It is obvious from the YouTube video that I had to work relatively hard to keep the car in a straight line. But it all felt controlled."

HEIDFELD AVERAGED JUST over an astonishing 100mph across the resulting 41.6 seconds that it took to get to the top of the Hill. Once past the finish line and in the Top Paddock, he did a 180-degree burnout and calmly got out of the car. "I was there when he jumped out," says the Duke of Richmond, "and it was very, very exciting and emotional. But Nick was, well, pretty calm, typically German! That run was a fantastic moment, but in some ways it burst the bubble."

"Afterwards," says Whitmarsh, "I went to see Charles and just said 'we can't do this anymore. We can't come and pretend we're not racing if we're being timed. There's a competitive spirit in us, that's why we're in motor racing. We don't want to get beaten!" The arms race was progressing at too fast a pace - the teams had tyre warmers on the startline, and young drivers were expected to push harder than they perhaps should have been. From the following year, there was a gentlemen's agreement that modern Formula 1 cars would no longer do timed runs, and Nick's record has stayed safe for 20 years. Every year there are requests from hillclimb drivers to come and do a timed run, but Goodwood is proud of the fact that the record is held by a World Championship-winning F1 car. If it is to be beaten, it should be by a suitably special car and driver. Despite Heidfeld saying that he could have gone faster in 1999, 41.6 seconds has been a tough time to beat - even Sébastien Loeb gave it a shot with his Peugeot 208 T16 Pikes Peak car in 2014, but didn't manage better than 44.6 seconds.

Second-fastest of all time is Graeme Wight Jr in a hillclimb Gould GR51 (42.90 seconds), while at last year's event, Dumas in Volkswagen's I.D. R Pikes Peak did the 43.86-second run. Come July 4-7 this year, might Heidfeld's record finally be broken?

"Having the record is a very special thing for me," says Heidfeld. "When I did it back in 1999 I never thought we would still be speaking about it over 20 years later! It is always special when people come up to me, all over the world, with a sparkle in their eye and say that they were there in 1999. They remember where they watched from, they remember it so vividly. They really enjoyed it, and that makes me so happy."

"It was very emotional, but Nick was pretty calm, typically German"



Blast off! Heidfeld was on maximum attack from the startline on his record run

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BEST OF THE NON-TIMED RUNS

Despite contemporary Formula 1 cars running untimed since 1999, a few drivers have pushed hard when there wasn't a clock on them. Video footage does show how close they got to Heidfeld's time, though...

- **2015, Anthony Davidson**
Mercedes-Benz W04
Estimated time: 43 seconds
- **2014, Sébastien Buemi**
Red Bull RB8
Estimated time: 43 seconds
- **2002, Allan McNish**
Toyota TF102
Estimated time: 41 seconds

FERRARI F1 CHIEF BINOTTO

"We have everything we need to win..."

That's the view of Ferrari's new team principal Mattia Binotto, but a run of Mercedes 1-2s told a different tale at the F1 campaign's dawn. **Mark Hughes** spoke exclusively to the Italian

EXCLUSIVE INTERVIEW



ANDREW HONE

MATTIA BINOTTO, THE MAN in the background doing great work at Maranello for the last 24 years, finally finds himself in the spotlight as Scuderia Ferrari's boss. The contrast in style with his predecessor Maurizio Arrivabene could hardly be starker; quiet consensus replacing adversarial pass-it-down-the-line commands, a search for the nuances of understanding as opposed to raging against the circumstances, engineering rigour rather than marketing bluster, someone who understands how people work together rather than how they choose cigarettes.

Before his sudden and untimely death last year, Sergio Marchionne had come to realise what Binotto's true role should be. The talents he'd demonstrated as technical director, as he'd totally revitalised Ferrari's long-dormant creative energy, made him the logical choice to lead the whole team. The upper management left in Marchionne's wake eventually came to the same conclusion – and so the spotlight swung around to shine upon him. Ironically, he does not enjoy that light anything like as much as his predecessor, but neither does he duck it. It's just part of the whole, and he's never been stressed by learning new skills or assuming more responsibility. So he sits down with *Motor Sport*, camera shutter clacking in the background, to tell us about his new role.





"Being technical director didn't mean I was the best technician," he says. "That's not the case at all. I am the person who can help the others develop their creativity or deliver what our targets and objectives are. It's true since I started at Ferrari I have been responsible for a continuously increasing number of people.... It's something I enjoy, and I believe it's my strongest skill." He has continued with exactly the same approach in his new position.

"There are many areas with which I was not familiar until now, with merchandising, sponsors, politics, drivers. That's the most difficult part, dealing with things that didn't involve me in the past... but other than that, it's just adding some people. The approach has not changed."

Think Ross Brawn rather than Adrian Newey, then, as he expands his technical management into team leadership. He has a similar way with people, getting their respect through his actions while retaining a nicely soft exterior. The ambition and steel lie somewhere beneath, out of sight.

Changes elsewhere in the structure have barely altered with his promotion; he's simply added another layer to his own responsibilities. So he's pretty much in the role that Brawn inhabited back in the day, when Binotto worked in the engine department. "I learned much from Ross. I worked closely with him and still for me he's a good reference. Sometimes when I need to make a decision I think, 'What would Ross do?' He was a great leader at Ferrari. If you have such a reference you use it. There were so many fantastic people to learn from - Michael [Schumacher], Jean [Todt], Rory [Byrne]. I'm still working with Rory, of course. He is a part-time technical advisor but certainly when he's involved he's very passionate about what he's doing. It's great to have him still with us."

Binotto's personality has been reflected in a much more relaxed working atmosphere within the team during a race weekend, even if it's been replaced by a different sort of tension - that of an internal competition between the two drivers.

Arrivabene had pressure imposed upon him by Marchionne and reacted to that by applying that pressure, in turn, to those working for him. Not in a positive way. When some development parts did not work as simulation had suggested during a critical phase of the championship, Arrivabene raged to the staff in that department: "If I get taken down, I'm bringing you all with me." Word of that came directly from the

It took Mark Hughes just a few races to secure time with Binotto, who has dissolved his predecessor's culture of silence





The pain in Spain: Leclerc leads Vettel, but Ferrari never came close to challenging Mercedes

MOTORSPORT IMAGES

"Rory Byrne is very passionate. It's great to have him still with us"

inside. It illustrates perhaps the pressure the man was under - but also his rough, unsophisticated understanding of how to handle it, how to get the best from a group of creative people. He was essentially making exactly the mistakes that Binotto's restructuring of the technical department had reversed for Ferrari in the summer of 2016, after years of a culture of fear.

BINOTTO DIDN'T MAKE ANY BIG announcements to the staff upon taking over, explaining how it would be. That's not his style. He tactfully underplays the contrast. "No, certainly the objectives are unchanged. So in that respect there was no different message. Certainly my style might be different to the past seasons, but everyone in Ferrari knows me so I don't think it was something I needed to explain."

He's respected rather than feared - and that is absolutely in line with the changes he oversaw in that 2016 technical restructure, which allowed for a different, more collaborative approach that he describes as: "More horizontal - to make sure the people working for you and your collaborators are the ones responsible for what you are doing, and feel accountable. It's really down to them to understand how we are playing our game and feeling accountable for what they are doing and it's down to me put them in the right condition to do it."

He gives Marchionne much of the credit for the initiative behind it, and it's clear his relationship with the late boss was very different to Arrivabene's.

"The real architect of that was Sergio Marchionne. He felt the necessity of changing our approach, changing things internally, giving a boost to free some energy from the entire organisation and we worked through the company looking at chassis, power unit and having one single person - myself - in the position of technical director over engine and chassis. But I did not want that to be 'in command'; that's not the way we approach it. I personally am fully convinced by the type of organisation in which people may feel more inclusive, feeling part of the team, feeling accountable for what they are doing, feeling accountable for what we are delivering as well. They are the people playing the game on the field, I'm simply putting them in the right conditions to deliver."

Since this was implemented Ferrari has become arguably the most innovative and

creative of all the teams, no longer simply adopting what other teams had done - as had become the trend since the Byrne/Brawn glory years. Suddenly it was Ferrari concepts being copied, Ferrari pushing up against the FIA boundaries of what was permitted. "I really think this is just from that change of approach," he says. "The people have not changed. You give more freedom and you get more ideas. You remove yourself from being a bottleneck in all the decisions. It's not one person in command, so it's not only one person thinking. Then to make the ideas happen, what you need to put in place is just a process of escalation on certain critical decisions.

"Mr Marchionne? First of all, he was a very smart person, with a very fast brain. Very straightforward. It was easy to understand what he was asking. Very challenging - he always set very ambitious targets. But at the end of the day, for me it was a great period. I learned much. Not only from the way he was managing and approaching, also the way of thinking about discontinuity. Because what he did at the time - changing completely our approach to the organisation - was quite a big discontinuity, not only within Ferrari but in the whole of F1...

"We both strongly believed in an organisation in which everyone has their own skills and responsibilities for which they are personally accountable and this vision is shared today by our chairman John Elkann, who is always very close to the team.

"Aggressive is not the right word for Mr Marchionne. He was very demanding. Being demanding is part of the ambition. That was his way of doing it - because he was convinced that we were capable of delivering more than we believed we could."

BUT IT WASN'T ONLY BINOTTO that Marchionne had decided to promote. The replacement of Kimi Räikkönen with Ferrari junior driver Charles Leclerc was absolutely his initiative and - as with Binotto's promotion - something that hung in the balance for a while after Marchionne's death. But ultimately Elkann decided to follow through with Marchionne's plan on both. It represents ambition, even if it's made for a dimension of difficulty that wasn't there before as the ambitious Leclerc sees the necessity of proving himself against the veteran multiple champion Sebastian Vettel. Binotto has dealt with the inevitable flashpoints calmly, but without undermining Leclerc's ambition or Vettel's pride. It's going

ANDREW HONE

"Sergio Marchionne was a very smart person, with a very fast brain"



Binotto occupied various roles at Ferrari before becoming team principal, having started with the engine division in 1995



Present and past: Binotto with ousted Ferrari team principal Maurizio Arrivabene, right

MOTORSPORT IMAGES

to be a tricky situation to manage.

"I don't think there are many tensions. Each driver is trying to do his best to be ahead of all the others, but I think we have a great understanding between us of what we are doing. The interests of the team always come first and that's the way we are acting. Overall I am happy having Charles and Seb with us because they are fantastic drivers - and that's a nice problem to have."

Binotto made clear before the season started that, although the drivers are free to compete with each other, in any 50/50 situations Vettel would be favoured. "Yes, there are always situations where as a team you need to take a decision and prioritise one driver or another. In a 50/50 situation Seb has priority for the reasons I explained at the time - many years at Ferrari, four world titles, Charles still very young. That's at the start of the season; things might evolve and we have to evaluate as it goes on. But we wanted to remove some pressure from Charles at the beginning."

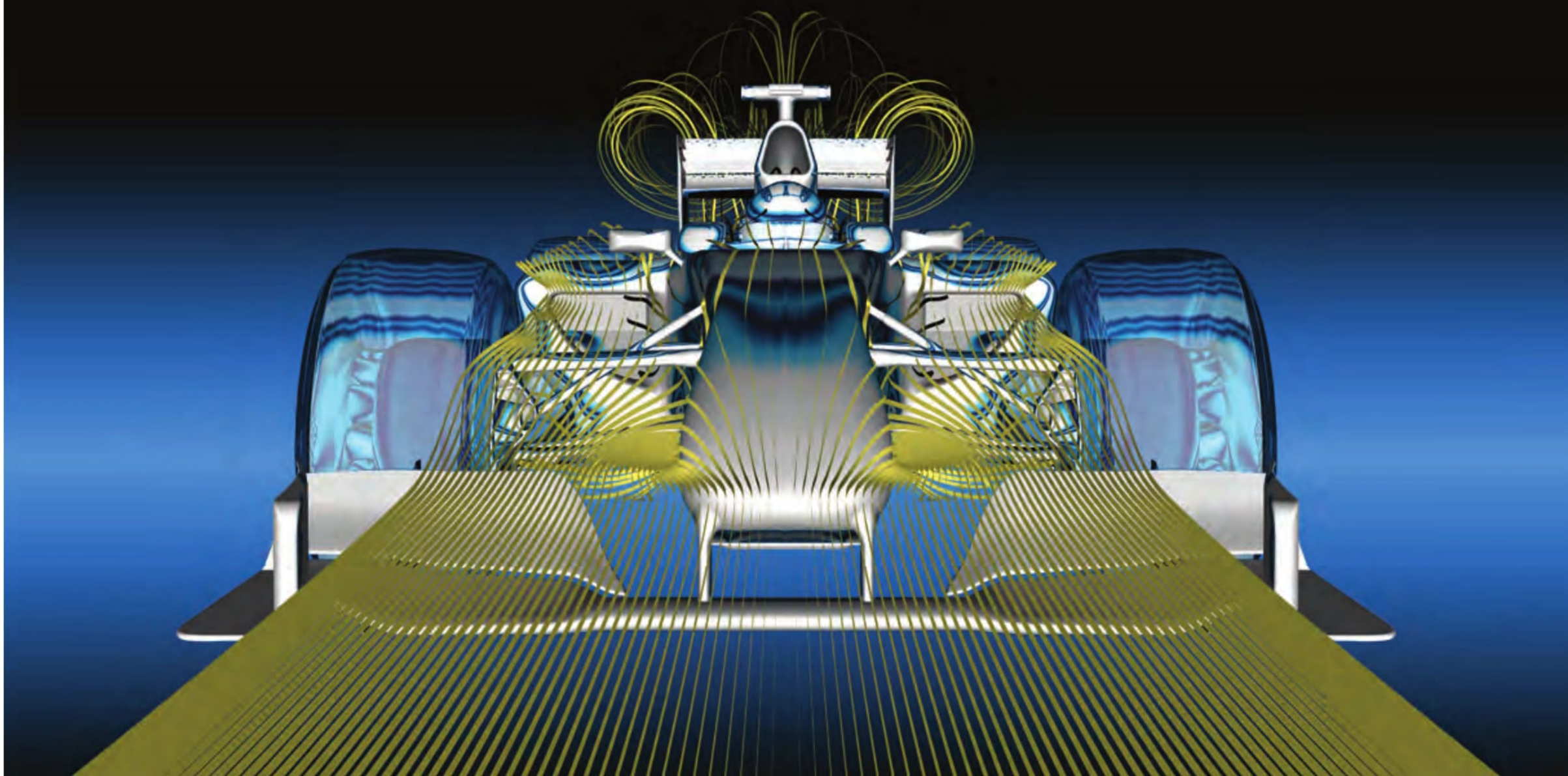
Five races in, Ferrari had twice had the fastest car but a technical failure (Bahrain) and driver errors (Vettel's in Bahrain, Leclerc's in Baku) allowed Mercedes to take five straight 1-2s. So what does the Scuderia need to win, to make that final step?

"No doubt the first few races have not been to our advantage. But if we look so far, including testing, we have been competitive with Mercedes except in Australia - and there were reasons we could not perform there. Even in Barcelona winter testing Mercedes was very close at the end, did the same lap as us actually. We were slightly faster in Bahrain, they were slightly faster in China. It's the type of variance you get through a season between two cars of similar performance. It could also be that Mercedes is slightly ahead in terms of actual performance but I don't think they are so far ahead on speed to have had 1-2s in the first five races. We are still positive, still looking with optimism to the next races. We know it will be a long season, we can see challenges. It's what we are trying to do.

"I think we have all the ingredients to do well, but we still need to work - and work a lot. Overall we are still a very young team. And being a young team, we are in the process of learning. Even if you look at last season, towards the end of the season a few things were not perfect, shall we say, but that's part of the process of learning. In terms of methodology, the way we approach development, we are still in a learning phase. It's a matter of working and building all together. I think we have everything we need in order to win. In this moment stability is key and we just need to go on working as we are."

Drawing in the air

Today a wind tunnel is a tool no Formula 1 team can do without. But where did the aerodynamic departments turn before team tunnels became the norm? **Gordon Cruickshank** investigates



The news that Britain will soon have its own high-speed hole in the ground – a disused Victorian railway tunnel turned into a car test strip – marks the latest step in the assessment of car aerodynamics, a pursuit that began over a century ago.



TotalSim hopes racing cars will soon be hitting 150mph through a tunnel where steam locos once ran

In this latest development, computational fluid dynamics (CFD) specialist TotalSim is turning the disused Catesby rail tunnel in Northamptonshire into an advanced aero facility. Cars, with drivers aboard, will shoot down the dead straight 1.7-mile tube, accelerating into the centre measurement section, and then have half a mile to stop. Turntables at each end mean a quick return. With no fans to drive, power use and noise are radically reduced. "And the repeatability is rock-solid," says the firm's John Paton. "It closes the loop of the three methods. CFD gets better all the time but it's not the real world - there's no vibration or heat for example. The tunnel will allow us to validate model tests and CFD against the real thing. It's the perfect companion."

It also completes a loop back to the roots of the technology, when wind tunnel testing was just as contentious as today - not due to environmental concerns or F1 testing limits, but because many didn't believe that blowing air over a static car had the same effect as driving in free air. It took the genius of bridge designer Gustave Eiffel to prove it did - and that's just the same debate that today's wonder tool CFD had to win before being accepted into the aerodynamics armoury.

Not surprisingly it was dreams of flight that produced the earliest tunnel, in 1871. But while some pioneers, notably the Wright brothers, learned much from tunnels it was not very relevant to early road cars. Record cars were different - 100mph was breached by 1904 - and some of these featured tapered, wedge or torpedo bodies. But there was little comparative testing; they just looked fast. Until Peugeot contacted Eiffel.

Tunnels were rare at the start of the 20th century - doubters preferred tests where the air stayed still and the test piece moved, fixed to a car or a train, swinging round on an arm, or sliding down a zip wire. Even tunnel pioneer Eiffel tried dropping objects from his famous tower to check drag before in 1909 building his first tunnel at the foot of his landmark - a seminal event in aerodynamics.

He wasn't the first; experimenters had blown or sucked air over objects before this, but Eiffel hit on the shape we still use - the venturi with its narrowing and then opening throat. More importantly, he realised his device could test model buildings, planes, trains - and automobiles.

Previously it had been about speed, but in 1913 the ACF reimposed fuel consumption limits for its grand prix, and a year later a 4.5-litre capacity ceiling. Drag factors had a new relevance, so in 1914 Peugeot sent models of its L45 racer to Eiffel's tunnel. The result was that the Peugeots arrived at the Lyons Grand Prix with tapered tails, full undertrays and smooth front edges. They didn't win, and it didn't change racing car design overnight. But it proved that model testing worked, that results were repeatable and controllable. Once engineers worked out how to scale model results compared to full size, a new field had opened up.

Quickly crucial in aircraft design, aerodynamics still had limited application to wheeled vehicles. Even racing focused on power and handling, and a limited amount on frontal area, but few had even heard of drag coefficients. Once racing cars went single-seater, racing bodies began to look smooth and sleek but more by received wisdom than empirical testing. And the wisdom was - streamlining. As cars and aeroplanes fought over speed records the word quickly caught the public mood as shorthand for advanced, futuristic, stylish. And it came from the wind tunnel.

Once your car is installed in a tunnel you need to make some measurements. Balance bars and spring balances can check drag and lift, but to improve profiles engineers needed to 'see' the air flowing over their careful curves. One method was to apply a chalk and oil mix which dries off to show useful patterns. Another answer was smoke, fed to a series of nozzles so lines of it streamed over the test item - the 'stream lines' that would shape the Art Deco era, from planes to washing machines.

SUCH A LOOK WAS EASY TO APPLY to a car: smooth noses and tapering tails echoing aircraft forms became the racing norm. Fiat's vertical-ended 'Bordino' tail on its 1922 GP cars came from the firm's aeronautical department, but through the 1920s few cars reached tunnels and without proper testing the importance of the small elements - louvres, lights, hinges - slipped by. Few wind tunnels could yet take a complete car and making a test model wasn't on anyone's radar. There were open-air options: coast-down - timing how long a car takes to slow from a given speed - was and remains a valuable tool, while tufts of wool glued to the body or a hand-held wand look comical but yield useful clues about surface airflow. What you couldn't measure was internal flow, such as cooling, and how lift affected stability - a vital element no-one was yet looking at.

Pioneer aircraft designer Edmund Rumpler tried to reshape the car scientifically in Germany's aviation tunnels, leading to the 1923 Benz Tropfenwagen racing car and hints at the later A-type Auto Union. After shaping airships in the Zeppelin tunnel, Austrian Paul Jaray transferred his knowledge to cars from the Twenties on, which trickled into a few racing designs. Adler tested very efficient Jaray-style Trumpf coupés using wool tufts before they ran at Le Mans in 1937 and '38. It was proof that low drag compensated for low power - on just 56bhp they finished seventh in '38. But Jaray's tapering tails and narrow cabins made for an inconvenient package. Tunnel testing produced ideal forms, but this isn't an ideal world.

Jaray had shown that car shapes could be scientifically tested, but the simple 'what looks right, is right' principle dominated. As fashions go, streamlining worked better than most - tapering forms and cowled radiators intuitively give cleaner aero - but there was little awareness that those surface details mattered more than a long tail. In any case, on a racing car, enclosed fairings made the mechanic's job difficult, and extra bodywork weighed more. Fashion and aesthetics produced some smooth shapes - George Paulin's Peugeots and Bentleys, Bugatti's T57 Tank - but aerodynamics remained a fringe aspect for most makers.

One exception was Daimler-Benz. Aero studies for its 1920s Indianapolis racers showed promise, and in 1932 Manfred von Brauchitsch took a victory at AVUS in a streamlined Mercedes SSKL. Smoothly faired shapes appeared on the 500K and 540K *Autobahnkuriers* and a coupé for the cancelled 1938 Berlin-Rome race, and also its grand prix cars: from 1934 the company combined coast-down runs with model testing in a small tunnel at the Stuttgart Technical Institute, replaced in 1939 with a facility that accepted full-sized cars. (Radically updated, this FKFS facility is still a vital cog in Daimler-Benz engineering today.)

Hence the clean lines of Stuttgart's racers from the lean W25 to the radical streamliners of the late Thirties which contested speed records with Auto Union on the Darmstadt autobahn - with fatal results. Auto Union's engineers knew their hastily modified streamliner showed instability in the tunnel but as 1938 dawned a frenzy of rivalry between the silver marques meant there was no time to adjust. At 269mph a sudden side gust pushed even the skills of Bernd Rosemeyer beyond critical; he died at the scene. Gaining the knowledge is step one; step two is applying it.

Key man at the Stuttgart institute was Prof Wunibald Kamm, an aero genius who would give his name to a vital lesson: his tunnel tests showed that if you chopped off that pointed tail at the right place a cone of still air filled it in for you. Result: the Kamm tail - a shorter body retaining good drag, a lesson BMW employed on its 1939 328 coupés which beat bigger cars on the 1940 Mille Miglia. Alfa Romeo's high-tailed 2900B which led at Le Mans in 1938 and the little Fiat 508MM show the same influence.

POST-WAR IT WAS ANOTHER aircraft engineer who brought slippery elegance to the race track. Malcolm Sayer's C- and D-type Jaguars slid through the air at 180mph, shaped by calculation, experience and open-air testing - prophetically, he doubted tunnel figures because of the static wheels. Nevertheless a trip to the Royal Aircraft Establishment at Farnborough, which had increasingly larger tunnels from 1906, to place a D in front of the 30ft fan of its biggest - able to swallow entire aeroplanes - confirmed his work. Benetton would later use the same historic facility, now a listed building. Only in 1960 did the UK get its first full-size car-dedicated tunnel, at MIRA, although as it measured only drag it was less suitable for racing; it was model facilities at universities such as Southampton and London's Imperial College which would prove crucial in race car development.

As the maths and the measurements meshed, it became possible to calculate and predict aero behaviour: aerodynamicist Frank Costin stated his sleek 1956 Vanwall was shaped by slide rule and never saw a tunnel until later. Costin's work for Lotus led the way in sleek designs from the MkVIII on: his brother Mike, then Colin Chapman's No2 at Lotus, recalls him strapped to a speeding car on an airfield observing the wool tufts. Chapman seized the baton with the pencil-shaped 21 to 33 single-seaters, aiming at good penetration with plenty of airflow beneath but not tunnel-tested, although Lotus trialled windscreens on the 29 Indy car in MIRA's tunnel in 1963.

Now it was sports cars with their full-width bodies which highlighted an increasing threat - high-speed uplift, destabilising and sometimes catastrophic. Techniques to cancel lift and restore stability came by experiment, especially among American Indy and sports car teams where strips of metal - the Gurney flap - and nose winglets cut lap times - but no-one knew exactly how. It would take tunnel testing to show why, and in the UK that meant going to the universities.

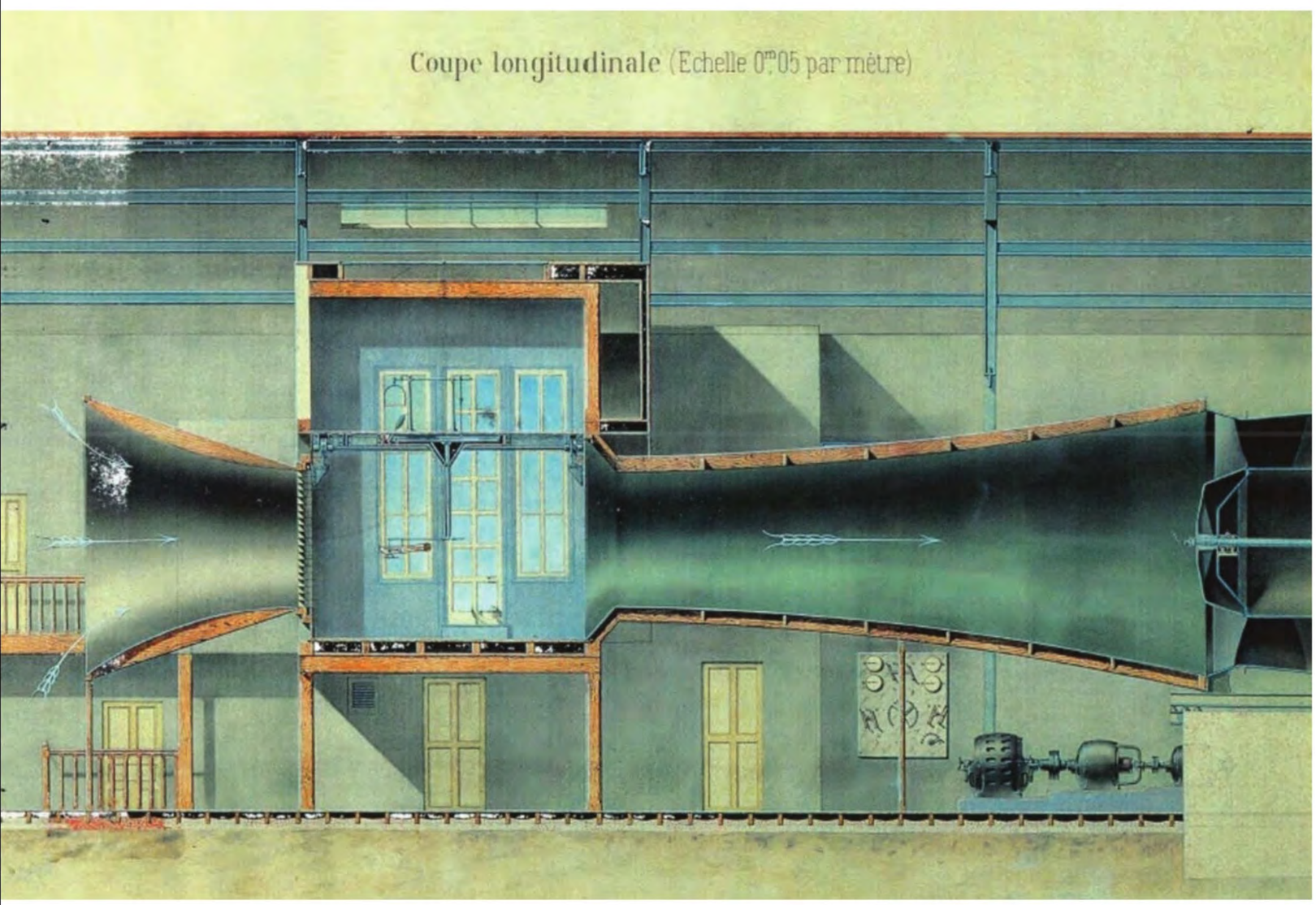
Tony Southgate worked on the Lola T70 in the mid Sixties and says that while they knew spoilers made the car faster, they didn't know why. He took a model to City University in London where one expert was developing the 'perfect' car body. After testing Tony's model he threw up his hands: "You've ruined my life's work!" The 'spoilered' model clashed with pure theory but worked better. Stability, traction and increased tyre grip counted for more than drag, especially with a powerful V8 pushing the car through reluctant air. Now as racing car designers tried to stop the air flowing under the car and kill those dangerous low-pressure areas that could lift the tail, a new horizon appeared. Downforce.

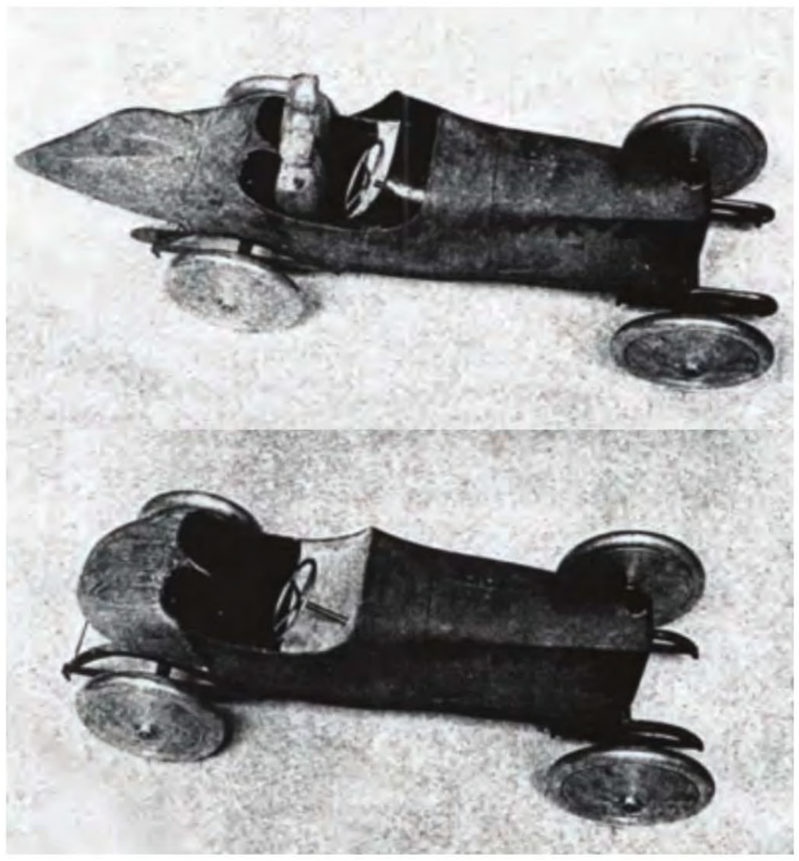
All this Ford was discovering in the US in the early Sixties, using the corporation's extensive tunnel facilities to shape the GT40, though Southgate remembers often seeing GT40 models at City: "The aero was awful - they had a new nose every week until they finally got it right".

> "The GT40 aero was awful – they had a new nose every week"

But there was a smaller team with below-the-pit-counter access to a major tunnel: Jim Hall's Chaparral outfit. While its links to GM's vast aero facilities stayed below the radar, the innovations were visible as flips, ducts and spoilers marked Chaparral's inventive aero development towards the next breakthrough.

We'd seen wings before on record cars and the odd Porsche, and in 1952 Stirling Moss discovered his Mercedes 300SLR air brake also increased cornering power, but once that aerofoil flew above the 1966 Chaparral 2E, everyone wanted some of this free gift. That led Formula 1 toward the ill-fated strutted aerofoils of 1968/69 - acting direct on the tyres and raised high to clear the messy body-surface air tunnel testing had revealed. A perfect equation that multiplied grip with speed - and calamity if a strut broke.

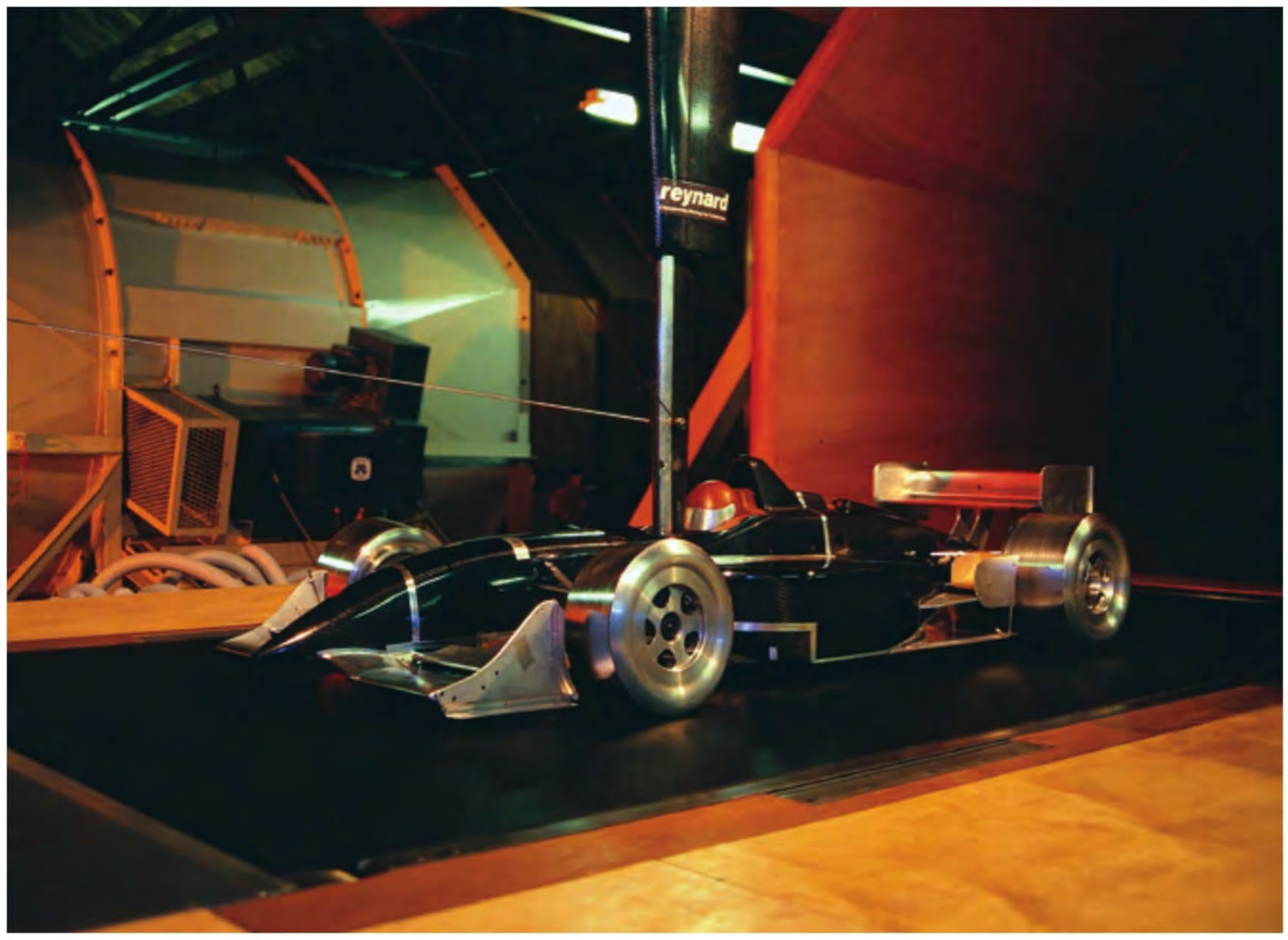






Clockwise from top: Eiffel's tunnel showed the way with its 'venturi' design. Before and after models of a 1914 Peugeot. Note the elongated rear of the reworked design (top). A Jaguar D-type with wool tufts attached to the body. Reynard model on the moving floor at Cranfield. Air streamlines over a 1938 540K race coupé in Mercedes' current tunnel





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With these banned and fixed body-mounted foils mandated, Chapman's Lotus 72 wedge supplanted a winged 49, indicating the next approach with nose and tail wings which could be changed and tweaked.

After 70 years drag had become a force for good. And measurable - as long as you could book tunnel time at MIRA, Imperial, Cranfield or Southampton Universities. And keep it quiet: Lotus designer Martin Ogilvie recalls that for secrecy only the Imperial technician was allowed to work with them.

Peter Wright, who was instrumental in developing ground effect, had earlier side-stepped this bottleneck, building a ¼-scale tunnel (powered by a VW engine!) for bodywork maker Specialised Mouldings. John Barnard shaped the Can-Am Lola T260 there. "They sold it to Williams, who later passed it on to Lotus," Wright says. That's how prized wind tunnels were.

For McLaren's M23, John Barnard found a tunnel on the Isle of Wight. "It was used for Concorde work - and hovercraft," he recalls. This was some of the very first full-size aero testing. "We developed the single-post wing there. Then at Parnelli we took complete cars to Lockheed's 200mph tunnel in Atlanta - very expensive!"



Lotus 29 screen test at MIRA; mechanic Jim Endruweit with wool-tufted helmet and wand used as a low-tech way to monitor airflow

ground effect - the 'something for nothing' prize that pitched racing aero into a new era. It could not have been pinned down and quantified without a tunnel. (Although it was noted before that - Donald Campbell's Bluebirds gained some downforce from underbody mods in the Imperial tunnel.)

Now most F1 teams have their own wind tunnel, sometimes two, which until limits were imposed worked flat-out all year. Other teams rely on universities or commercial operations such as Windshear in the US. Model scale is limited to 60 per cent, beautifully and expensively crafted in intricate detail. Once they would be hand-carved in wood, then in slow and costly carbon-fibre - "more expensive than a real car," says Southgate. "I saw one that cost $1m!" Today they are 3D-printed direct from the CAD model. Moving floors are a given; turntables give crosswind and yaw figures, multiple miniature transducers monitor pressures while laser and other particle visualisation techniques show distribution, vortices and above all that precious downforce. But it's hugely expensive, noisy and power-sapping - and very un-green. It's a long way from tufts of wool on a runway.

Yet this is only half the story. From the 1980s the surge in computer power assisted the arrival of CFD, the number-crunching method to virtually visualise moving air. Its accuracy has soared over the years, meaning it can usefully feed back to physical tunnels. Superb as today's tunnels are, there are always flow and drag effects which would be absent in free air. Now by comparing tunnel figures and pure CFD of the same object, tunnel results can be digitally adjusted to represent free air, minimising the inherent errors of even the finest tunnel.

"A wind tunnel was the big investment that Lotus never made!"

There was still a snag in tunnel testing: a fixed floor didn't equate to passing over the track at speed. Spinning the tyres improved the equation, but it wasn't until 1975 that Imperial perfected a moving ground tunnel, a huge belt under the car that spun the wheels at road speed. Tunnel testing was closing in on real life. "Everyone and his dog wanted to get in there - the moving floor was vital," says Southgate. "We found a 15 per cent difference between fixed and moving floors. One of the worst cases was Porsche's 956 - it was developed with fixed wheels and floor. On the XJR-14 we had very sophisticated models and found we had far more downforce than a 962." Indeed, Porsche had struggled with aero problems from the 907 onward, employing the French SERA institute to parallel work at FKFS.

A moving floor creates immense friction and consequent cooling demands, but it was vital. It was at Imperial that Peter Wright's team made the momentous 1976 step into

Wright had posited an upside-down wing for BRM in the late '60s and with the Lotus 78 was aiming for a simple wing car, but when the moving belt lifted and the sidepod sagged he and designer Ralph Bellamy could suddenly see suction in action, a discovery that would lift racing into a new age.

Now a wind tunnel was crucial, increasing pressure on proprietary facilities. Back at McLaren, Barnard found a tunnel at the National Maritime Institute where the team installed its own moving floor, using it into the 1980s. Arrows went to the Royal Aircraft Establishment at Bedford; Ferrari relied on Pininfarina's facility or Airbus at Filton, and even aerospace company Matra came to Imperial to use the moving-ground tunnel for cars, while Penske used Southampton for its Indy-winning PC23. It was the 1980s before F1 teams built their own, starting with Gordon Murray's (typically self-designed) unit for Brabham in 1981. "That was the big investment Lotus never made!" smiles Wright.

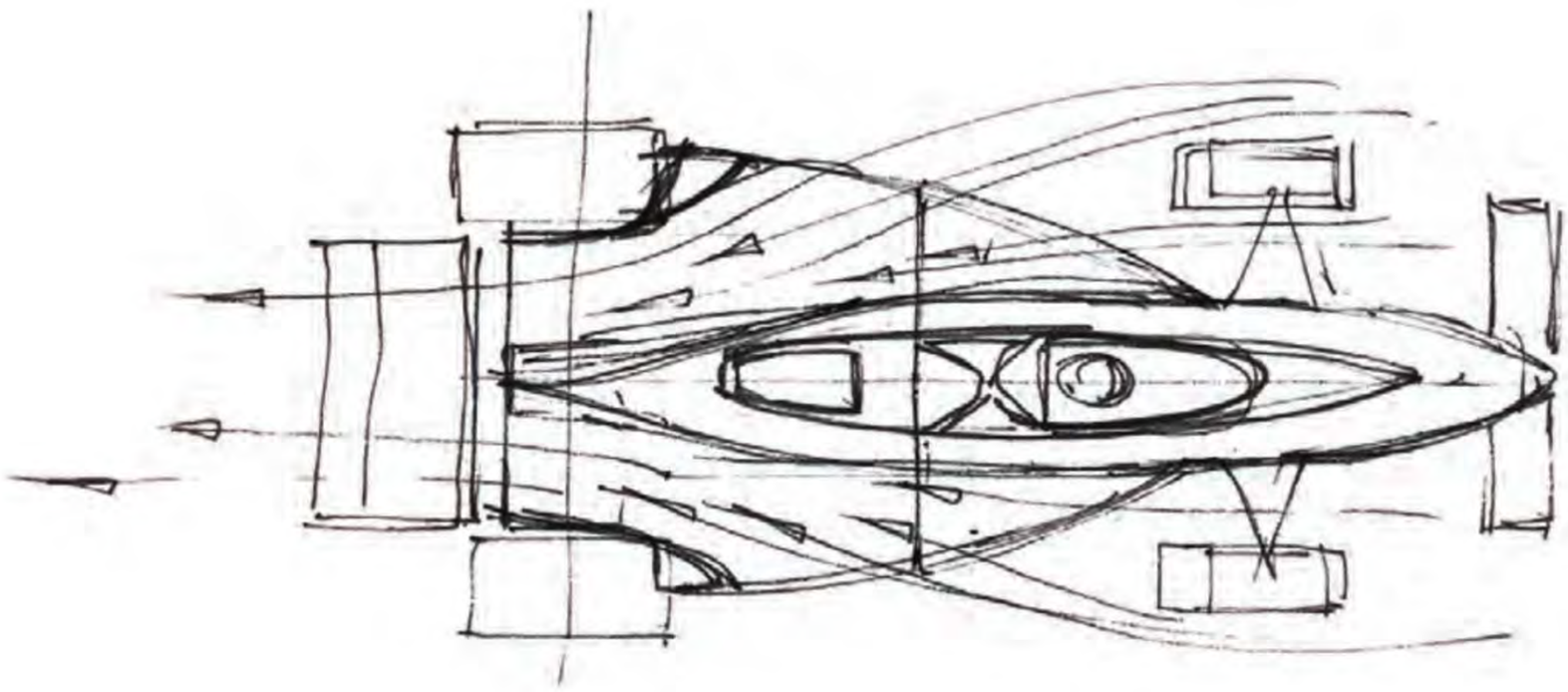
And now we're returning to historical technique of a moving car in still air. In the US the Ganassi team began exploiting the disused Laurel Hill rail tunnel in 2004 and it is now block-booked by one manufacturer. TotalSim hopes that Britain's equivalent at Catesby will be running by 2021.

Today's F1 designers can prove that those tiny winglets on a front aerofoil are worth a hundredth or two, and they know it so precisely because the three main ways of checking - physical testing, wind tunnels and CFD - are collectively homing in on the 'true' picture. This cross-referencing is exactly what Gustave Eiffel had to do to prove that his new-fangled wind tunnel gave the same results as his drop tests. That's the scientific method in action.



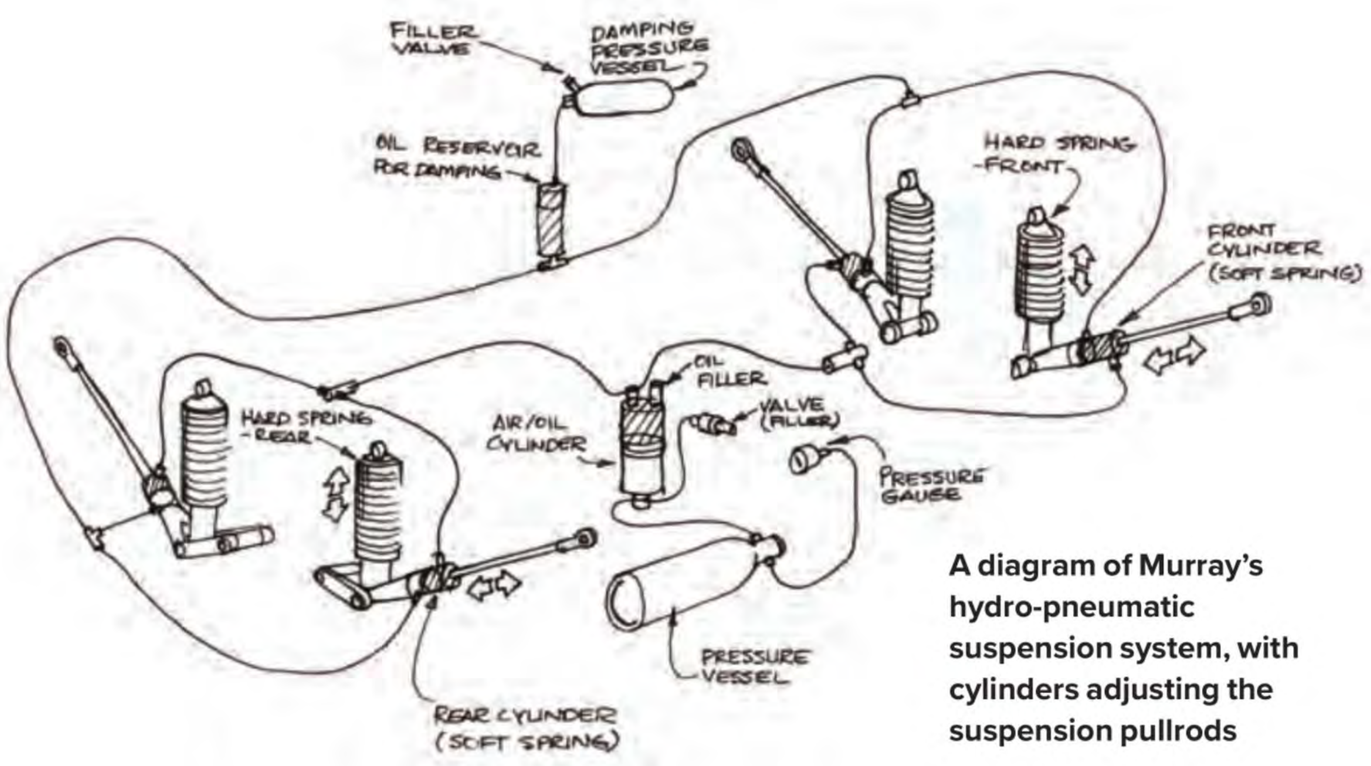
Gordon Murray chats with F1 tsar, and then Brabham team boss, Bernie Ecclestone during the 1975 British GP at Brands Hatch

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Hiding in plain sight

Innovation was rife in the early 1980s. In this extract from his new book, **Gordon Murray** recounts to **Philip Porter** how he bamboozled the field with his adjustable suspension design on the 1981 Brabham BT49C



A diagram of Murray's hydro-pneumatic suspension system, with cylinders adjusting the suspension pullrods



MOTORSPORT IMAGES

'This car was born from the regulations. It was a variant of the successful BT49. By then the car was so reliable – we knew it inside out. At that point, way ahead of other teams, I'd started introducing an organised 'lifing' system so we'd change parts before they showed signs of wear.

'We even had an early computer programme in those days where we changed parts just down to the mileage that they'd done and the abuse that they'd had. This was run by one of our guys called Pete McKenzie, and [the BT49] became one of the most reliable grand prix cars of all time.

'I was very friendly with David Phipps, the photographer, who in turn was very friendly with Colin Chapman. In fact, David was the one who first came up to me and offered me the job [at Lotus] in 1974, on behalf of Chapman, after we won the United States Grand Prix. So that was my connection with David; we stayed good friends.

'The fine-tuning of the rear suspension on Formula 1 cars was very, very important, because the tyres were ridiculously wide - 18in-wide rims. Of course, we had quite a bit of camber change and were running the cars quite soft in those days, so you could very easily end up coming out of a corner trying to use all the tyre but, due to the squat under acceleration, only using half the tyre.

'Because the cars were quite lightly loaded at somewhere like Monaco, your contact patch went down to half and you'd blister the tyre or damage the tyre. So, designing the right geometry and the right roll control with springs, dampers and anti-roll bars was very important. But there was no telemetry in those days, so it was very difficult to try to assess what was happening, apart from looking at the tyre and talking to the driver.

'So, I came up with this concept of sending a photographer out to a certain bend - high speed, medium speed, low speed - and he would take photographs of all the cars from exactly the same angle and exactly the same spot.

'He would have them developed quickly and I would get them back and I could check what camber compensation other people were using on their geometry for that particular circuit and how the tyre was being used, and compare it against our cars. One of the spy shots was our car, and the others were Ferrari, Williams, whoever. If he couldn't develop them in time from the first day of practice, I'd take them home and do the analysis anyway. Then I would adjust either the suspension geometry, if I thought we were wrong, or more usually just the



Brabham's BT49C took Nelson Piquet to three wins, and the world title in 1981

settings for camber, static camber and the ride-heights, and the amount of anti-squat that we used. I think I was the only person, and certainly the first person, to do that.'

'THAT WINTER THE TWO OF us set about designing a hydro-pneumatic system and luckily we had pull-rods still operating the suspension. We just broke into the middle of the pull-rod with a little piston and cylinder. We had a valve that fed hydraulics to one side of the cylinder, and we had a valve that had the tiniest, tiniest port, and a filter to stop anything blocking that port, which the hydraulic fluid had to go through.

'So the car went out slowly with the 6cm ride height. The driver took a lap with the downforce pushing on the springs. The springs pushed the fluid up out of the piston in the rod, which lowered the car slowly. Tuning the size of the hole was the trick. The final hole was so small that we had to find an extremely fine filter to ensure that the valve hole could not be blocked - from memory, the filter material was some form of volcanic rock!

'It had to be a lap's worth of running, roughly, until all the fluid was on the other side of that valve. The pull-rods were all longer by a certain amount, which meant we then had only a very small gap under the skirts and we were making twice the downforce of everybody else.

'Then, after the driver finished the race, he did one slowing-down lap - very slow, like 40mph - which you were allowed to do before you came into the pits. Without the downforce, the spring pressure pushed the fluid back through the valve and raised the car back up to 6cm.

'We arrived in Argentina and people immediately saw these four cylinders on the push-rods with tubes coming off and people like [Gérard] Ducarouge, who was with Ligier, went absolutely bananas with the scrutineers and he said, "Come and look at this - these guys are cheating." And I invited them all into the garage. The valve body was just a little milled aluminium thing with a tube that just came in one side and out the other. You couldn't see what it was; it just

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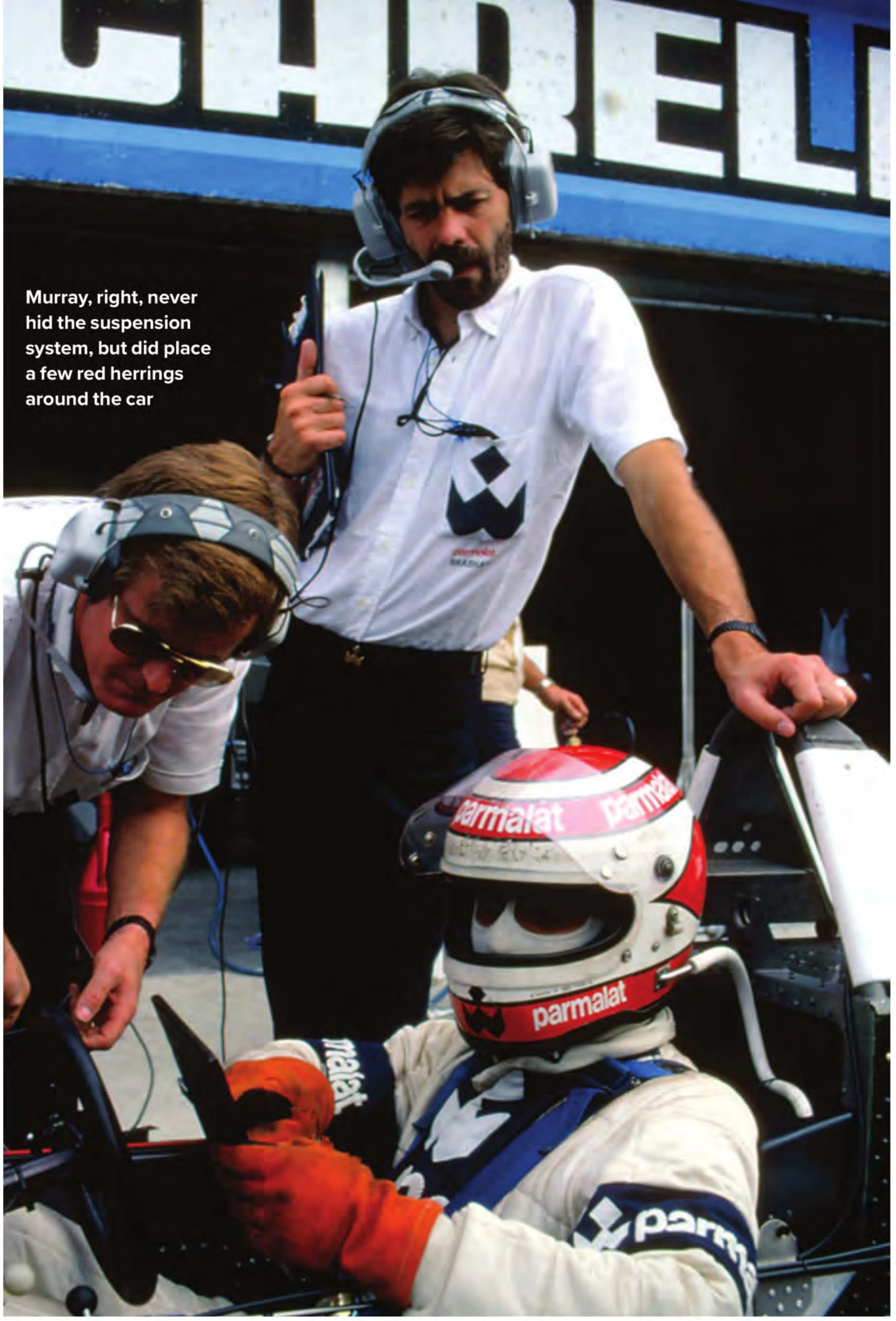
looked like a junction. It didn't look as though it did anything.'

With his wicked sense of humour, Gordon had incorporated a red herring.

'I'd said to the mechanics, "You must leave the top bodies off all the time." In one of the sidepods we had a big 20-gauge aluminium box, which we'd made with electronic wires and hydraulic pipes going into and out of it, and that went to the same system and looked like it all joined in. So it looked like we had some sort of big hydroelectric thing that operated the suspension cylinders.

'We invited everybody into the garage, the FIA and the other competitors. They all spent time looking at that and nobody saw the little valve blocks. Ducarouge was furious and some of the other people were really upset as well - Lotus and Tyrrell, the usual suspects. They went back to the FIA and said, "We think they've got a driver button, not a lever, and the button operates something in that box and that lifts the car up and down." I told them all to come back in again and said to the guys, "Clear the cockpit, take the seatbelts out, show them the cockpit. Now, find me the lever or the button that the driver operates. Here you go. Spend an hour, if you like, looking for it." They all did and of course they couldn't find anything at all because they kept looking at this electronic box.'

Fiendishly clever though this set-up was, it was not without its teething problems. At the end of the year, Gordon told Doug Nye that, at the season-opening Long Beach race, 'The car went down and wouldn't come up. Then it came up and wouldn't go down. Then one end went down and the other jammed up. It was awful. We were using plastic hydraulic lines to save weight. They blew off or melted on hot parts, the fluid leaked, the car sank and stayed sunk. It looked as if Nelson wouldn't qualify so we took the system off his car and ran with conventional twin-rate springs.'



Murray, right, never hid the suspension system, but did place a few red herrings around the car

MOTORSPORT IMAGES

"Do you want us to disqualify the whole field? Nobody will win"

PIQUET FINISHED THIRD BEHIND the two Williams. To the consternation of their teams, Goodyear had pulled out of racing during the winter and Brabham was now using Michelin's radial-ply tyres.

Piquet was on pole for his home grand prix at Rio but could finish only 12th, the wrong tyres having been chosen. In the fortnight between this race and the following Argentine Grand Prix, Gordon flew back to the UK to redesign the lowering system. At Buenos Aires, Piquet qualified on pole. Williams and others protested the Brabham to establish exactly what was legal and what was not.

Gordon commented, 'Everything flexes to some degree. How do you define it?' He and Ecclestone offered to back down if everyone agreed to have marker paint on their fixed skirts on the understanding that, if any such paint was found on the ground at any point round the circuit, they would be disqualified. There were no takers!

Piquet won the race with team-mate Héctor Rebaque holding second for much of the grand prix until his distributor rotor arm stopped playing the game.

'So Ducarouge and the other guys go bananas and say, "OK, look at the underside of their skirts." The scrutineers get down and sure enough our skirts are scuffed all the way along where they've been touching the ground. They said, "You must have been less than 6cm at some point because the skirts are scuffed." And I said, "Yep, sure. I told you that before the season started."

'So I said, "Now will you go along to all the other cars that finished the race and look at their skirts?" And of course they'd all been over kerbs - everybody was scuffed. So they went back to the other competitors, Ducarouge in particular, and said, "Do you want us to disqualify the whole field? You won't have a winner for the Argentine Grand Prix."

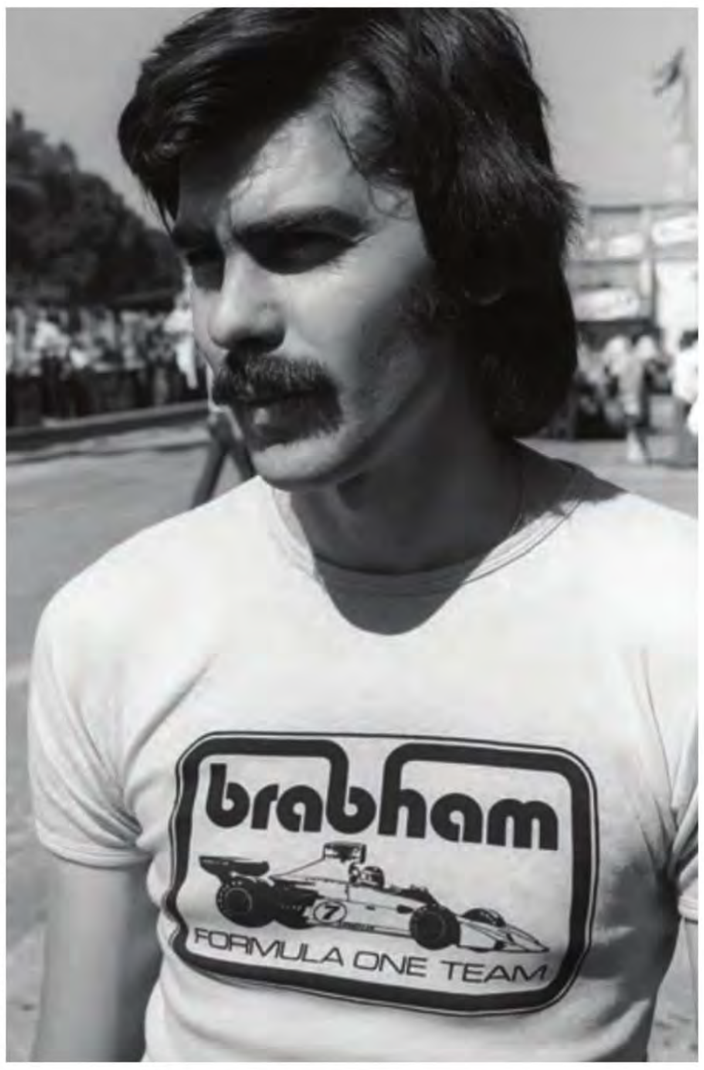
'Then of course other people were trying to find out what we did. Everybody thought we had some sort of thing that could, when the springs were compressed, hold the car down somehow. And Williams in particular were trying all sorts of things. They couldn't suss out what we were doing. We had all these cars going round Brands Hatch, coming down the pit lane and down past the pits, springing up and down with them trying to hold the car down. And of course none of them were working.'

A front spring and cylinder were stolen from the team's garage in Argentina and the Brabham crew were intrigued as to who would have a similar system at the next race at Imola. There was considerable bitterness directed towards Brabham. "It was a bad feeling - all the blokes you'd always chatted to, all your friends, suddenly not talking to you," Gordon told Doug Nye. Piquet won the San Marino Grand Prix but accidents then eliminated him from the next three races.

'We got to Monaco, which was in May, only a third of the way through the season, and the other people were really pissed off because obviously we had so much more downforce we were just going to walk away with the Championship. So the FIA, because they couldn't work out what we had, changed the rules at Monaco and said, "From now on you can have a lever that lowers the car down when you're on the circuit and you have to raise it after the race."

'I was incensed. Can you imagine? So we made a big false lever in the car with "FIA cheat" on it. Obviously then people caught us up very quickly because they could just mechanically get round the rules, which we weren't doing. Then we had a much tougher job. In the end, though, we won the Championship, in spite of that. But that car was significant because it was hydropneumatic. It had carbon brakes, carbon monocoque, machined bulkheads, and was easy to work on. So the 1981 version was a very significant car.'

The title the team won was the drivers': The team finished second to Williams in the constructors', which had Carlos Reutemann second in the drivers', by a point.



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Gordon Murray made his name with Brabham before moving on to McLaren where he played a part in the MP4/4 design



Book extract taken from *One Formula: 50 years of car design* by Gordon Murray & Philip Porter. Published by Porter Press.

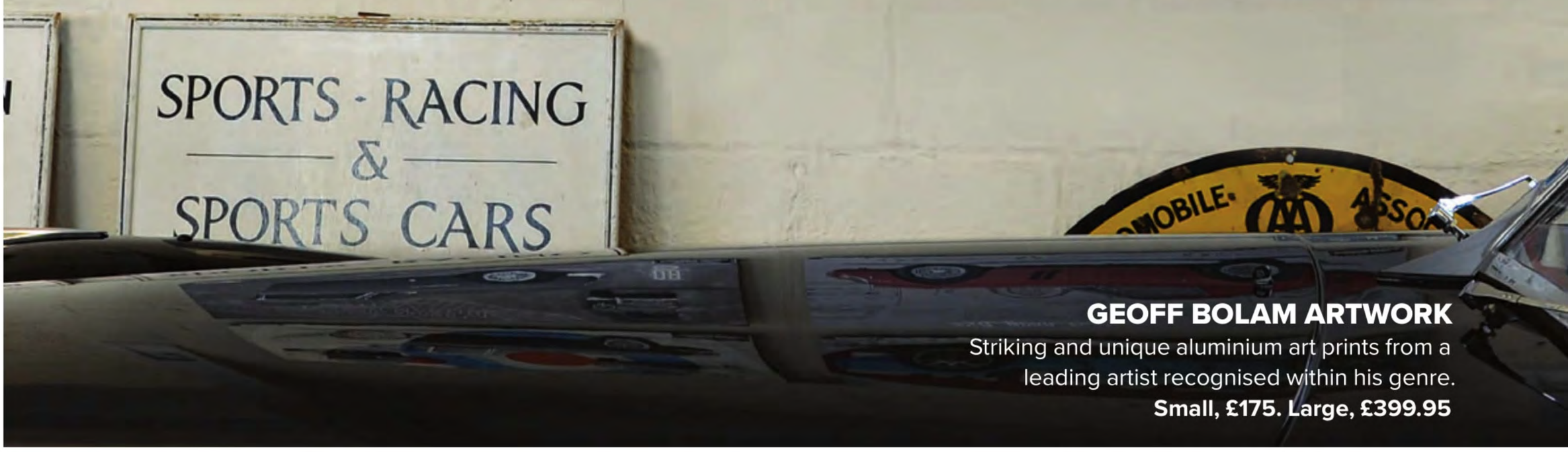
Piquet won from pole in Argentina, which caused a storm of complaints. But no team could pinpoint the BT49C's secret











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PHOTOGRAPHER **LYNDON McNEIL**

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Unless you are restoring a classic car, when you suddenly discover how many choices your trimmer wants to know about. And that's when simply copying what someone at Lagonda or Austin, Bertone or coachbuilder James Young installed many years before. There is much skill in stitching those seams to a period pattern and ensuring the material is beautifully taut and the stitching ruler-straight. Traditional skill, but not inventive. But if you've radically altered your latest machine in restomod fashion you don't really want standard upholstery.

Step forward Dean McConnell of Trimworks. You want a vibrant interior colour scheme? Completely reshaped seats? Alcantara everywhere? Dean can rustle up a dozen ideas for something fresh that no-one else can boast. He's perfectly ▶

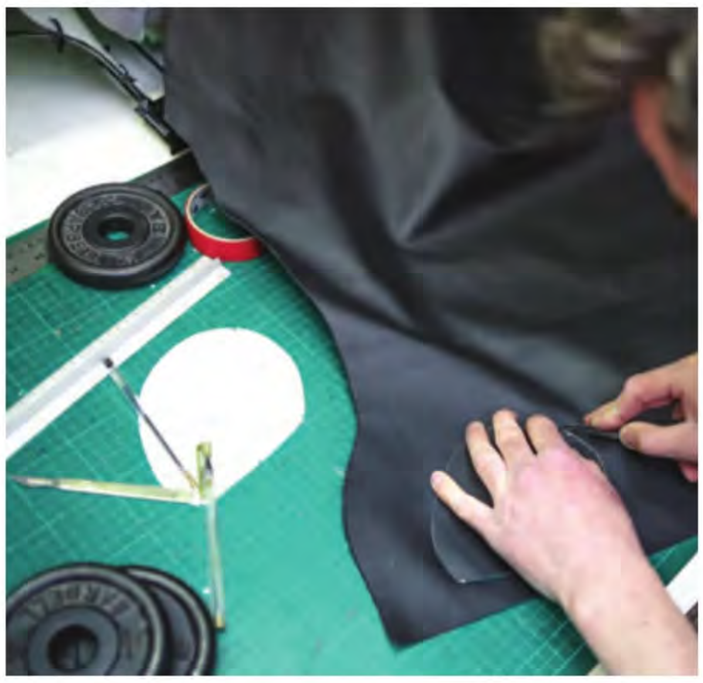
Dean McConnell installs new bespoke seats in Mercedes. Below, sketch ideas for Alfa interior

"You need to get to know your clients, and they need to be open to ideas"



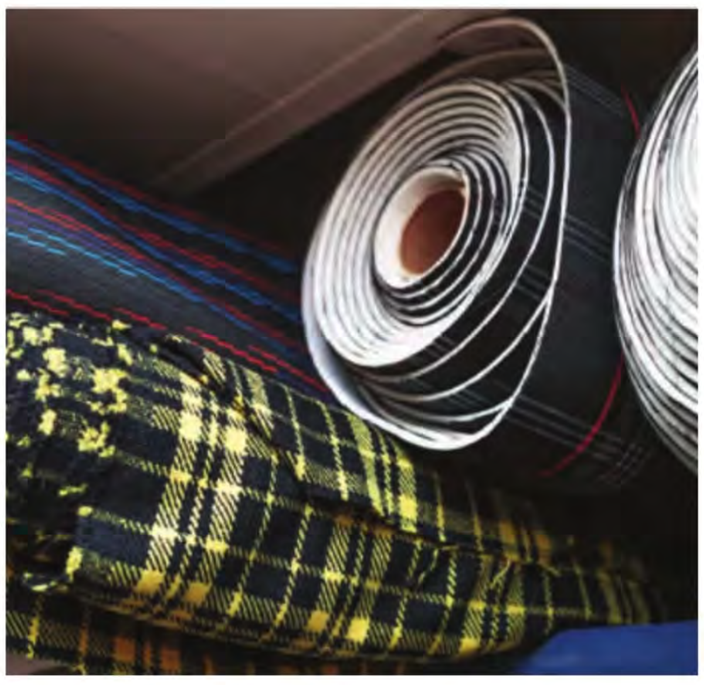








MASTER CRAFTSMEN



In his jumbled workroom, soon to be moved and enlarged, Dean stitches together seat covers for a new project. Among the leathers and fabrics is a roll of Murray tartan (left) for seat inserts on the F1 designer's Escort



capable of assiduously copying a worn-out interior for a much-loved classic, but it's the chance to get creative that gets his sketching fingers twitching.

Though a stand-alone operation, Trimworks is firmly linked with Retropower, whom we investigated last month. If you read that one you'll recognise several of the projects he's working on, like the Kaiser Mercedes W108 saloon and the Lancia not-quite-Stratos.

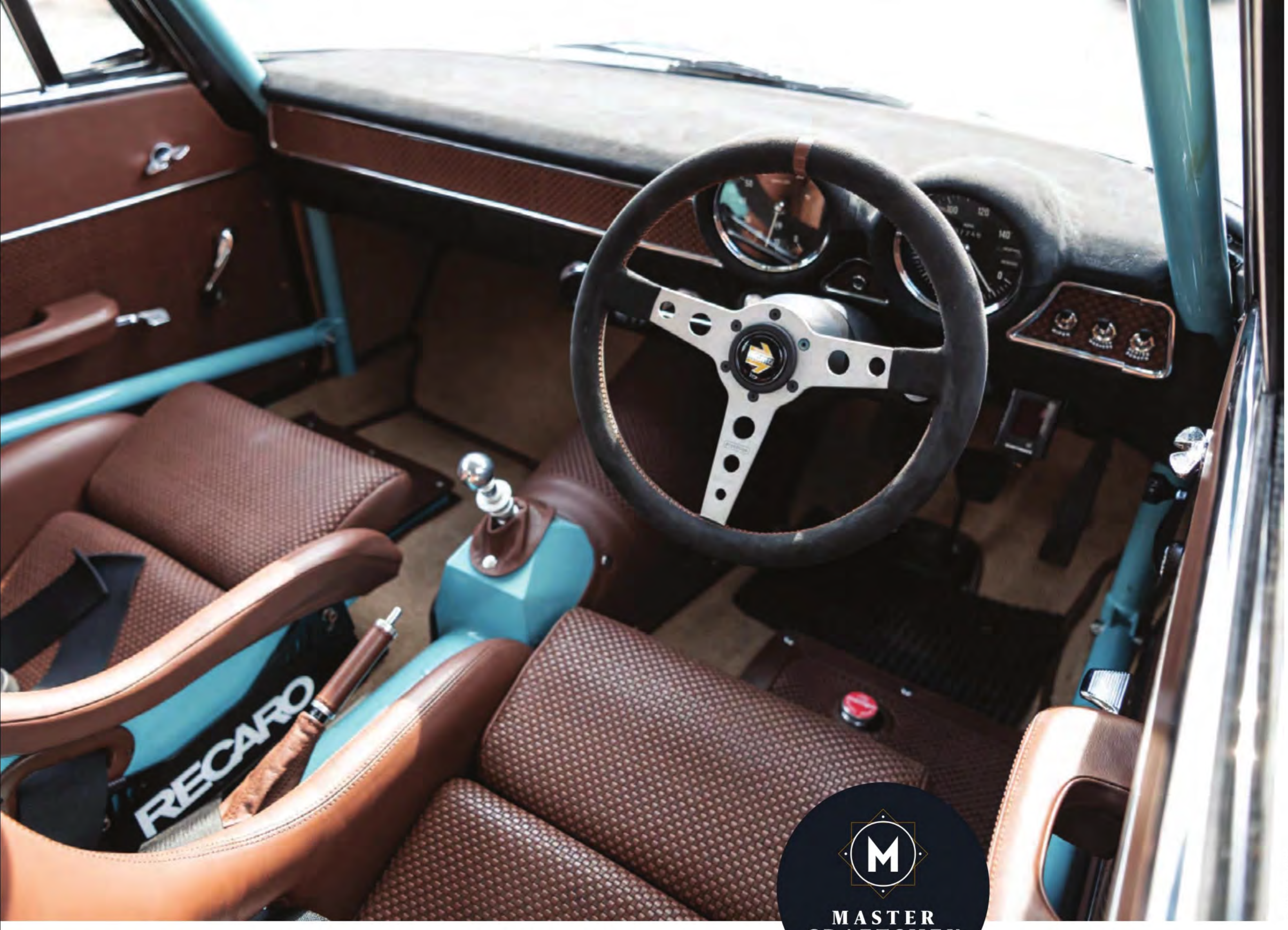
"Maybe 70 per cent of my current work is with Retropower," Dean says. It figures, as at the moment his studio is upstairs in the Retropower building, though a new shop is under construction which will allow him to add staff. He actually took a degree in shoe design and worked in footwear for 15 years, but cars were a constant interest. "I had done a few trim projects," he says, "and I was friends with Nat and Callum [Seviour, Retropower's kingpin brothers] and I knew we thought on similar lines. So when they got going it made sense to switch direction and ally myself with them".

His forte is in creating unusual interiors reflecting the character of the vehicle – a Ford Bronco with chunky tan leather door cards and thick hide straps to match its macho image, sophisticated woven leather panels and Alcantara console for a 1960s Alfa Giulia GT coupé (the rear cushions fix with powerful magnets to be quickly removed for track days), copper-coloured stitching for that Stratos. "There's a definite process of getting to know the client," he says, "and they need to be open to ideas." His sketchbooks burst with ideas – a whole page on quilting designs, another on stitching patterns. Dean's website talks of bespoke interiors, and it's certain whatever you decide with him for your project is going to look utterly different from anything else.

In his upstairs lair, where leather hides hang in racks alongside rolls of upholstery fabrics (even a Murray tartan for the Gordon Murray Escort we described last month) he's sculpting rear chairs for the Kaiser Mercedes from chunks of green foam of differing densities, to be clothed in sumptuous black leather with purple trim.

But it's not just about leathers and stitching. Dean also contributes to the Retropower team on external and internal styling. In a neat little sketchbook he shows me schemes for the 'widebody' wings and spoilers on that highly modified ZX Nissan – "We're going for that crazy '80s Tokyo look!" – and the subtly restyled dash on the Escort: a few extra dials and a nav screen, quietly integrated as Ford might have done it decades back had GPS existed. He's completely in tune with the Retropower ethos – free-ranging

"We're going for that crazy '80s Tokyo look!"



CHRIS FROSIN

Woven leather and subtly altered dash in Alfa GT coupé add luxurious feel to highly modified trackday car

MASTER CRAFTSMEN

ideas tempered with a period approach.

More sketches involve that Stratos; it was Dean's idea to remodel the plain slats of the rear window into the chevrons of the Zero show car, and he designed the extra air intakes as well as a dramatic sweeping dash without the original's instrument binnacle and new seats referencing the 'chocolate bar' style of the prototype. And if you haven't yet seen it on YouTube, Retropower's Corvette-powered Jaguar XJC boasts a Trimworks interior, completely reclad in dark leather with a real Supermarine Spitfire starting button on the console. The seats were remodelled and updated but in a way that harks back to the Seventies. "That car involved a lot of separate small panels to re-cover," Dean says, "but at least they were designed to be covered in leather. Modern cars can be hard because a moulded plastic panel doesn't leave room for the thickness of the leather".

He has just refreshed a Lotus Esprit with leather and Alcantara (every designer's favourite artificial suede), while there's another classic in the wings for a proposed restomod job - a Triumph TR6. Dean shows me the exterior design sketches: you know it's different but you might have to look twice to see where. "I've tried to tidy up the lines," he says. "closing up the bumpers to the body, but without losing the recognisable muscular British shape". It too would gain a custom interior - classic but not conventional.



Sketch proposals for Mercedes interior include whisky bottle and glasses compartment in rear

There's a wistful comment I'm sure I hear every time I visit a workshop or restorer. I ask about a car lurking in a corner, to hear a sigh and the answer "that's my baby - I just don't have time to work on it..."

Ditto with Dean: "I want to fit a new interior to my Nissan Patrol, and I have a Mercedes saloon that used to be my daily driver but now needs a workover. I just don't have time..."

THE ESSENTIALS

- **Name** Trimworks
- **Specialisation** Interiors and styling
- **Established** 2015
- **Number of employees** 1 – currently!
- **Premises** nr Wykin, Leics
- **trimworks.co.uk**

william**loughran** Ltd.



1983 Ferrari 512 BBi

Rosso Corsa with Crema interior, 1 of 42 UK RHD,
Ferrari Classiche, detailed history file, 17,310 miles

POA



2018 Ferrari 812 Superfast (LHD), del miles – **£POA**



2002 Ferrari 575M Maranello, 5,280 miles – **£129,950**



2010 Mercedes SLS AMG, 36,696 miles – **£129,950**



2015 Porsche 911 (991) GT3 PDK (LHD), 126 miles – **£129,950**

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One of just six imported new to the UK, this Targa sports the 210bhp MFI engine

Roofless efficiency

Long regarded as the cheap and cheerful option, the 911 Targa is finally getting its due, says **Simon de Burton**

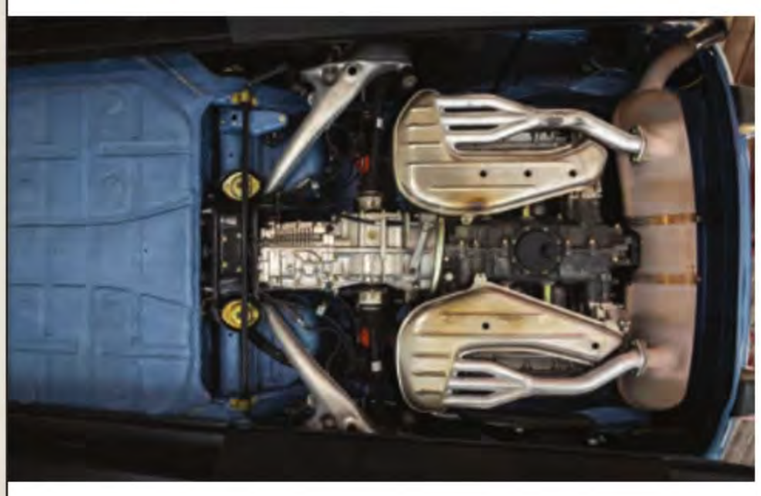
When it comes to collectable Porsche road cars, it's the sublime 2.7RS that generally gets the nod as being at the top of the tree, while the less track-worthy Targa variants in their various guises have traditionally been regarded as a more affordable way into 911 ownership.

But when the 'new' 991 Targa became available in 2014, a sudden nostalgia developed for the original versions that, combined with what appeared to be an insatiable demand for classic 911s across the board, boosted values markedly and caused 'old' Targas to be regarded in a new and more favourable light.

Anyone who has ever owned one (I have a cooking SC version) generally wonders why it took so long for the Targa's merits to be more widely recognised, since it offers true open-air motoring without many of the inconveniences of a conventional soft top, such as poor visibility, sometimes recalcitrant frame mechanisms and the expense of replacements.

Perhaps the major drawback of the design, however, is not the 'body flex' that many doubters imagine, but the propensity for the Targa top to leak which, especially on earlier, non-galvanised cars, can lead to serious, expensive to remedy rust issues.







The answer - money permitting - is to buy one that has been fully and meticulously restored. And they don't come much better, or rarer, than this fabulous example being offered by 911 specialist Hexagon Classics of north London.

Apart from its outstanding condition inside and out, what makes this car really special is the fact that it is one of the ultra-rare versions to be fitted with the same 911/83 RS mechanically fuel-injected (or 'MFI') 210 bhp engine that, famously, endows the car with an immediacy of throttle response that is lacking on the later electronically-controlled cars.

A total of 1647 MFI coupés were built after production of the 2.7RS stopped, but only 631 MFI Targas. What makes this one super rare, however, is that it is one of a mere six that were supplied new to the UK.

Hexagon Classics boss Paul Michaels discovered the car around three years ago, initially placing it into storage until the firm's highly regarded restoration shop had time to tackle what proved to be a ground-up, nut-and-bolt rebuild that included returning it to its original and sought-after Gemini Blue from the incorrect red it had previously been repainted in.

"It really is a remarkable car," says head of sales Jonathan Franklin, who oversaw the 18-month restoration.

"The engine and gearbox are the original units with matching numbers and the car has covered just 82,000 miles from new in the hands of six owners - which is low for a 45-year-old 911 of any description. The Targa derivative is the only factory built 911 convertible to be fitted with the same engine as the legendary 2.7RS, and I would say the condition of this example is probably better than new. It really is a rare opportunity."

I'm inclined to agree - but then I am already converted when it comes to Targas.

1974 PORSCHE 911 2.7 TARGA. £170,000

On offer at Hexagon Classics, 82-92 Great North Road, London. *Hexagonclassics.com*

In the market for a summer Targa?

Al fresco driving that offers a little extra in terms of wind protection



1981 FERRARI 308 GTSi. €69,950. Left-hand-drive example that has covered just 38,000 miles from new. Dutch registration. Original wine-red leather interior. *thegallerybrummen.nl*



2002 CHEVROLET CORVETTE C5. £17,995. Fastback model fitted with relatively rare six-speed manual transmission. Electron blue metallic paint; black leather trim. *motodrome.co.uk*



2000 LOTUS ELISE S1. £15,995. Meticulously maintained two-owner car with 58,000 miles. Probax sports seats; four-point harnesses; Bilstein shocks. *barryelysportscars.co.uk*



1988 FIAT X1/9 1500. £5499. Neither fast nor particularly practical, but mechanically straightforward and fun. In good running order, despite little recent use. *atsportscars.com*

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911 Carrera RS (964)

Rubystone Red • Triple Tone Leather Bucket Seats • Manual Gearbox • 17" Magnesium Cup Wheels • 79,701 kms (49,873 miles) 1992 (J)

£189,995



911 GT3RS (996)

Carrara White • Black Nomex Bucket Seats • Manual Gearbox Full Roll Cage • Air Conditioning 20,752 miles • 2004 (53)

£164,995



911 GT2 (996)

Polar Silver • Black Leather Sport Seats • Manual Gearbox • Porsche Ceramic Composite Brakes • Sports Exhaust • 21,725 miles • 2003 (03)

£134,995



911 GT2 (996)

Arctic Silver • Black Leather Bucket Seats • Manual Gearbox • Porsche Ceramic Composite Brakes • Rear Roll Cage • 49,352 miles • 2002 (02)

£114,995



911 GT3 (991)

Guards Red • Black Half Leather Bucket Seats • PDK Gearbox • 20" Centre Lock GT3 Wheels • Front Axle Lift Kit • 8,410 miles • 2014 (64)

£109,995



911 Turbo S (997)

Carrara White • Black Leather Adaptive Sport Seats • PDK Gearbox Porsche Ceramic Composite Brakes Sport Chrono Pack with Sport Plus 19,524 miles • 2011 (11)

£89,995



911 Carrera Sport Targa

Grand Prix White • Dark Blue Leather Seats • Manual G-50 Gearbox • 16" Fuchs Wheels • Fully Electric Seats • 22,373 miles 1988 (F)

£84,995



911 GT3 (996)

Atlas Grey • Black Leather Sport Seats • Manual Gearbox • 18" GT3 Wheels • Air Conditioning • 37,370 miles • 2003 (53)

£74,995

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Le Mans body style on this 1935 Alfa Romeo reflects the marque's four wins there

AUCTION HERO

Blue-blooded Italian

It may not be finished in *rosso corsa*, but this Alfa Romeo 8C has a fine pre-war pedigree, says **Simon de Burton**

BONHAMS ANNUAL AUCTION AT the Goodwood Festival of Speed always features some exceptional cars, with the likely star of this year's event being the celebrated 'Old Mother Gun', the 1927 Bentley Jackson Special that won at Le Mans in 1928 and reached the impressive (and officially recorded) top speed of 148mph in period.

It's a remarkable, well known and well documented machine which could make a blockbuster price – but equally interesting is this magnificent 1935 Alfa Romeo 8C that is one of the last examples of Alfa's original eight-cylinder model to leave the factory.

Pre-war Alfa fans won't need reminding that the 8C was powered by engineer Vittorio Jano's sublime twin-camshaft 2.3-litre supercharged straight eight, which produced more than 140 horsepower at 5000rpm and was built specifically to cope with extended bouts of high-speed, full-throttle running. Ideal for competition.



Como-based enthusiast Gianfranco Peduzzi was the original owner of this example, after which it is believed to have been imported into Belgium by the legendary racer Felice Bonetto, a one-time works driver for Alfa Romeo and Maserati and later winner of the 1952 Targa Florio. Known as 'The Pirate', he died the following year after his Lancia collided with a post while leading the Carrera PanAmericana.

Bonetto dealt in Italian sports cars and likely sold on the Alfa relatively soon after acquiring it – after which it disappeared from view until after World War II when it was rediscovered in Antwerp by two Belgian enthusiasts having had its original bodywork changed or modified.

A move to New York followed when the car entered the collection of Alfa enthusiast Jim MacAllister, who owned it for 20 years before it returned to the European continent where Swiss collector and historic racer Jost Wildbolz rebodied it with Touring-style spider coachwork and used it to tackle the modern Mille Miglia.

After a stint in the UK under the ownership of Trojan microcar boss Peter Agg, the Alfa once again crossed the Atlantic, ending up in Texas where, ironically, it received a replica Le Mans-style four-seater body built by English specialist Rod Jolley.

Back in the UK for the past dozen years, the car is now nicely mellowed and, following an extensive programme of competition outings at venues as far afield as South Africa and the US, was given a £60,000 engine rebuild by marque specialist Neil Twyman.

This fabulous example of arguably the greatest of all pre-war Italian sports cars has been little used since – and is now crying out for a suitably well-heeled buyer to give it its head at some of the numerous historic events for which it is not only eligible, but deserves to be warmly welcomed.

On sale at Bonhams, Goodwood, July 7



1964 LESLIE SPECIAL SOLD FOR $112,000, BONHAMS. The second of two significant US single-owner sales within a week, the Tupelo Automobile Museum auction included one of four Leslie Specials built for the 1965 Warner Brothers movie *The Great Race* – the suitably ostentatious transport of 'The Great Leslie' Gallant III, a part played to perfection by Tony Curtis. Despite their appearance, the Leslie Specials were Ford F100 pick-ups clad in glass fibre bodywork.



1982 LANCIA 037 RALLY STRADALE. SOLD FOR €770,000, RM SOTHEBY'S. No wealthy fan of early '80s rallying would spurn the chance to own an 037 Rally Stradale – but the chance to own one like this was probably a one-off. It has covered just 3500km from new and almost doubled its €400,000 estimate.



1927 BUGATTI TYPE 40 GRAND SPORT. SOLD FOR $362,500, RM SOTHEBY'S. The dispersal of cars and automobilia amassed by St Louis architect Fred Guyton raised $11.7m. This Bugatti stood out among much Americana. Replacement bodywork might have kept the price down, but the car was otherwise original.



1982 AC 3000ME PROTOTYPE. SOLD FOR £18,562, H & H. Only 106 AC 3000MEs were built, with this one being the personal car of managing director Andrew Horlock and, later, AC test driver Ray Wilkinson. Subject to an £11,000 mechanical refresh last year, the Alfa Romeo-engined car was sold ready to use.

Bikes buck sales trends

Car values have stalled, with exceptions, but the classic market isn't wholly static

SEVERAL USUALLY UPBEAT dealers have told me lately that the classic car market is in the doldrums. The problem seems to stem from investors - or their absence. It's well known that speculators rather than true enthusiasts have been the driving force behind stratospheric price rises witnessed during the past decade, but now their interest is waning.

Who are the remaining buyers? The first is a group of truly passionate collectors who, in many cases, have all the cars they need. The second is represented by small-scale buyers looking to satisfy a nostalgic need for cars they knew in their youth.

Truly coveted but sensibly estimated rarities can still realise surprisingly high prices at auction (such as the Lancia Rally Stradale mentioned on the left) but, generally speaking, expectations are being lowered across the board, with many owners opting to disperse extensive collections through the 'no reserve' route in order to ensure a successful sale.

Conversely, motorcycle values are on the rise, with everything from veteran models to modern classics attracting strong money if they are genuine and original - a sure sign, of course, that investors are now taking two wheels seriously.

But, as the car market has shown, trees don't grow forever - so take care to get your two-wheel timing right.





1962 TRIUMPH TR6SS. SOLD FOR £97,750, BONHAMS. While the classic car market adjusts, classic motorcycles are flying – witness Bonhams' £3.8m spring sale in Stafford. Highlights included this 1962 Triumph TR6SS once ridden by Bud Elkins, famous as Steve McQueen's stunt double in *The Great Escape*.



1965 EXCALIBUR SS. SOLD FOR £73,750, SILVERSTONE AUCTIONS. Two cars with Tony Curtis connections in the same issue... Silverstone Auctions sold this remarkable Excalibur SS, which the actor bought new in 1965. The SS was designer Brooks Stevens' take on a Mercedes-Benz SSK for the '60s.



MAX GIRARDO

"The classic market is led by feelings and emotions, which makes it special"

May has hosted some of the best events of the year – interestingly, the two most talked-about were in Italy. The first was the Mille Miglia – one of the most famous on the list of 'must-do' events.

A few weeks later was a much smaller event on the shores of Lake Como, which, by comparison, only had a tiny number of cars (approximately 60). But don't let that number fool you, as attendance is just as international as the Mille Miglia and the event just a famous. Yes, I'm talking about the Concorso d'Eleganza Villa d'Este, which, in my opinion, is one of the best of the year.

Why am I mentioning these events in a market review? The answer is simple: it's these type of events that have a significant effect on the desirability and, ultimately, the value of the cars that we see at public auction. You'll be surprised to know that our office phone often rings with requests from all over the world for cars that are eligible for this or that event, be it clients looking for a Mille Migla car or a car that could win Best of Show at Pebble Beach, with the latter being something more difficult to source.

This further proves the point that our market is fuelled by passion. Collectors today not only love their cars but also the events, from walking along the luxurious grounds of the Villa d'Este hotel to driving an open barchetta in the rain from Brescia to Rome, the experiences that go with owning these cars is breathtaking. The classic car market is largely dictated by feelings and emotions, which, to me, is what makes our market so unique.

In next month's column I will review the Bonhams Aston Martin Sale – how the 33 cars faired, as well as the 71 lots in the RM Sotheby's Villa Erba sale.

Looking ahead, the Big Three are all working away to secure the star lots of their Monterey sales, with RM Sotheby's offering a beautiful Ferrari 250 GT SWB without reserve — a smart move as it will command all the attention.

Gooding & Company has also announced one of its star lots: another one featuring a Prancing Horse on the front grille, the 1958 Ferrari 250 GT LWB 'Tour de France' Berlinetta, which has undergone a Platinum Award-winning restoration by Motion Products Inc. It's finished in very attractive colours, and is Ferrari Classiche certified.

Bonhams will offer one of only 50 factory Blower Bentleys, and although it has a new body, it's one of few extant original Blower Bentleys.

Max Girardo is the founder of classic car specialist Girardo & Co. Before that he spent 20 years in the classic car auction world, where he was the managing director and head auctioneer at RM Sotheby's

Max's top picks coming up this month



1987 ASTON MARTIN V8 VANTAGE X-PACK, £320-360,000 Great colours and name. I must admit that I've never driven one, but I've always wanted to, so I'll be watching this one closely.



1958 FERRARI 250 GT 'TDF' BERLINETTA I mentioned it above, and having spent time behind the wheel of a Ferrari TdF, I can tell you that they are delightful to drive. I personally love the look of this car.



1962 FERRARI 250 GT SWB BERLINETTA The latest SWB at auction, and this time with no reserve! The last car sold well, so this will be a real test of the market. I won't be the only one watching!



Buying guide

Lola T300/330/332

From mighty single-seater to Can-Am special, the T300 did it all

FEW RACING CARS HAVE ENJOYED such long and successful careers as Lola's T300 series. What started out as a world-beating Formula 5000 open-wheeler in 1971 outlived the cars that were meant to replace it, and the design was still a winner as a sports car of sorts deep into the 1980s.

Not bad for a car that had its roots in a throwaway remark on an aeroplane journey in June 1971. Frank Gardner made the suggestion to Lola boss Eric Broadley, on the way back from Monza, and the idea took hold. The plain-speaking Aussie reckoned that putting a five-litre Chevrolet V8 in the back of the British constructor's T240 Formula 2 car might offer an improvement over the existing T192 and boost his chances of winning the Rothmans European F5000 Championship.

Gardner turned out to be right. The car was ready in time for the Thruxton round in August and was on the podium first time out. In fact, Gardner never finished off the podium in his new works-run car over the remainder of a season in which he notched up three wins on the way to the title.

"It was definitely Frank's idea," recalls Bob Marston, who ran the Lola design office under Broadley throughout the 1970s. He describes the T190/192, the first monocoque F5000 Lolas that had evolved out of the T140 of 1968 vintage, as a "bit of a heavy old car".

But the T300 was always a compromise, says Marston, and it failed to repeat Gardner's title success. Lola took on the lessons and came up with the T330 for 1973.

The chassis was new and the design incorporated a series of upgrades, including using the big V8 as a stressed chassis member, but the car kept the family look defined by the distinctive side-mounted radiators. These were dubbed "elephant ears", though Marston can't remember who coined the phrase.

The T330 was a race winner in both Europe and in the L&M cigarettes-sponsored North American series, although championship success again eluded it. Jody

LOLA T300/330/332

- **Price new** n/a
- **Price now** £120,000-£160,000
- **Engine** 5-litre Chevrolet V8
- **Power** 500bhp-plus
- **F5000 championship race wins** 31 (USA), 28 (Europe)
- **Verdict** The definitive F5000 racer that evolved into a successful second career in single-seater Can-Am



Guy Edwards at Mallory Park in 1974, aboard his Lola T332. The car's roots could be traced to the T300 of 1971

Scheckter did, however, twice race a T330 instead of his regular Trojan on his way to winning the Stateside series.

The T332 of 1974 was a further refinement and began a purple patch for Lola in F5000 and beyond. The car was unbeaten in North America, Brian Redman taking the title in a car run by Lola importer Carl Haas. Bob Evans, meanwhile, triumphed for Alan McKechnie Racing in the European series.

Redman would go on to score a hat-trick of US titles, although in Europe the championship went to a new Lola, the T400. VDS Racing was one of the few teams to get a handle on a car that incorporated rising rate suspension, but the T330/332 still won races with those that couldn't.

"The T332 of 1974 began a purple patch for Lola in F5000 and beyond"

That explains why Lola offered a 'C-spec' T332 alongside a T400 update for '76. And why, when the organisers of the North American series decided to revive Can-Am by clothing F5000s in all-enveloping bodywork, Lola used the T332 as the base.

The T332CS and T333CS took a hat-trick of titles with Patrick Tambay, Alan Jones and Jacky Ickx from 1977 through '79. But that wasn't the end of the T300 story. The design formed the base of many Can-Am specials, most famously the Frissbees in which Al Unser Jr and Jacques Villeneuve Jr claimed title successes. Veteran Horst Kroll won the final Can-Am crown in 1986, driving a Frissbee that was in fact a T332 below the surface - the second one delivered.

Market view

If you want an F5000 Lola, look Down Under

Due to the international nature of the events in which the T300-series Lolas competed, the market is widespread. Of the known remaining examples, only a handful are thought to reside in the UK, with most cars now located across North America, Australia and New Zealand.

That isn't too surprising, as Australia was the last country to drop F5000, at the end of 1981, and the category has regained momentum via the Antipodes-based Tasman Cup Revival Series, run continuously since 2003.

There is no recent auction data to indicate any emerging price patterns and public sales appear few and far between. In May 2018, T332 chassis HU32B was listed for sale in America for the equivalent of £125,000. And in New Zealand, T332 chassis HU16 was advertised for NZD$275,000 (£140,000 at the current rate), though the date of the listing is unclear. The previous owner competed in the Tasman Cup Revival Series in 2013.

With New Zealand being the home of historic F5000 racing, it seems logical that market activity should centre around Australasia. As such, T330/T332 sales are rare in the UK and price fluctuations could result just as easily from exchange rate movements as market demand.

Robert Johnson,
Classic and Sports Finance

CLASSIC & SPORTS
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ONE RECENTLY SOLD

Lola T330

On the forecourt

Lola T300-series cars occasionally crop up on the open market. This one has some special heritage

This Lola T330/332, which has been a regular on the historic scene, changed hands through James Hanson at Speedmaster Cars early last year. Unusually, it was bought back from Neil Glover by its previous owner Mike Wrigley.

It's the latest twist in an interesting life story for T330 chassis HU23. The car was sold new to well-known Australian driver Johnnie Walker, a podium finisher in the Bathurst 1000, and raced in the 1974 Tasman Series with a Repco-tuned Holden V8 rather than the usual Chevy. The car is believed to have been twice rebuilt around new T332 monocoques after substantial accidents, one of which at Sandown is reputed to have demolished a large section of equestrian railing at the combined motor sport and horse racing venue.

Sources suggest it was robbed of much of its running gear after Walker sold it in the early '80s to create the one-off Veskanda Group C sports car. What is clear, however, is that car has the lineage back to Walker's original 1973 T330.

Hanson won't put an exact price on the car, but he says that it wouldn't be likely to fetch more today.

"Values of F5000 machinery aren't on the up at a time when the corresponding figures for 1970s F1 cars and the recent rise in prices for F2 cars means there isn't much between them," says Hanson. "A lot of it is down to what's in fashion. An F5000 offers similar performance to an F1 car, but at half the price, so what's not to like?"

Speedmaster Cars, Wetherby, Yorkshire. Tel: 01937 220360
speedmastercars.com



ONE ALREADY RESTORED

Lola T332

In the workshop

An Anglo-American alliance helped put this ex-Andretti racer back on track at its spiritual home

Driven by Mario Andretti in period, this Vel's Parnelli Jones Racing Lola T332 made a triumphant return to Laguna Seca almost exactly 40 years after the US racing legend claimed his final F5000 victory aboard the car in October 1975. The Anglo-American United Autosports organisation won a bagful of silverware with the newly restored machine.

United team boss Richard Dean won both F5000 races at the Monterey Historic Reunion in August 2015, and Zak Brown – his partner in the team, owner of the car and McLaren Racing chief executive – did the same a week earlier in the so-called Pre-Reunion. Just for good measure the car, chassis number HU29, was awarded the President's Cup for the most historically significant machine present at the meeting.

The Lola was returned to the specification in which Andretti had taken seven victories across the 1974 and '75 seasons. After a brief F5000 stint in Skeeter McKitterick's hands, it had been converted into a Can-Am machine and campaigned by Rocky Moran into the 1980s.

"It was a complete car, but not what I would call a racing car," says United technical director Paul Haigh. "The tub was really nice and it had been liveried exactly how it was, but we had to go through it with a fine-toothed comb like we do with all our historic cars. A lot of the parts needed, like the brakes, clutch and bearings, are readily available, but we had to put a new manifold on the engine, and they're like hen's teeth to find."

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Buying guide

Ferrari 275 GTB

A milestone car that quickly became an Italian style icon

SOME SAY IT'S THE MOST BEAUTIFUL Ferrari ever, perhaps the most beautiful car of all time. That is a widely held if ultimately subjective claim made for the 275 GTB. A more tangible claim is that it was the first 'modern' car to roll out of the Maranello factory. It was Ferrari's first proper production car with full independent suspension, a transaxle and, in its final incarnation, twin-cam cylinder heads.

Beauty and modernity combined to make the 275 GTB cool and, eventually, an icon of the 1960s. Sophia Loren had one, as did Peter Sellers, Roman Polanski, Catherine Deneuve and Miles Davis. Steve McQueen is reckoned to have had three in his time!

Pininfarina designed the bodywork of the new front-engined two-seater grand tourer, introduced in 1964 to replace the 250 GT SWB Berlinetta. Charged with translating his beautiful lines into metalwork was coachbuilder, Carrozzeria Scaglietti.

But it is what lies underneath that long-nosed coupé shape that gives the 275 GTB such an important place in Ferrari's history. The car leaned heavily on the competition pedigree of the Scuderia's early-1960s Le Mans 24 Hours winners. That explains the independent rear suspension and the gearbox at the back of a car that factory sportscar driver Mike Parkes helped develop.

The engine was the tried and tested V12 designed by Gioacchino Colombo, but now enlarged to 3.3 litres. That meant a 275cc capacity for each of the 12 cylinders and explains the type number. GTB, of course, means Gran Turismo Berlinetta.

A power output of 280bhp was quoted for this two-cam engine in the standard three-carburettor configuration. Customers could specify another three Weber carbs with the promise of extra horsepower.

Ferrari, as ever, had an eye on racing when it developed the 275 GTB. It wasn't conceived to triumph overall at Le Mans and in international sports car racing, rather to win the GT class. It did just that at its first attempt on the French enduro in 1965 when one of a short run of what was known as

FERRARI 275 GTB

- **Price new** £5699
- **Price now** £1.5-£2.5 million
- **Engine** 3.3-litre, 24-valve V12
- **Power** 280bhp
- **0-60mph** 6.6sec **Top speed** 160mph
- **Rivals** Aston Martin DB5, Maserati Sebring, Lamborghini 350 GT
- **Verdict** Stunning classic that helped cement the Ferrari legend



Is the 275 GTB the best-looking Ferrari, or even the best-looking car, of all time?

Competizione Speciales entered by Ecurie Francorchamps came third overall driven by Willy Mairesse and Jean 'Beurlys' Blaton.

The 275 evolved over time, and its racing exploits had a lot to do with that. The nose was lengthened by nearly four inches at the end of 1965 in the name of improved aerodynamics. That change was a lead-in to the introduction the following year of the four-cam engine with an extra camshaft on each bank of cylinders – though still with only two valves in each – and dry-sump lubrication, as well as the six-carb set-up as standard. The 275 GTB/4, with its distinctive bonnet bulge, was born with 296bhp as standard.

"Beauty and modernity combined to make the 275 GTB an icon of the 1960s"

The ultimate racing 275 was the GTB/C, 11 of which were built in early 1966 in the factory between production of the two-cam ceasing and the four-cam starting. Every panel was different in the name of weight saving, which shed 150kg from the car.

There was one more 275 GTB derivation commissioned by Ferrari's North American importer, Luigi Chinetti. The GTB/4 NART Spider paid homage to his North American Racing Team that had claimed Le Mans victory in '65 with a 250LM driven by Jochen Rindt and Masten Gregory.

Production ceased in 1966 with just over 800 built - not counting the 200 275 GTS roadsters. The final tallies were 456 two-cam cars, 350 four-cams and 10 NART Spiders. It was a milestone car, with more GTBs built than any other Ferrari up to that point.

Market view

When history and provenance win overall

Housing one of the great Ferrari V12s, the 275 GTB has gone up and down in the market lately. Its eligibility for events is off the charts, from racing to concours, so the 275 GTB has a ticket to some of the most exclusive events.

Reading auction results it's clear that who's owned, driven and restored these 275 GTBs is what demands the top money, as well as if it's got three or six carbs, a Long or Short Nose and if it's made from alloy or steel. Built from 1964-66 there's still choice, with the non-matching, older restorations needing work tending to either not reach estimate or sell close to reserve.

Looking at the private sales, most publicly available adverts are listed as price on application (POA), so determining a realistic pricing benchmark can be tricky. We've done some digging and can see that if you're looking for an early matching-numbers example in restored condition with its original tool kit and history books, it's around £1.5m, whereas an alloy-bodied Long Nose model with the same provenance is between £1.8m to £2m.

It pays to do your research. Most cars are known to historians, dealers and restorers. Opt for an original chassis, engine and gearbox with matching numbers and you'll be better off.

David Bond, Managing Director, Footman James

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ONE CURRENTLY FOR SALE

1966 Ferrari 275 GTB

On the forecourt

A change in collection direction has allowed this 275 with a rich history onto the market

This 1966 275 GTB – one of only eight right-hand drive, long-nose two-cam cars with the torque tube drivetrain rather than the original open driveshaft – has an amazing history full of twists and turns. It might be described as chequered, but it is now back in its original factory specification, complete with *Celeste Chiaro Metallizzato* – that's dark metallic sky blue – bodywork and is for sale at Simon Furlonger Specialist Cars.

It was originally the personal car of Ferrari importer Col Ronnie Hoare at Maranello Concessionaires. It had a supercharger fitted in the late 1960s, was converted into a NART Spider in the early 1980s and also had a brief spell in the ownership of David Morrison, who ran the Parabolica team that fielded a McLaren F1 GTR in sports car events in 1997. Only in 2013-2014 was it returned to its original specification, roof and all, with an extensive restoration at Twyman Racing.

There's an impressive history file, says Simon Furlonger. It includes a copy of a road test in *Autocar* with the car "smoking down the road pulling a little fifth wheel measuring device".

"It's a matching-numbers car with Ferrari classiche authentication, and still has the original tool roll," Furlonger says. "It is just as it would have been in period, but also has an amazing back story."

The current owner, a high-profile car collector, is selling the car because he is "changing the focus of his collection," says Furlonger. The asking price is £2.25 million.

Simon Furlonger Specialist Cars, Ashford, Kent
Tel: 01233 646328, *simonfurlonger.co.uk*



ONE PREVIOUSLY RESTORED

Ferrari 275 GTB

In the workshop

It takes about two years to fully restore a 275 GTB, such as this celebrity example

DK Engineering is the foremost Ferrari 275 GTB specialist in the country and has so far restored more than 20 of the cars during the past decade. In its workshops right now is a four-cam GTB that once belonged to English comedian and actor Peter Sellers.

The left-hand-drive car has been with DK since August 2017 and is on schedule to be delivered back to its owner in the summer after a restoration that has taken it back to the configuration in which the actor drove it on the roads around his Swiss home in the late 1960s and early '70s. That work has included returning it to its original *Celeste* green and even fitting a radio antenna on the right-quarter panel.

"To do a 275 restoration properly takes two years," says DK acquisitions consultant Harvey Stanley. "This car was perfectly presentable and no one would have said it looked a bit tatty when you drove it into the golf club, but if you've got a car that is a seven or eight out of 10, the restoration process is the same as if the starting point was a one out of 10.

"You still have to strip the car back to the bare bodyshell. That's what you have to do if you want a car that's going to be in concours condition."

There was a debate over the radio aerial, however.

"Sellers would have had to have it fitted and it is actually quite ugly," says Stanley, "but it is one of the identifying features of the car."

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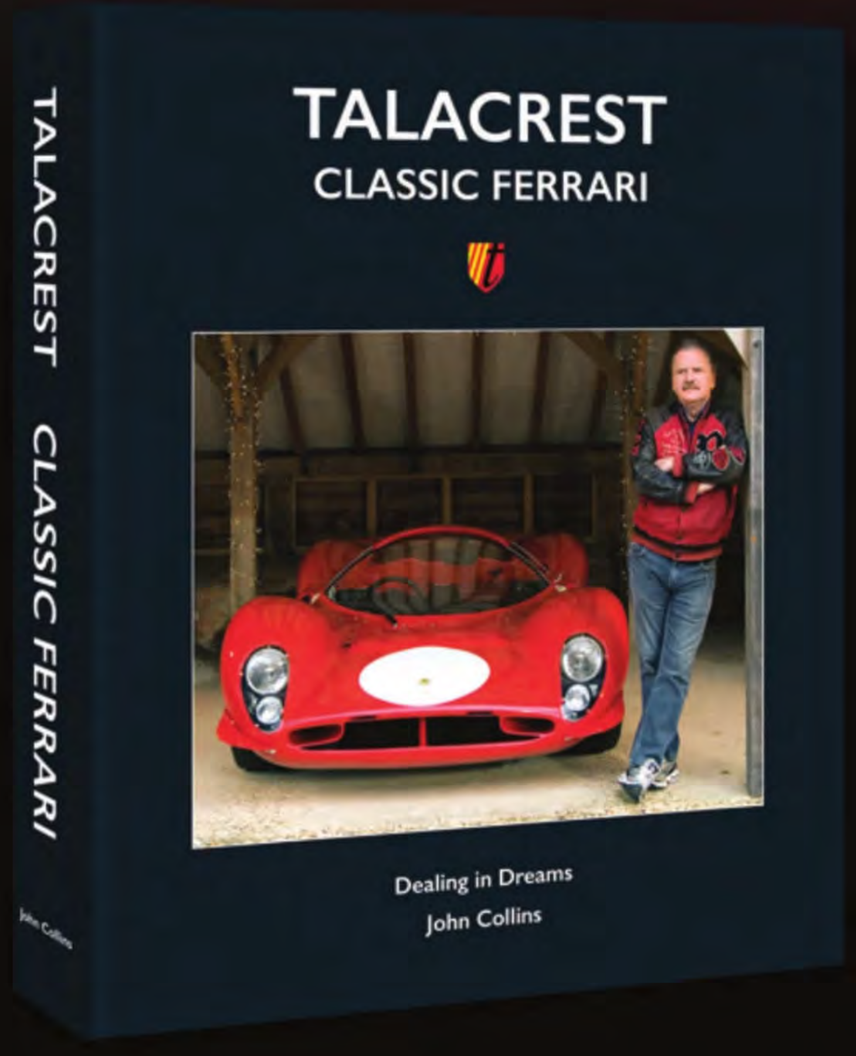
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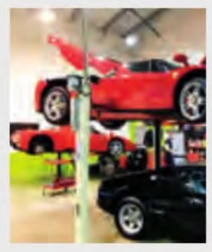
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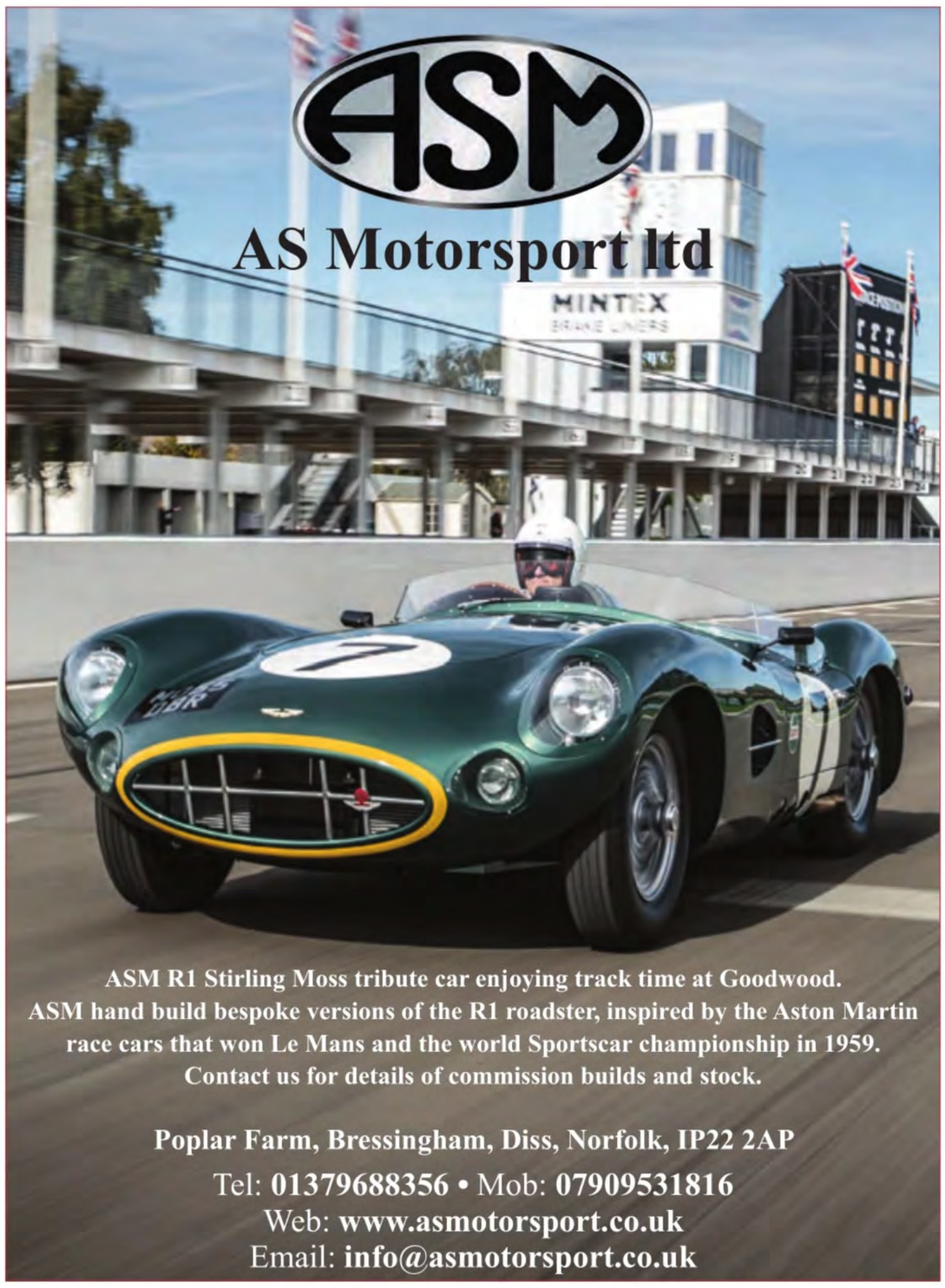
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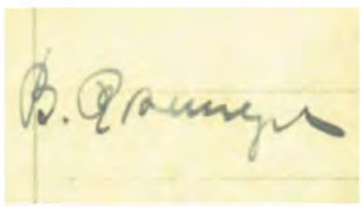
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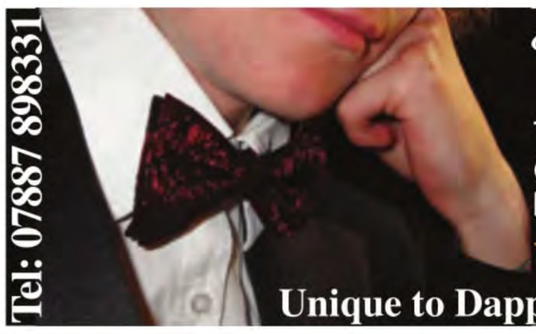
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Bright news for older cars

Most responsible owners of older Rolls and Bentley models 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.

At the back, an amazing new three-function bulb directly replaces the original and gives a brighter tail light and brake light and flashes orange through the red lens when the indicators are activated.

All of this is made possible by a new electronic control module which mounts at the front and tells the new bulbs what to do and when. It can work in conjunction with semaphore indicators and the kit has bright flashing LED bulbs to upgrade these, but will also suit cars built without them.

One bulb - 3 functions







Inside the car there is a loud sounder and a discrete visual display. All of this means that an upgrade that used to take days can now be done in hours.

The complete kit, together with instructions costs just £249.99+VAT.



For more details, visit www.bettercarlighting.co.uk or call 0121 773 7000

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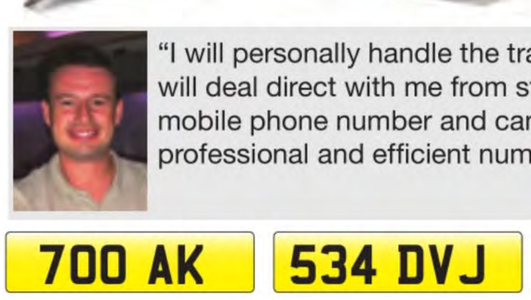
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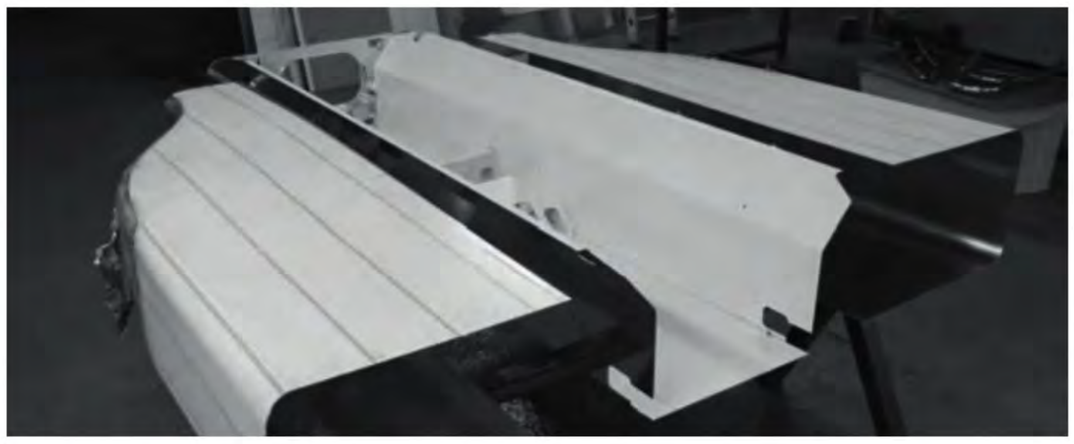


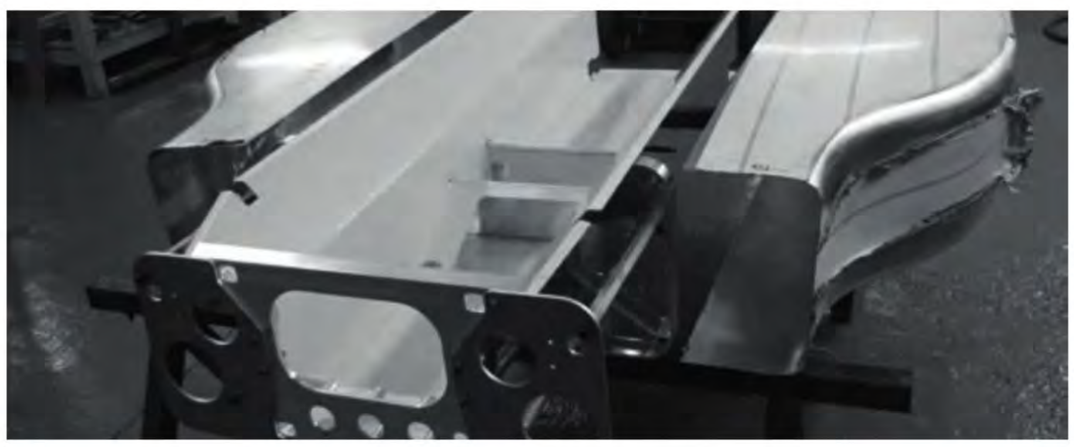
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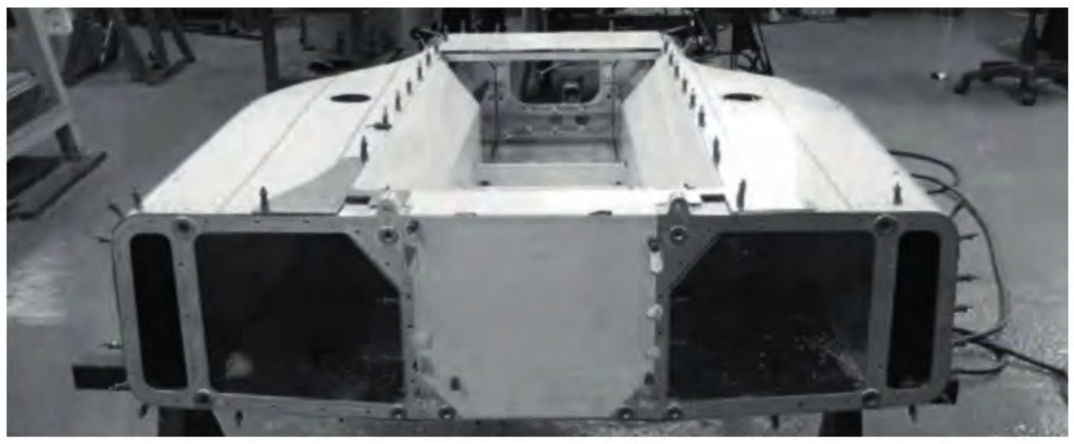
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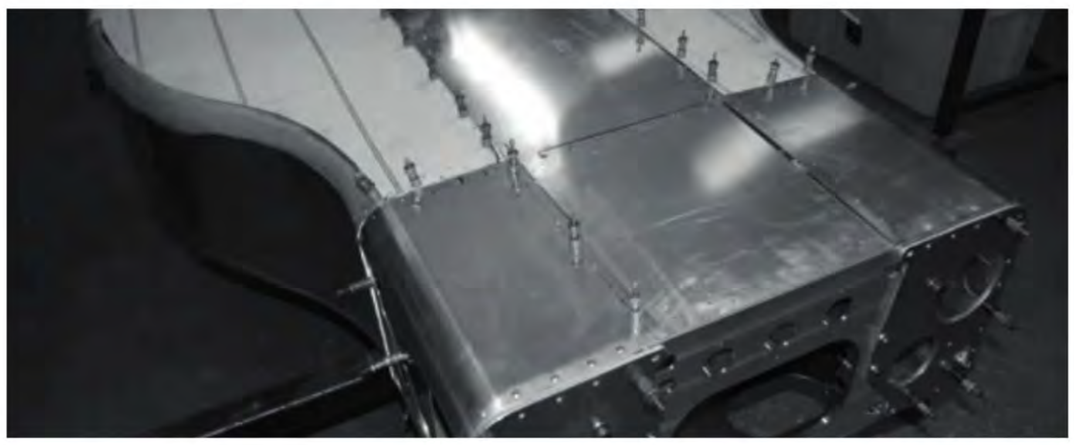
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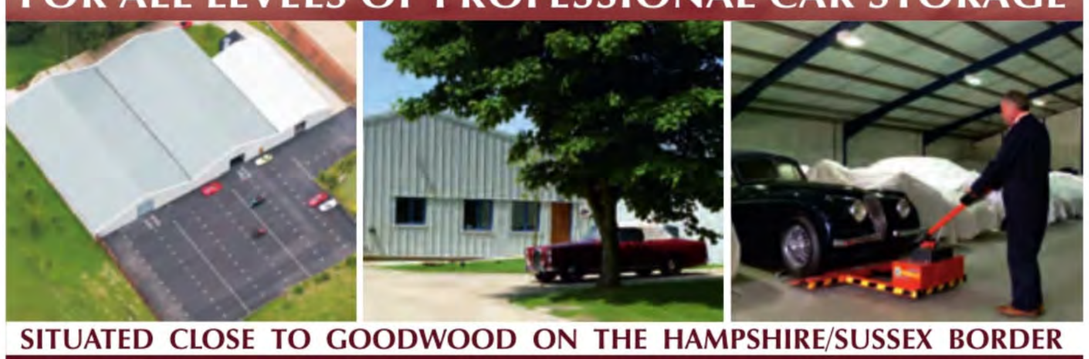
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Stirling Moss's Aston Martin DB4 GT Zagato in the pits, Easter 1961. He finished third in the Fordwater Trophy, behind Mike Parkes and Innes Ireland

First entered in a Coombs E-type for the 1962 TT, Graham Hill switched to the team's 250 GTO; right, Hill with commentator John Bolster; below right, Roy Salvadori in the E-type











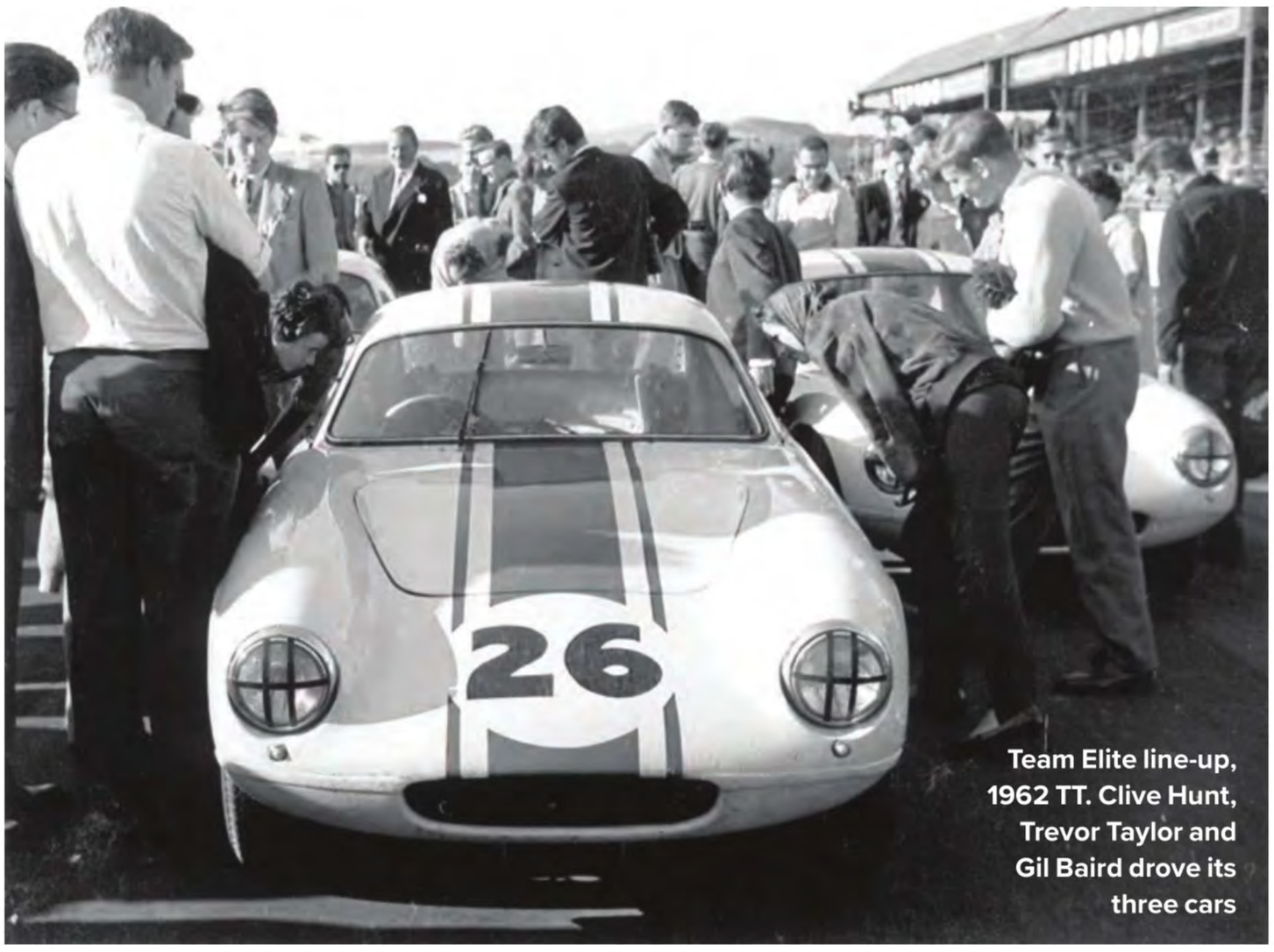
Proof that the Goodwood paddock wasn't quite as swish back then as it has since become... Mike Salmon's ex-Ecurie Ecosse D-type receives a fresh set of Dunlops, Easter 1961



UDT Laystall mechanic guides a Lotus 19 towards the paddock, with driver Henry Taylor riding shotgun. Taylor finished second to team-mate Stirling Moss in the 1961 Sussex Trophy

Glorious Goodwood

A keen visitor to his local circuit during both phases of its history, **Tony Gardiner** took these with what he calls a 'basic' Kodak Retinette IB plus standard 50mm lens



Team Elite line-up, 1962 TT. Clive Hunt, Trevor Taylor and Gil Baird drove its three cars



John Surtees (Ferrari 250 GTO) passes John Coundley (Lotus Elite) in the 1962 TT. Surtees might have won but for a tangle with Jim Clark

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PARTING SHOT





MARCH 28, 1976
LONG BEACH, CALIFORNIA

Clay Regazzoni (Ferrari 312T) leads Patrick Depailler (Tyrrell 007), James Hunt (McLaren M23), Niki Lauda (312T), Tom Pryce (Shadow DN5B) and Ronnie Peterson (March 761) at the start. Depailler and Hunt soon tangled, the Englishman retiring. While strolling back to the pits, he kept walking onto the track to shake his fist at Depailler... Regazzoni went on to take his only win of the season, ahead of Lauda.

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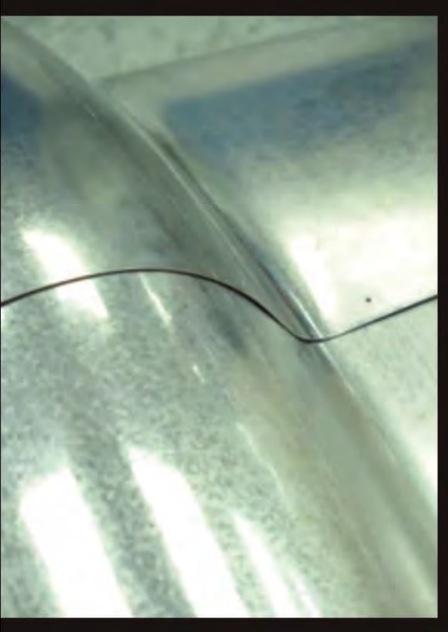
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