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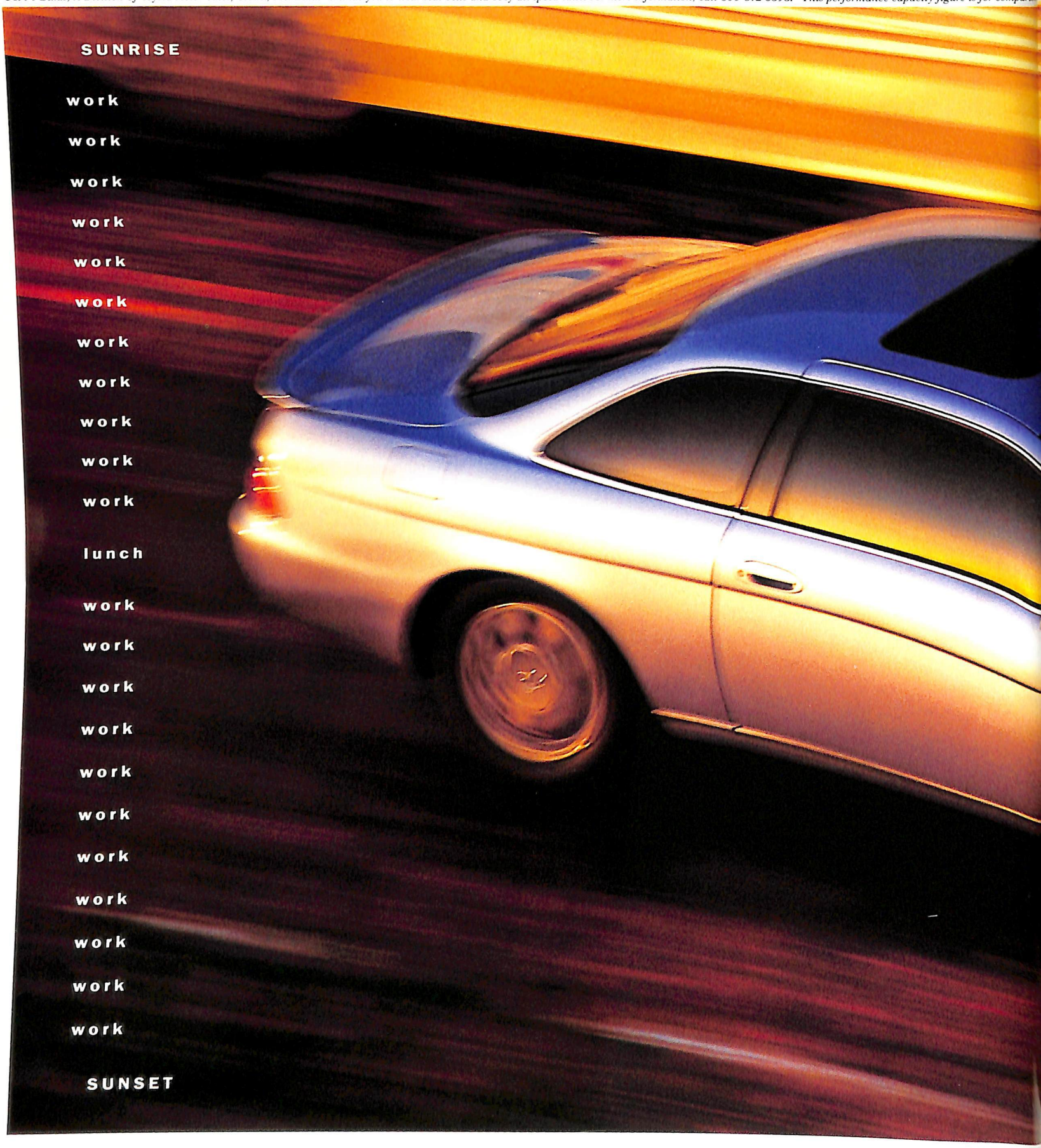

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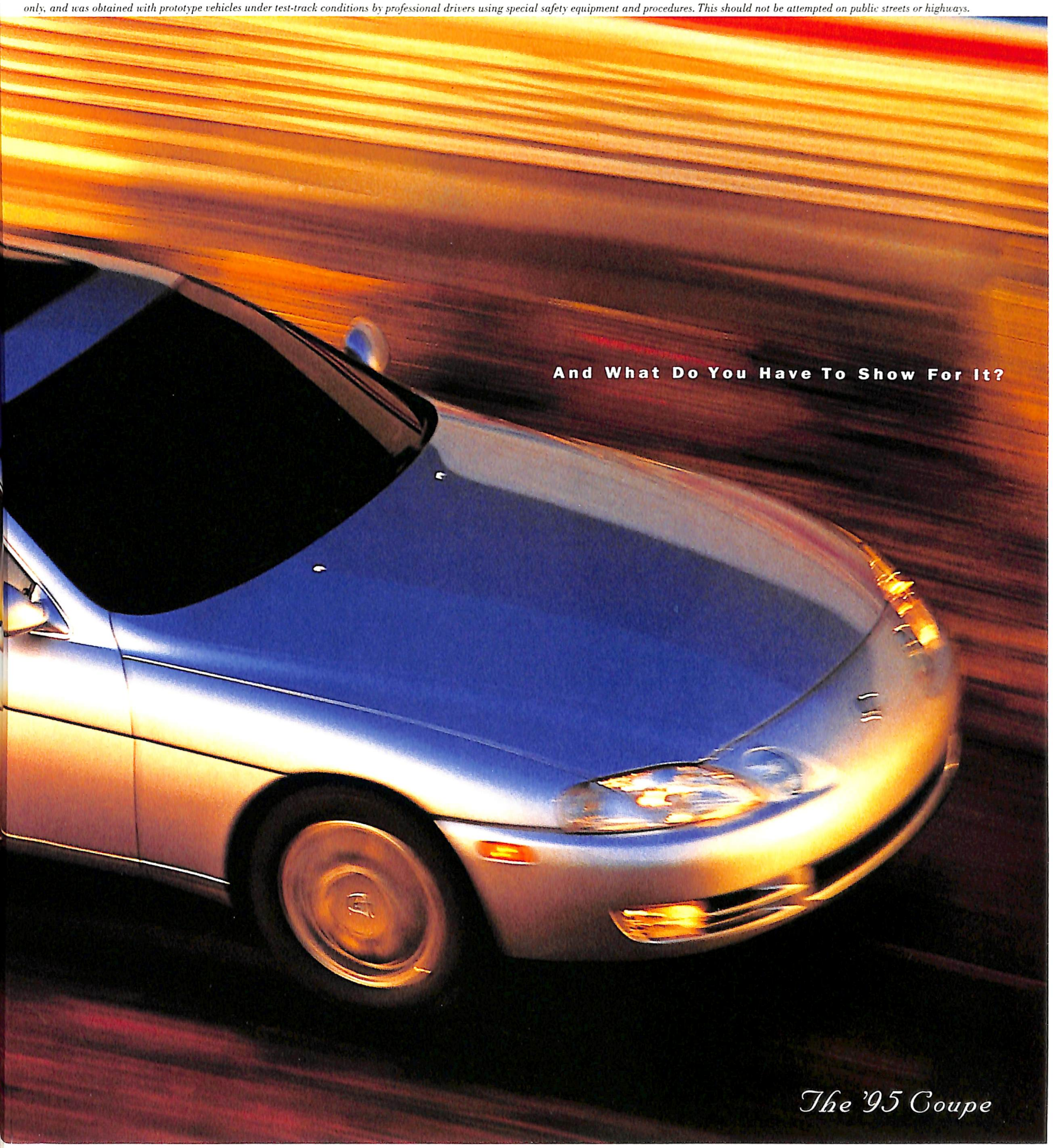

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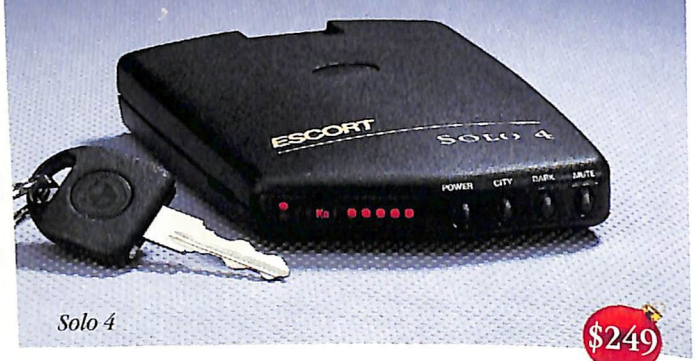

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Laughing at the dangerz, Zcott Dahlquizt doez a zunrise crane zhot at the Ztreetz of Willow Zpringz

PHOTO RASMUSSEN

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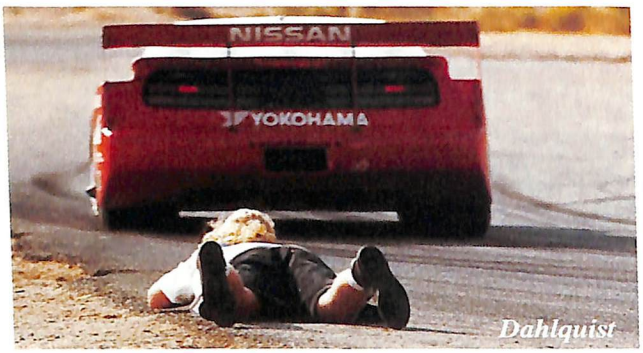
In This Issue

Next Generation

➤ **Scott Dahlquist** and I are about the same age, and we were both introduced to this business at an impressionable period of our lives. Like so many of our colleagues (Tim Dunne, Jean Lindamood, Paul Lienert, Dutch Mandel—the list goes on and on), watching a parent make a living writing about cars has permanently stunted our ability to get a *real* job, so this is where we've all wound up.



Dahlquist

Scott also works for Popular Mechanics, Motor Trend, European Car and a host of other car, bike and boat mags. But his desire to go anywhere and try anything means that every shoot has an unexpected image or two to play with, and that's something SCI can encourage while more packaged publications cannot. Sometimes it works and sometimes it doesn't, but there's no doubt that Dahlquist is as talented a shooter as this business has to offer. Watch out for this guy—as soon as he learns to shoot more and surf less, the commercial photography business in L.A. will become considerably tougher.

➤ John Dinkel's handling story seemed a great bit of writing but a hard one to illustrate. Then the art staff came up with the perfect photo idea—toy cars, child models ...it'd be *great.*

Getting it to actually happen was another matter, and our photo search slowed the project down for months. Henry R. finally pulled it off when he contacted **Ron DeMateo,** an avid collector from Salinas, California. Ron's family had a bunch of perfect cars, two perfect kids and one mom (**Lorraine**) patient enough to get the latter working beautifully with the former.


Sarah

Four-year-old **Sarah** fit the Italian-built Giordani like it was made for her; 10-year-old **Mark** was a bit tighter in dad's Austin-built (yes, the *real* Austin) Pathfinder, but in the end both came through swimmingly. Ron will continue trading his cars around—its the only sensible way to engage in the hobby, he says—but all too soon I suspect he'll find Sarah and Mark looking for larger conveyances. In the meantime, sincerest thanks to whole DeMateo family—models, owner and coach.

➤ Last year's New England Tour 1000 sounded like such a good time that this year we signed the magazine up as a (teensy-weensy) sponsor. Naturally it didn't hurt that the husband-and-wife organizing team also happen to be East Coast Editor and Contributing Photographer to the magazine; still, we've never supported an event before and it took serious deliberation to convince me we should break that policy now. What I finally decided was that if any pair could throw a well-run, entertaining and safe weeklong road trip it was **Taylor** and **Constantine.**


Taylor

I also, quite frankly, admired their dedication. The idea of a vintage rally is to give everybody a good time at a fair price while raising money for charity. The first Tour 1000 did all that, but it took a big bite out of Rich and Jean's lives in the process. I think anybody willing to do that again year after year deserves all the help they can get.

—Jay Lamm, Editor

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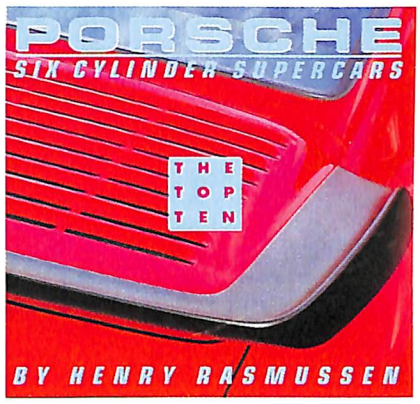
Can You Trust the Critics?

■ This is how John W. Barnes summed up his impressions of *Ferrari—Salute To The Spyder* in *Cavallino* magazine: "Great to view, great to study, great to browse through, whatever your pleasure. There is more in here of value than in many recent Ferrari books at twice and three times the price."

■ Dr. Mike Zimmerman had this to say about *Corvette—Cream Of The Crop* in *Corvette Restorer:* "The cars are impeccable, the photography is more than up to the task, and the text gives some truly informative background about the production decisions on these special cars. The book represents an outstanding value."

■ Phil Lampman wrote about *Porsche—Six Cylinder Supercars* in *Excellence* magazine.This is how he finished his review: "The photography is superb and the book is entertaining, not so text-book-like as some Porsche books. I don't hesitate to recommend it for the Porsche library. The price... only $29.95.



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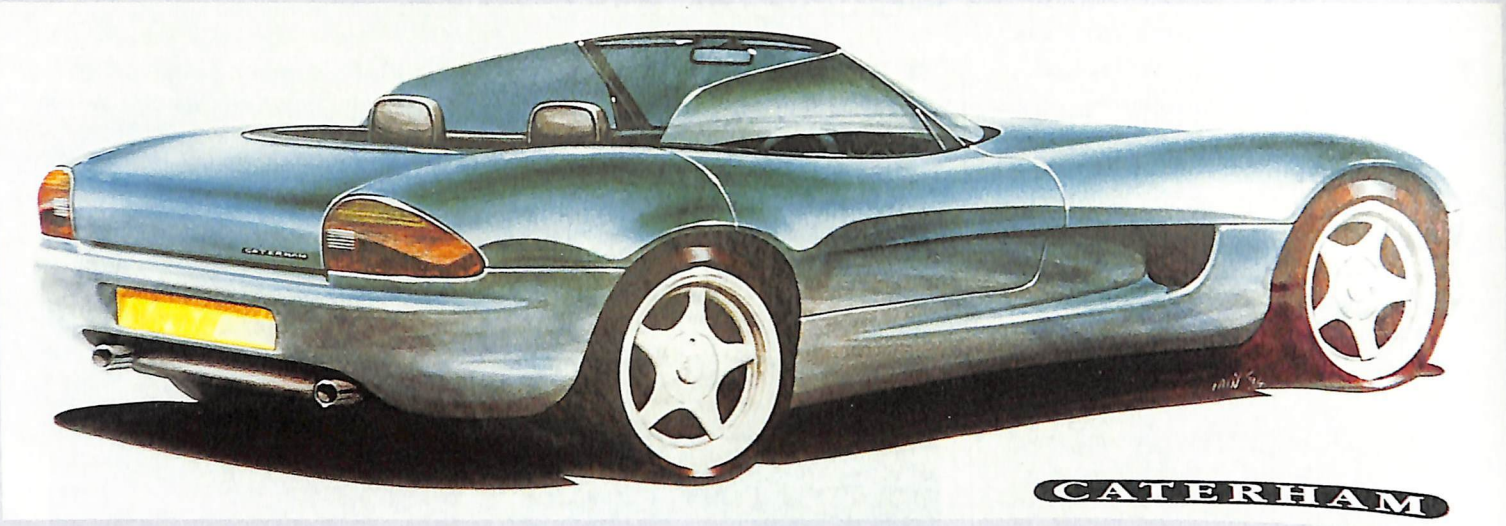


➤ ***Dartford, England***—Caterham is celebrating 21 years in the car business with the launch of a brand-new 2-seater at October's NEC Motor Show.

➤ The sub-$30,000 sportster is Caterham's first all-new car and will be built alongside the evergreen Super 7 on which it is loosely based. Only one model will be available, though customers will have a variety of engines to choose from including Rover's 1.4-liter K-series Four (103 bhp), Opel's 147-horse 2-liter and GM's blown 201-bhp Four. The Japanese market will also have the option of fitting the fearsome 250-horse powerplant currently used in the JPE Special Caterham 7. All variants will use Caterham's own lightweight 6-speed.

➤ Performance, even for the lowest-output models, will be impressive thanks to the 21's low weight; Caterham is aiming for a 1410-pound curb weight, which means even the K-series mill would be capable of hitting 60 in about six seconds. The 2-liter turbo should speed to 60 in under five seconds and better 150 mph at the top end. Caterham's boss and founder, Graham Nearn, has long harbored a desire to build another car alongside the Super 7 and vainly tried to buy the Elan assembly rights and facility from Lotus, though he refutes the idea that the 21 came about as a response to not getting the FWD Lotus for his firm.

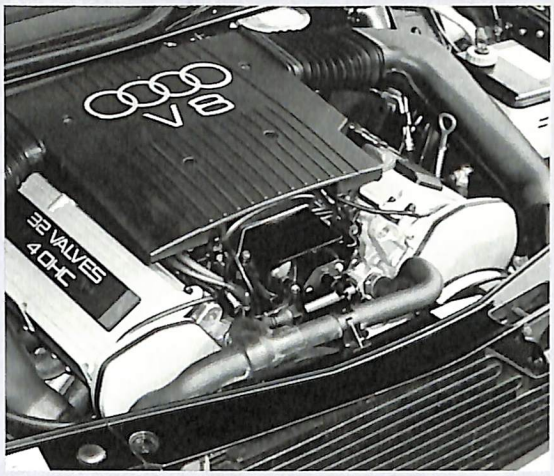
➤ The spaceframe chassis is a development of the Super 7's but estimated to be five times stiffer thanks to the extensive use of carbon fiber and other composites in the stressed bodywork. Measuring just 150 inches from bumper to bumper it's still 17 inches longer than a Super 7 but tiny by modern standards. Suspension is carried over from the 7 with adjustable dual wishbones up front and a de Dion axle at the rear; the 21 will also feature 4-piston calipers all around.

➤ According to Nearn, the car—designed in-house by Iain Robertson—will enter production next spring barring any delays that might be needed to ensure a high-quality launch. It will initially be sold in component form, but if interest merits a Low Volume Type Approval will be filed and turnkey cars made available. Nearn predicts 200-300 units per year destined primarily for Japan, Germany, Switzerland and the U.K. —*Ian Adcock*

German Reinforcements Have Already Arrived

➤ ***Greer, South Carolina***—*Those pundits waiting for the world to end when BMW began building 3-series cars in the United States were not only disappointed this month, they were surprised. The first U.S.-built car was finished (constructed largely from German-supplied kits) on 8 September 1994 with the barest minimum of fanfare—many automotive reporters were not even aware of the build until it was already completed.*

➤ *BMW is hoping to minimize the hoopla surrounding their first U.S. assembly facility until dealers and zone managers have had a chance to examine the first cars off the line themselves. An extra-slow startup schedule will mean fewer than 1000 units coming off the line before the end of the year. The Greer, SC assembly facility is intended to produce 90,000 cars annually: 318s and 325s for now, roadsters later.*



Americans Can Say Audios to the V8 Sedan

➤ ***Ingolstadt, Germany***—But *willkommen* to the BMW 3-series-fighting A4, as a sedan in the U.S. next year and a coupe, convertible and wagon by the end of '97. Powerplants from 100 to 174 horses will be offered along with optional AWD, and a Coupe Quattro S4 version with a 260-horse V6 is expected to appear at the Frankfurt show in 1995. The all-new A4 will replace the 80/90 series currently on sale worldwide.

➤ In the meantime, with initial sales of the aluminum-spaceframe A8 sedan—Audi's replacement for the current V8 Quattro sedan—slated for Europe but not the U.S., Audi will go without a V8 flagship in America for a spell. First seen in 1989, the V8 Quattro (nee 300) impressed testers but was hampered in American showrooms by a high price and tall, autobahn-style gearing. Eventually, the A8 will come to the U.S. in its place. —*Jerry Traeger*

Pischetsrieder Says Everything Alt is Neu Again

➤ ***Munich, Germany***—*With the blood of English knight Sir Alec Issigonis running through his veins, perhaps it's not surprising that BMW chief Bernd Pischetsrieder has voiced his desire to see England's great marques revived. Then again, maybe its also because BMW now owns Rover, titleholder to the MG, Austin-Healey and Mini names among others.*

➤ *Either way, there will be no complaints over here. Word is confirmed that the next-generation Mini will pay serious styling homage to its Issigonis-designed forefather; in the meantime, a run of 35 Grand Prix Mini Cooper specials will be built to celebrate the 35th anniversary of Cooper's groundbreaking F1 Championship. Uprated engine and suspension bits account for a $20,000 pricetag.*

➤ *The mid-engine MGD—already spotted undergoing roadtesting—will be introduced at Geneva in '95. No big news there; more interesting is BMW's refusal to deny the possible rebirth of the Austin-Healey badge, reportedly in front-engine/rear-wheel-drive sports/GT form around 1998. Rover had already begun feasibility studies, but BMW hardware would make any such project considerably easier. Keep your fingers crossed. —Katrina Mueller-Jackson*

Pardon Me, Ma'am, But Your Schnitzer Has Attached Itself

➤ ***Aachen, Germany***—Europeans are never satisfied. It's not enough that sedan and convertible versions of the M3 are available over there, all stronger than the U.S.'s coupe-only version.

➤ Even so, you can also pick up aftermarket varieties that are faster still—to whit, the just-released Schnitzer S3. Based on the M3 sedan, Schnitzer kicks power up to a full 320 bhp @ 7000 rpm via reprofiled camshafts, low-restriction exhaust and remapped Bosch engine management. The basic S3 offering also adds competition-style 18-inch wheels at all four corners.

➤ From there the sky's the limit: strut braces (in metal or composite), height-adjustable suspension, 4-wheel cross-drilled rotors with aluminum calipers all around—the lot. Just so the neighbors don't think you're slacking, the optional spoilers and undertrays are designed for light weight, "but as well offers thoroughbred racing-look because of its manufacturing process in visible Carbon-structure." Easy for them to say. Optional Group A gauges also supply "all important informations." Top speed reportedly betters 165 miles per hour.

THE WORD...

Formula One Team Lotus On The Rocks

➤ ***London, England—Team Lotus—perhaps the most famous, innovative and successful Grand Prix team of the modern era—is reportedly on the financial rocks, with debts of £10 million ($15.3+ million). Inside sources say the team has three months to sort itself out.***

In the current situation, two administrators—Neil Cooper and Nigel Ruddock, both of the Robson Rhodes accounting firm—have been appointed by the Court and given 12 weeks to demonstrate that Team Lotus is financially viable. During the time of this administration—similar in concept to the USA's Chapter 11—Team Lotus is protected from attack or claims by creditors or aggressive parties. Meanwhile, the administrators can reorganize the company or dispose of the business as a going concern.

Recent speculation has put Tom Walkinshaw at the head of a consortium to buy Team Lotus with backing from Castrol and Peter Hall's ICS computer company. Although it's known that Walkinshaw has visited Team Lotus' Ketteringham Hall headquarters, all parties are keeping tight-lipped.

Other rumors even claim that McLaren's Ron Dennis wants to buy the team.

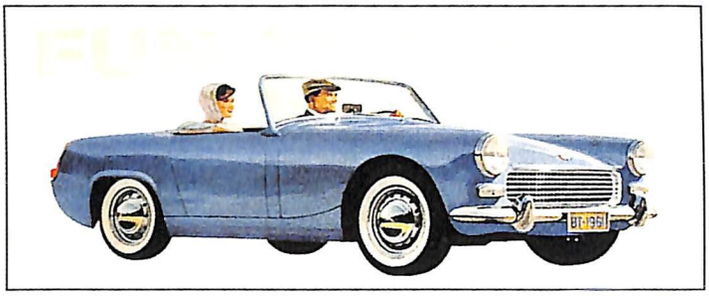
Whatever the outcome, Team Lotus is going to find life very difficult: Even a mid-ranking F1 squad spends about £10 million a year, while the top teams go through twice that amount each season. Nevertheless, the administrators have made assurances that two cars will appear at the final Grands Prix of the season and that work will continue on next year's new car. —Ian Adcock.

FROM THE EDITOR

Burnt Piston, Heal Thyself

➤ Like so many other creatures intent on survival, my Alfa just quit smoking.

In the company of less civilized men it had acquired a nasty quart-a-month habit, which meant I was in constant fear of being spotted by Marin County's Waffen EPA. This group's operatives seek out EcoTerrorists like myself and communicate our locations back to Headquarters, generally via smoke signals belched out the arse-end of a Rabbit Diesel. (Go figure.) Their revenge, as outlined by *Fire in the Belly,* is swift and terrible. Being branded a pariah doesn't generally bother me, but the



threat of an involuntary chakra realignment by eight burly guys wielding Talking Sticks does. Still, when I found out how much the parts alone for a simple Alfa engine rebuild would cost I began wondering if I'd bother.

And I made sure to wonder aloud.

Having had no small amount of experience with these matters, I know the value of offhanded threats made to one's car. We Lamms have always had a Sacrificial 'Goon in the driveway—that ubiquitous wood-paneled station wagon used to haul around everything from old engine blocks to pets with intestinal disorders. Whenever one of our Goons— and they were legion—refused to start, my father would lean down by the defroster vent and say, in a very casual tone, "Gee. It might be time to send this car to the junkyard."

Vroom! Cured.

➤ A '94 Mercedes wouldn't buy it for a minute: What's the worst you can do, send it back to the dealer? Big whoop. But a '72 Country Squire wagon, well.... A '72 Country Squire knows you not only *can* send it to the crusher and *will* send it to the crusher, you're actually *eager* to send it to the crusher. That time it barfed antifreeze on your new Cole-Haans? Oh yeah, baby...*you'll have your revenge someday.*

Because we hold such godlike power over our vehicles, certain cars—those that feel the fires of Hell nipping at their tires—live in a constant state of agitation. And while this has a bad effect on their day-to-day behavior (I mean, could *you* remember not to hock ATF loogies on the floor if you thought Death lurked around every corner?) it also means we have tremendous sway over what they'll do for us when pushed.

My high-school pal Dan Casey had an (aptly-named) Sprite that refused to take this threat seriously. Theirs became a gargantuan battle of wills: The Sprite manifested every ailment this side of devil-possession and Casey tried to shame it into submission via the subsequent repairs.

When the Sprite's starter toggle failed he replaced it with a kitchen light switch; when the headlight circuit exploded a new one was fabricated from extension cord; when the shift knob stripped out a nasty ball of duct tape appeared in its place. Finally the Sprite developed a lower-end death rattle worthy of Edgar Allan Poe. Its goofy, smiling grille looked desperately smug: Game, set and match.

Or was it? Casey made a big show of opening the hood of his mom's 428-powered Ford wagon, the hood of the Sprite and carefully measuring their respective engine bays. "Hmm," he mused out loud, stroking what passed for a goatee in the 11th grade. "Yeah. *No reason it shouldn't work....*"

Vroom! Cured.

➤ There are those who'd say this belief is naive—that there's really no process by which bent and knackered hardware can magically heal itself. On the other hand, how else does one explain all cars' insistence on only misbehaving when they're more than 50 yards from a mechanic? If the Titanic had been carrying a qualified shipwright, there's no doubt the captain would have found himself in the forward hold with an embarrassed look on his face, saying, "You know, I'm *sure* we hit something back there."

"Well, it didn't fix *itself,*" the shipwright would have replied, knowing full well it probably *did.*

So by making sure I priced out all the Alfa's engine parts, bearings and gaskets on the telephone in my garage, I ensured the car knew what lay in store should it fail to mend its evil ways. I neither know nor care the method by which it grew itself new valve guides; I am only pleased to see we've come to an understanding.

Sad, isn't it?

Not a Porsche around for miles. And so easily averted. Simply ask for genuine Porsche parts. We back our parts and labor for two full years on any work performed at an authorized Porsche dealer. Questions? 1-800-PORSCHE.

On Chapman

➤ **Journalist at press conference following Elkhart Lake Race:** "Jacques [Villeneuve], how do you feel about racing with legends like Emerson?"

I don't know how Jacques felt about that question, but I was sitting next to him and it made *me* feel pretty uncomfortable. When I think of legends I think of Fangio, Jack Brabham, Ralph De Palma, Jim Clark or the man who really gave me my start in racing, Colin Chapman.

The first time I met Colin Chapman was at a test in Snetterton, England. In 1969 I was driving Formula Three cars for the Russell Racing School, and Colin showed up at the end of the year to see me drive. I couldn't believe it; I wanted to shout to the whole world that I had met Colin Chapman. For so many years I'd been following him and his teams with Graham Hill and Jim Clark. It was incredible to me, a dream come true.

After the test he called me and said I should come to the factory to talk with him. You can imagine—I said I could be there that day.

Unbelievably, he said he wanted me to drive for him in his Formula One team in 1970. Although I couldn't believe my luck, I thought that it would be a mistake for me to leap to F1 so soon. I was terrified to turn down his offer, but I had to. Luckily, he agreed with my reasons and in 1970 I started driving Formula Two in a joint-venture team with Lotus Components, which was a part of Team Lotus.

Well, after the Zandvoort F1 race, Colin called me again saying that he still wanted me to race for him. We made a plan where I would start to race in July, but I asked him for a lot of test time before then. He gave me an old Lotus 49 to practice with and I put in many miles with that.

I made my first start at Brands Hatch in the Lotus 49—in fact I think I'm the last person to drive a Lotus 49 in a Formula One race! I qualified in the middle of the grid, but I was just amazed to be racing in F1 at all. Remember that Jack Brabham was still competiting, and there was Jacky Ickx, Graham Hill, Denny Hulme, Bruce McLaren and Jackie Stewart. That was the year that Jochen Rindt won the Championship posthumously. And there I was, only 16 months out of Formula Ford.

Monza was the first race that I drove in the Lotus 72, and it was an incredible car, but I never finished that race. At the *Parabolique,* Jochen spun into the guardrail and was killed instantly. All of Team Lotus withdrew and we didn't race at the Italian or Canadian Grands Prix. We only raced at the last Grand Prix of the season, and I won my first Grand Prix there, at Watkins Glen.

➤ But this story is supposed to be about Colin. To work for him was just unbelievable: He was simply the best racecar engineer in the world. He had something very special, like an intuition about cars. If the car was very bad on Friday, he would take me out to dinner, and then after dinner he would go back to the track and work all night if necessary with the mechanics and put a completely new setup on the car: wings, springs, cambers, dampers—the whole thing. The next morning I'd come in and 95% of the time the car was much faster. It was just amazing; he could *feel* what to do.

He was simply the best racecar engineer in the world. It was just amazing; he could feel what to do.

Colin was also an incredible teacher; I worked for him for four years and all the time I was learning. It was one of the things that made him so successful, but more than that was his willingness to take risks. He was always trying new ideas for the future, always anticipating things that other teams might be doing. It was a very high-risk situation sometimes, for the drivers particularly—those cars were very fragile things. But he was always ahead of the competition on aerodynamics, suspension and chassis.

In some ways Colin was like a father figure to me, but at the same time he kept his distance. He told me very directly that he never wanted to get as close as he had been to Jim Clark. When Jim died it was about the biggest shock of his life, and he told me "Emerson, I like you very much, but"— and he was very clear—"but I never want to get close to another driver." Still, both he and Hazel, his wife, were incredibly good to me. Whenever I was in England I stayed at his house, and I always asked him to tell me stories of his experiences with Jim.

➤ Colin was the first one who told me—with firsthand experience— about Indianapolis. He was the first of the new breed from Europe, he and Jim Clark, to go over there, and of course they won in 1965. He told me what was difficult about Indianapolis and the best way to approach Indianapolis, and these things still hold true today. At a time when many Europeans had contempt for Indy racing, he was the one who taught me to respect it.

➤ At the last couple of races of 1971 we found the way to make the Lotus 72 consistent, and after a good winter of testing we were really ready for the 1972 season. From the very first race the car was incredibly solid: We had a very good basic setup that would work just about everywhere. From there we could improve a little here, a little there, but basically we were quick all over. Colin was a very intense person, with so much energy. With him we always went forward, there was like a snowball effect, and every race we just got better and better. By the middle of the season we knew we could potentially win any race, and even win the title. I was very young, and it could have been too much pressure on me. Colin took the pressure from me; his experience on the circuit made each race easy. He knew all the problems at each event and had them smoothed out before we got there. It was a magic season.

➤ The last time I spoke to Colin was about six months before his death. We were talking about the helicopter he had learned to fly. He was tremendously excited about it, as he was about anything he set his mind to. His death was a tremendous blow to me—to all of motor racing.

He was a part of the history, a big part of what makes racing great. And to me, personally, he was even more than that. He was—*he is*—a legend.

Your friend,
Emerson Fittipaldi

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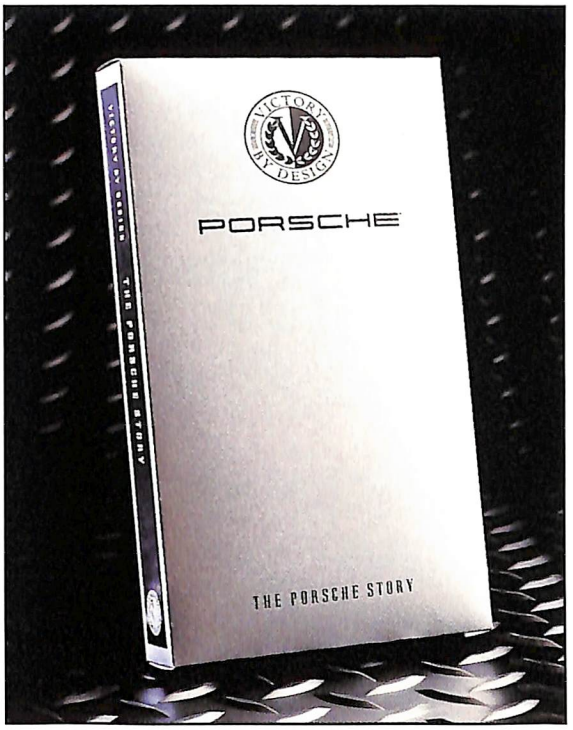

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PHOTOPOOL

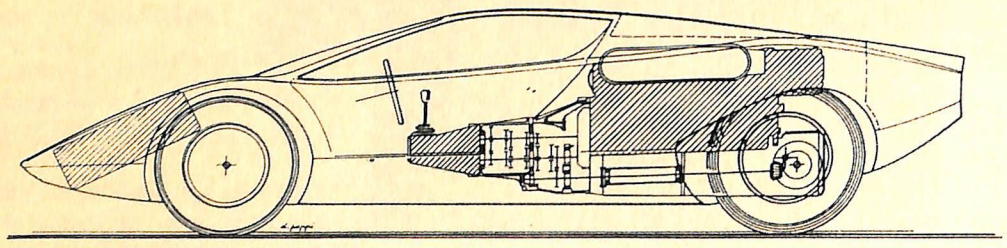
➤ *SOHC 1995 GT*

Detroit Cruises for Dates on Muscle Beach

➤ ***Phoenix, Arizona***—There's definitely neat stuff ahead in the cheap-rocket arena, with GM feeling it has a chance to unseat Mustang at the top of the sales charts for the first time since the Garfield presidency (the guy, not the cat). Annual sales of Mustangs and F-cars are running neck and neck this year—a bit of an illusion since the Camaro and Firebird had a third-of-a-year headstart, but marketable.

➤ No solid word on how Chevy will pump up the Z28's image in the near future, but Pontiac is reportedly working on SLP-style intake tweaks to give the Trans Am a full 300 horses, while Ford is preparing two new engine programs to steal their crosstown rival's thunder. First we'll see a very limited run of Cobra R models (a few hundred units) with a 275-horse 351-W Ford V8. That should generate some ink while engineers perfect the 1996 switcheroo from today's 4.9-liter OHV V8 to Ford's 4.6-liter SOHC and DOHC modular V8s. Figure the Mustang GT with SOHC power for about 250 horses; the DOHC Mustang Cobra should pony up 300 or so.

➤ *Well, maybe not <u>this</u> Lamborghini engine*



Lamborghini Engines for Indonesian Industries

➤ Supercar manufacturer Lamborghini has created a series of modular engines for its new owners, MegaTech Ltd. Ranging from a carbureted 3-cylinder, 997cc 2-valve unit producing 60 bhp to a 260-bhp, turbocharged 1994cc, 4-valve V6 and possibly a 4-liter V12, the Luigi Marmiroli-designed powerplants share common features like pistons, cylinder heads, etc. to minimize manufacturing costs.

➤ The World Modular Engine (WME) could be in production in Indonesia by 1998 and is being used by MegaTech as part of its campaign to persuade Indonesia's government to back local automotive efforts rather than buying technology from Europe, the US or Japan. A spokesman added that the Indonesians also want to export the engine. "The Indonesians see great kudos in...the 'designed by' or 'engineered by Lamborghini' badges," said the insider, adding that future projects will combine both Italian and Indonesian technological expertise.

➤ Just what cars these engines will eventually power is currently unknown, but the base 3-cylinder could rival Rover's K-series engine, which will also be built under license in Indonesia later this decade.

➤ There's also the possibility of the V12 powering an all-Indonesian sports car, while a Lamborghini insider also refused to deny it might power the next Jalpa. The turbo V6 could also theoretically replace the Ford Cosworth engine currently used in the Formula Asia single-seater race series.

➤ Mockups of both the 3- and 6-cylinder WMEs were displayed at Japex '94 in Surabaya. Earlier this year, MegaTech's principal shareholder, Setiawan Djody, revealed ambitions to build an $8000 to $15,000 sports car for local and export markets.—*Ian Adcock*

These Guys Do More Introductions Than a Dating Service

➤ ***London, England***—*In what's become an almost monthly occurrence, Rolls-Royce/Bentley has announced its fastest, most powerful model to date again: This time it's the slick 4-door 155-mph Bentley Turbo S. Although Bentley refuses to divulge its engine's power outputs, the authoritative Automobil Revue catalogue for the annual Geneva Salon puts the standard Turbo engine's output at 355 bhp and 550 lbs.-ft. of torque; Crewe insiders reckon the new engine is 20% up on those figures, or about 425 horses—enough to propel the 2.4-ton sedan from rest to 60 mph in an highly amusing 5.8 seconds. Engineering changes to the 6.75-liter turbocharged engine include an air-to-liquid intercooler, revised induction system and a Formula One-inspired engine management system developed by race wizards Zytek.*

➤ *External features include a lower-profile Bentley grille, wraparound bumpers with a front airdam and rear fairing and 17-inch alloy wheels wearing with the latest unidirectional Avon Turbospeed tires. The interior has deeply bolstered sport seats and Bentley motifs inlaid in the walnut-veneer waistrails. As with other Bentleys, Automatic Ride Control, a viscous differential and an interactive 4-speed auto are standard. Just 100 of the £147,500 ($225,000+) Bentleys will be made, and they're selling out fast.*

➤ *Mind, if you miss your chance you can always specify a Continental R to be fit with the same powerplant, for what would truly—and perhaps ultimately—be the fastest RR/Bentley to date. Its price? "On application," according to a company spokesman. —Ian Adcock*

➤ *Bentley Turbo S*

Real SLK Votes the Conservative Ticket

➤ ***Phoenix, Arizona***—We've held off talking about Mercedes' upcoming SLK so far, for the simple reason that while M-B has been giving away lots of rides in the slick concept-car prototype, the production version of its sub-$40,000, C-class-based roadster seemed unlikely to match the showcar in panache or adventurousness. (What production car *does* after all?)

➤ Finally, our resident Desert Rat caught herself a pre-production prototype in testing. Gone are the swoopy nose and tail treatments, headrest fairings and subtle, delicate side coves: Not surprisingly, the actual production body looks much less playful than the silver missile that's been making the rounds. U.S. engines should include a 148-horse aspro Four and a supercharged variant good for nearly 200 bhp. In its fastest trim, the SLK should hit 60 mph in about 7.5 seconds, or roughly as fast as an XJ12 or Maxima SE.

PHOTO PRIDDY

➤ ***Could this be a career-ending pitstop? Spymaster Brenda Priddy strikes again.***

The House That Pestering Built

➤ ***Bowling Green, Kentucky***—Dan Gale calls himself "a rotund dynamo with a walrus mustache." Every other speaker at the National Corvette Museum's opening ceremonies—and there must have been three dozen, ranging from Chevrolet boss Jim Perkins down to a brace of local TV-news hairdos—called Gale the "sparkplug" behind the facility, a man who'd "pestered" or "persuaded" each of them to earn themselves a spot of honor on the podium.

➤ Production-model display backgrounded by Giant Twinkie and Mobil's Dick; ribbon-cutting ceremony and internal display.

➤ So Gale is obviously a forceful character: Possessed by a dream to build a Corvette museum across the street from the car's Bowling Green, Kentucky assembly plant, three years ago this oversized Corvette owner moved here from Boston with his wife and started pestering or persuading everyone he could find to finance the place. The Rotund Dynamo started by pestering or persuading four local landowners into donating 33 empty acres next to Interstate 65. (No fools they, the locals wisely held onto the land along the service road; the National Corvette Museum will soon be fronted by a forest of fast-food joints, adding an arguably apropos ambiance.)

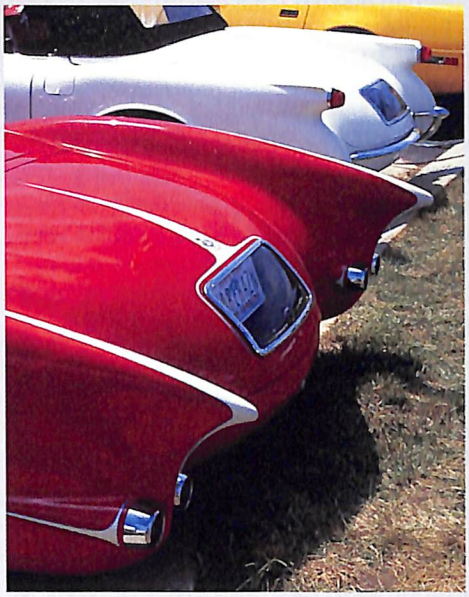
General Motors would have seemed the next obvious set of deep-pockets to hit, but apparently they wouldn't cough up a *sous*. In lieu of factory support, then, the Rotund Dynamo had to pester or persuade the local Bowling Green Corvette workers out of $170,000, Mobil Oil (makers of the current Corvettes' factory-recommended synthetic motor oil) for another $250,000 and various Corvette clubs, dealers and enthusiasts from all over the world to raise another whopping $4 million of their own.

With this grubstake in hand, Gale then pestered or persuaded a brace of local banks that a half-million Corvette fans would troop through Bowling Green every year to visit this facility, leaving behind $39 million and 1000 new jobs in their wakes; he got an additional $11 million.

➤ And so it happened. Architects Neumann/Smith of Southfield, MI designed a 68,000 sq-ft space in sort of a Wal-Mart-meets-Tomorrowland theme. The main building has a long, curving silver facade cantilevered out from the foundation; behind it is a giant fly-yellow Twinkie pierced by a bright-red 11-story cone (the highest structure between Louisville, KY and Nashville, TN). The cone's official name is the *Mobil 1 Spire*, but wisecracking locals already call it *Mobil's Dick*.

➤ All joking aside, the inside of the Corvette museum is, in a word, *superb*. The Exhibit Works of Livonia, MI planned the interior, obviously with a lot of input from people who know Corvettes.

Today's trend in museum design is to put exhibits in context, using props, music, videos, etc. At Bowling Green, all these tricks are used to great effect and an additional bennie has been added: White plaster figures by Karen Atta—obviously inspired by '60s sculptor George Segal—represent real people in the Corvette story along the way. A pigmentless George Meharis and Martin Milner populate the Route 66 exhibit; a '63 Sting Ray Coupe sits in a replica GM styling studio with a ghostly Larry Shinoda posed nearby; a late-model



➤ ***It takes all kinds....***

Corvette endurance racer has team-owner Tommy Morrison clenching his colorless clipboard while white-plaster engineer/racer John Heinricy scrambles out for a driver change.

Besides the engineering, styling, racing and cultural exhibits themselves there's a movie theater, library, a terrific gift shop/bookstore and room for about 50 Corvettes in the museum at any one time. Most of the cars are on loan, so these exhibits will change periodically. At the opening, not only were there examples of almost every production Corvette on hand but also the 1957 SS racecar, the original Sting Ray with which Dick Thompson won an SCCA C-modified championship, the Manta Ray, Harley Earl and Mrs. Bill Mitchell's personal Corvettes, etc.

➤ **TV Hairdo with superior smirk in the crazy moments before Opening Day:** "How long before you'll be ready to open, Mr. Gale?"

Rotund Dynamo with Walrus Mustache, glancing at his watch in obvious irritation: "In about 3 hours and 14 minutes!" And he did it: Dan Gale's armature hadn't stopped spinning for maybe 50 hours straight, but on Thursday night "700 of our most intimate friends," as Chevy PR flak Steve Rossi called them, toasted Gale's fantastic achievement inside the completed museum and then trooped out to a gargantuan tent for dinner and a concert by Grand Ole Opry star George Jones.

➤ So is the National Corvette Museum going to be a success? You bet your last tourist nickel: Some 70,000 Corvette enthusiasts already visit the Bowling Green Assembly Plant every year, so there's a built-in customer base that will already cover the museum's running expenses. What's going to put it over the top, though, are not die-hard Corvette enthusiasts trooping through at the rate of two hundred a day. What's going to allow the Corvette museum to pay off those banknotes instead is that Nashville, TN—home of the Grand Ole Opry—is just an hour down I-65. You know what's going to happen...when two million tourists a year descend on the Capital of Country Music, the womenfolk will spend the day at Opryland or Twittysville or Dollywood or whatever the heck it is they go there for, and the menfolk are going to bolt like bejeebers down the road to look at *cars*.

The National Corvette Museum in Bowling Green is now open daily from 9 am to 7 pm; admission is $8 for adults and $4 for children; the phone number is (502) 781-7973. The Rotund Dynamo with the Walrus Mustache, we hope, is taking the next few months easy. —*Rich Taylor and Jean Constantine*

CORRESPONDENCE

➤ Doc Knows Best

Yo, (Associate Publisher) Holly! In the October issue, page 74, your writer eloquently describes *The Torquemeister.* Great article, great car. Wow! But wrong tires! You guys i.d. *that Italian brand,* when in fact it is Goodyear that carries that beast through the countryside. And you know how sensitive we tire guys can be....

Hope you have been well, happy and prosperous. Happy Trails!

Doc Pingree,
PR Manager Public Affairs
THE GOODYEAR
TIRE & RUBBER COMPANY
Akron, Ohio

➤ *This one's completely my doing. Don't know where I got the idea that...er...Italian brand was involved, but I'm the one who put it in the spec box. I'll report for my checkup soon....—Ed.*

➤ Smoking Gunned

Emerson Fittipaldi is the professional sports figure I admire above all others, not only because of his accomplishments as a racecar driver but rather because he comes across as a genuinely good person. It is for this reason I was very disappointed by his October article, *Philip & Me.*

Twenty years ago I wouldn't have thought twice about tobacco sponsorship,

That would be the mandatory removal of all tobacco related names and logos during all televised sports events.

but time have changed. We can no longer forget cigarettes kill people.

To the extent that people have been influenced to use such a product as a result of Emerson's endorsement, he should now begin to regret. Emerson's personal focus on health makes this hypocrisy all the more unforgivable.

If the drive for cubic dollars is so great that someone like Emerson can divorce himself from the reality of the product he represents, other forces will simply have to come into play.

I believe it is time for the FCC to take the same steps we have seen overseas. That would be the mandatory removal of all tobacco related names and logos from the view of the camera during all televised sports events. Such action would bring about an end to cigarette advertising in racing. The loss of tobacco money would have the additional benefit of doing as much to equalize competition as any of the technical rule changes now being considered.

Douglas E. Billings
Pleasant Hill, California

➤ Exotic Diseases

Concerning the article on the death of the affordable exotic, I am pretty much in agreement with the assertions put forth. One problem overlooked is price. My 1987 Toyota MR2 listed for $16,000: This year's admittedly faster, better equipped version of the car is $32,000, or twice the amount I paid for mine.

Another overlooked point of the article is that in unfortunately all too many areas of this country, car theft is an overwhelming problem. I should know: My MR2 was stolen by some scum who couldn't keep his hands off of the car I took care of for seven years. No, I will not deal with police hassles, insurance surcharges (institutionalized rape), etc., in order to have a car attractive enough for some idiot who needs a ride to impress his idiotic girlfriend. I'm getting a white Jetta GLX and ripping off all of the emblems and spoilers, adding steel wheels and will drive around looking like every other housewife. Let them steal someone *else's* baby next time.

I feel better now.

Romy Locklear
Philadelphia, PA

P.S. Let's lobby for a law to chop off the hands of convicted car thieves.

➤ In *Death of the Affordable Exotic,* Rich Taylor misses the point completely. Where did Mr. Taylor get such a twisted idea of what constitutes "affordable?"

So what if an MR2 Turbo only costs $250 a month to lease? Leasing is throwing money down a rathole. How much are the payments when you buy one at current interest rates? What does it cost to insure? My income is supposed to be slightly above average for the Los Angeles area, but I can't afford to buy and insure a Miata, let alone an MR2.

In addition, since most of us have children and therefore need at least four seats, any sports car is by definition a second car

for the majority of its potential buyers.

The answer? MAKE THEM CHEAPER. Bring back the original RX7, the original MR2 and CRX and an updated version of the original Datsun/Nissan Z. At least those were almost affordable. Better yet, produce a convertible version of each.

So what if an MR2 only costs $250 a month to lease? Leasing is throwing money down a rathole.

For the vast majority of us poor working stiffs who have to buy what we drive, $25,000 might as well be $250,000.

Dean
Venice, California

➤ Natural Events

We are very pleased and honored to have our C-8 so prominently a part of SCI's 100th issue.

As usual, your publication distinguished itself with an accurate, readable story and exceptional photographic presentation. Still, there is one small issue that bears correcting: We've changed the price of the gearshift to $49! (But now they come in a choice of blue, black and red....)

Congratulations on achieving a great milestone. We hope SCI keeps up the good work for a long time to come.

Richard Carey,
Program Marketing Director
CALLAWAY
Old Lyme, Connecticut

➤ Cranky by Design

In response to Michael Bowler's article in the November issue, I don't know if we are experiencing the end of Italian styling or not but I do know that automotive styling in general has gone tremendously downhill. I think I know why.

The need to justify one's designs on real or imagined technological grounds has always been a part of automotive styling, but our standards of testing and our ability to build efficient cars have increased so much these days that the garden-variety B.S. passed off as aerodynamic theory in the old days can't cut it anymore. We got too smart.

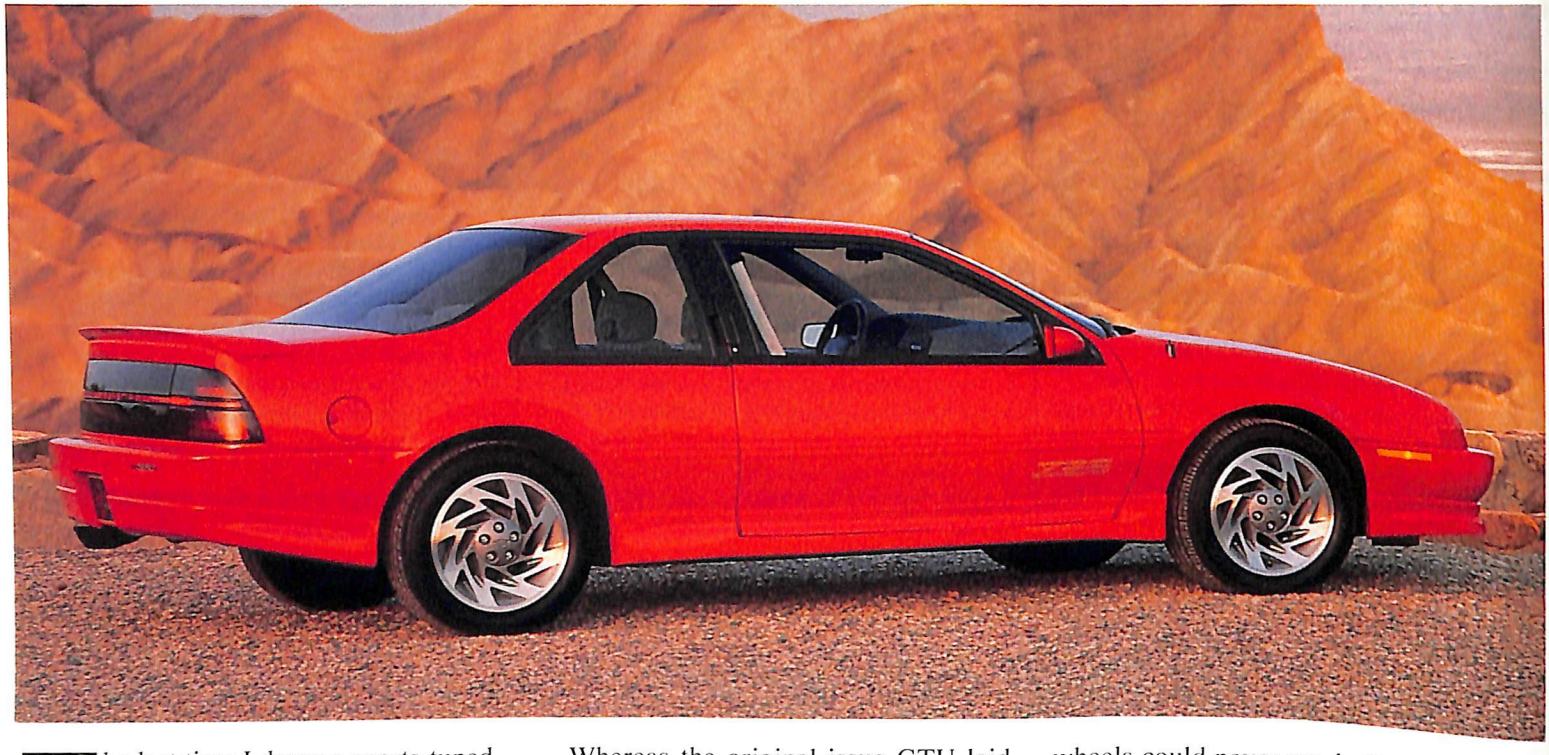
Just look at the Disco Volantes or Loewy Studebakers to see what our new-found efficiency has gotten us—cars that looked swoopy in the past really weren't, but we were happy to have them because they were interesting and different to look at. Now, cars that really are aerodynamically efficient are all too often ugly as sin, or worse still they are simply unremarkable. The thing is, if you think about why we buy and drive cars it has almost nothing to do with efficiency. If it did, we'd all be puttering around in little Geo Metros, happy as can be and totally satisfied. No, we buy cars for reasons that are quite different from efficiency; I say let's own up to that fact and put style first once more.

Maybe I'm just getting cranky in my old age, but you can take all those new jelly-bean cars (Corvette Indy, Renault Laguna and that abysmal thing on the opening pages) and blow them out the ol' wazoo. The old Monteverdi on page 58 is the best looking car of the bunch; Aston Martin-Lagonda is definitely on the right track with the Vignale showcar. Let's hope the rest of the world will listen, the Italian designers most of all. When passion comes back to design, their design industry is likely to come back with it.

Dale Kittler
Sparks, Nevada

The Survivalist

Is the latest Beretta Z26 a miniature musclecar or an overgrown commuter? Dave Colman reports.



The last time I drove a sports-tuned Beretta, it was called the GTU in recognition of Chevy's involvement with IMSA's GTO/GTU series. But GTU the race car proved a lot more successful than GTU the street car: While Tommy Kendall and Max Jones swept the competition clean in their Cars and Concepts Beretta, the street version that Chevy marketed was a few tread blocks short of a full contact patch.

The failure of the street version had something to do with the fact that you can't just pop a set of 16-inch wheels on an otherwise stock sedan and expect much in the way of improvement. With the new Z26, Chevy seems to have remedied most of the criticism leveled at their earlier badge engineering. This time, the task has been approached from suspension settings to seat support, and the end result provides a fine source of bargain amusement for the family man with a yen for speed.

Whereas the original-issue GTU laid stylistic claim to a prowess it couldn't substantiate, the Z26 is capable of backing up its boast. In the engine bay a 155-horse roller-lifter V6 is standard equipment, backed up by a quick-shifting electronically controlled 4-speed automatic transmission.

Two years ago Chevy improved the feel and action of the standard Beretta's 5-speed with a new clutch to ease engagement and facilitate quick shifts; that transmission unfortunately isn't available with the Z26 package this year, nor is the 170-horse Quad 4 engine that came with it. Losing that combo is bad news, but the genial nature of the current V6 and the high grip of the optional 16-inch GA Goodyears do combine to offer a Z26 that goes beyond the sum of its humble parts.

Genial though it is—still making all the right noises and offering decent midrange torque—the most humble piece of this package must be GM's long-suffering 3.1-liter V6. When push comes to shove, 155 horses and 185 lbs.-ft. of torque just aren't enough; it takes almost nine whole seconds to get this rolling party up to 60 mph.

Spring Arrives

The original repliracer suffered from too much suspension flaccidity, a sin which its simple upgrade to 16-inch wheels could never mask. But Chevy has come through with the goods on the Z26 by specifying upgraded antiroll bars, springs and shock absorbers. The sport pack gives you a direct-acting 18mm stabilizer bar which transfers loadings to the lower A-arms more efficiently than the 30mm bar that is standard on the base Beretta. The front spring rate is 210 lbs./in; at the rear, the Z26 utilizes deflected-disc shock valving and progressively wound springs rated at 250-415 lbs./in. The rear stabilizer bar is 19.5mm, big enough to endow the Z26 with sufficient oversteer to counteract the push designed into the base model. This is one of those rare front-wheel drivers you can throttle-steer at will.

In addition to proprietary front and rear antiroll bars and shock valving, the 16x8-inch aluminum wheels plant hefty 205/55ZR16 tires on the tarmac. This combination of upgraded struts, bars, springs, wheels and tires excels at coping

with real-world driving conditions. And this is no racetrack orphan designed to operate only on freshly laid asphalt: The Z26 is very much a daily driver that also sports a penchant for clipping apexes. It doesn't become unhinged over potholes, nor does it beat you to death with an arthritic gait.

Unfortunately, the steering feedback of the Z26 is number than your mouth after a trip to the dentist. While lock-to-lock travel is a sprightly 2.5 turns, on-center feel is lacking. Despite the fact that Chevy contracted Saginaw to revise the power steering two years ago, the Z26 still suffers from too much assist.

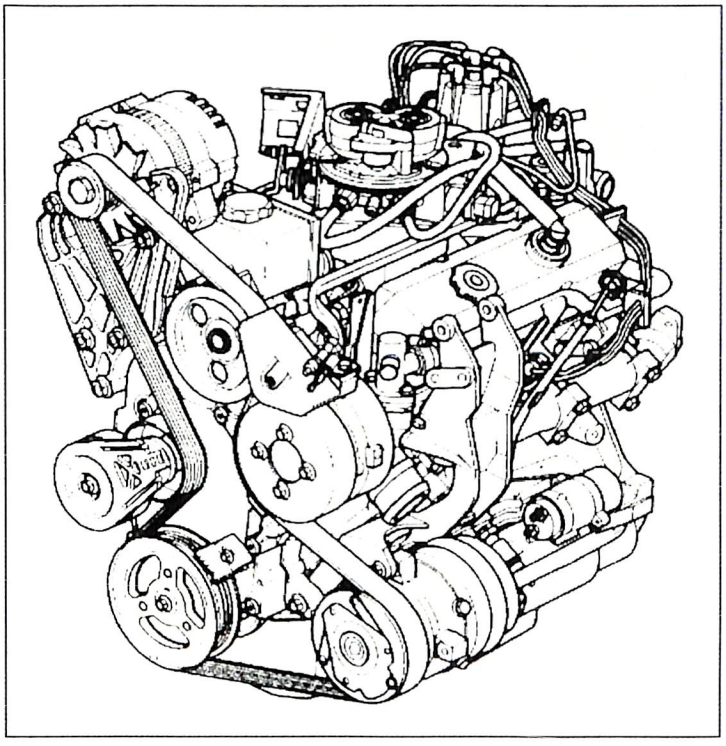
Pity, too, because the flying bridge in this Beretta is otherwise right up gasoline alley. The steering wheel is one of the General's better efforts at SRS design and the front seats look right and feel even better. Similar in appearance to the limited-edition chairs of the Indy Beretta of 1991, these replica Recaros will scoop you up but never spit you out. Heavy side support starts under your thighs and continues from the small of your back to the tips of your shoulder blades. If UPS packed you up as well, you'd always arrive undamaged.

Just the Facts

The well-engineered Z26 suspension package encourages you to extract the relatively peaky power of the V6 (maximum output comes along at 5200 rpm, just 300 shy of redline), and because of the pretty tame torque levels, torque steer is never a problem when you flatten the throttle. In fact, you could be excused for forgetting that this Beretta is even a front-wheel drive product: It's dead neutral, a fact unfortunately resulting as much from its lack of power as high-ticket driveline engineering. All in all, with the high-output Quad 4 gone in '95, this package has turned its back on the sports-car set in favor of the tourists.

At $17,000+, the Beretta Z26 has really become sort of a poor-man's Prelude. While it may not share the exterior elegance or internal slickness of the Honda, the Z26 outdoes the Prelude comprehensively on interior design, space, comfort and price. If you find those virtues appealing, then you should go ahead and check out this product of evolution. ○

➤ ***Despite roller cam followers and sequential fuel injection, 3.1-liter V6 from the GM stables is showing its age. Last year's optional Quad 4 made 25 more horses but disappeared for '95.***



Specifications

1995 Chevrolet Beretta Z26

➤ General
Vehicle type: front-engine, front-wheel-drive coupe
Structure: steel unibody
Market as tested: United States
MSRP: $17,150 (est.)
Airbag: std., driver only

➤ Engine
Type: transversely-mounted V6, iron block and aluminum heads
Displacement (cc): 3130
Compression ratio: 9.6:1
Horsepower (bhp): 155 @ 5200
Torque (lbs. ft.): 185 @ 4000
Intake system: SFI
Valvetrain: two pushrod-operated valves per cylinder

➤ Transmission
Type: 4-speed automatic
Ratios
1st: 2.92
2nd: 1.57
3rd: 1.00
4th: 0.71
Final drive: 2.97

➤ Dimensions
Curb weight (lbs.): 2990
Wheelbase (in.): 103.4
Track, f/r (in.): 55.6/55.1
Length (in.): 183.4
Width (in.): 68.2

➤ Suspension, brakes, steering
Suspension, front: MacPherson struts with coil springs and antiroll bar
Suspension, rear: beam axle with trailing arms, coil springs and antiroll bar
Steering type: rack and pinion, power assisted
Wheels (in.): 16x8
Brakes, f/r: 10.2-inch vented disc/7.9-inch drum
ABS: std.

➤ Performance
0-60 (sec.): 8.9
1/4 mile: 16.6 @ 84.1
Braking, 60-0 (ft.): 137
EPA fuel economy (city/hwy mpg): 21/29

Like the Hammers

Captain Christopher Bibb put BMW's M5 supersedan through its paces on a forced march from Monaco to Munich; Cymon Taylor documents the run.

It had been a tiring week, with business calls in Munich, Stuttgart, Zurich and Geneva before we latched onto the Monte Carlo Challenge rallyists as they overnighted in the French spa town of Gap.

It was now Saturday morning, and very definitely the Morning After. After the black-tie awards banquet at the Hotel de Paris, Rosie's Bar played host to the impromptu (but annual) post-Challenge party, and it was the early hours before everyone trickled (and stumbled) back to their respective hotels.

Beyond the flailing curtains, breakfast was laid out on the balcony. The pale February Côte d'Azur sun was streaming into the room, and except for the fact that it was not yet seven in the morning life should have been bliss. Why on earth did I harbor a nagging impulse to race back to cold, damp England? I told myself it was a simple matter of guilt, but knew it would take little to dismiss such a thought had I really wanted to stay in Monaco.

The point was, I knew I could be back in Hampshire by dinnertime, because outside sat the world's fastest and most competent sedan—a veritable intercontinental missile in aluminum, plastic and steel. In retrospect, it was the sheer sense of challenge that seeded the irrational impulse to desert paradise and hightail it for home, along with the pleasure of using BMW's M5 for the purpose its designers had intended.

Freight Train

One small drawback, apart from the discovery of a badly sprained wrist–some forgotten misdemeanor of the previous night?–was the fact that the M5 still had to be returned to Munich. That meant no channel to cross and fewer miles of Autoroute to pound, but the towering blockage of Switzerland and the Alps lay between me and this endpoint. Furthermore, access to the industrial jewel of southern Germany when approaching from this route is limited by geography to only a couple of corridors, and neither are ever quiet.

Six By Five

By the time we'd threaded out of the tiny principality and connected with the A8 to Genoa it was already eight o'clock. Shooting down the damp sliproad the M5 tracked perfectly under full power, its firm tail resisting the urge to droop or slide. Well used to its prodigious acceleration after a week at the wheel, the M5 had begun to feel like any ordinary BMW, sounding and revving as sweetly as all the other Sixes in Munich's stables. Similarly geared–it doesn't have the 850's unnecessary 6-speed–it feels utterly familiar; silky smooth, safe and comforting. Until you glance at the speedo that is: Slipping into 4th at 6000 rpm in a 320 Coupe tallies with 100 mph, but doing likewise in the M5 gives a ground speed of more than 130 and climbing. Still, the sensation is eerily identical.

It's precisely this phenomenon that has led some commentators to talk of the M5 as being amorphous. On first acquaintance, its kidney-walloping performance is an eye-opener even for the most cynical tester, but as the impact fades, the noteworthy performance begins to assume a less-than-special feel. Of course, this is to forget that while

capable of matching a Ferrari 348 through the gears, the M5 is a luxurious 5-seater with a suitably commodious trunk. Unlike AMG's long-reigning Hammers, the M5 also speaks its part in calm, courteous and unruffled tones—a fact that does not hinder its ability to get the job done.

Most of all, when you have a long journey to cover and a warm dinner at home to attend, then the BMW M5 truly comes into its own. In short, when the odds are stacked against arriving before the port is served, the M5 delivers: Appreciating this car means the recognition of an indomitable and faithful friend.

With my target in mind any thoughts of failing were banished, and as the autostrada began to climb and weave its way toward Ventimiglia the vista was one that could only generate optimism. To the left, snow adorned the summit of le Grand Mont, the ridge of which serves as the Franco-Italian frontier. To the right, the glassy Med bent the low sun's rays, almost concealing a brace of powerboats heading from Menton towards La Spezia. Viaducts bridged steep valleys dotted with terraces and lined with acres of greenhouses, while the ridges were continually dotted with churches, olive groves and pine trees.

Emerging from each of around two-dozen tunnels the sunlight proved blinding, a factor augmented by the damp road surface. Pirelli's tenacious 235/45 winter tires provided limpet-like adhesion, but at something in excess of 100 mph the twisting 2-lane highway proved tight enough to demand total concentration from the driver. For the first time the M5's bulk felt apparent; where the M3 bobs and weaves but tracks exactly where aimed, 3800 pounds of 5-series tends more to weave and squirm, requiring constant (if minimal) correction at the helm. Snatching at the car, strong sidewinds have a similar effect: Thankfully the speed-sensitive, power-assisted steering conveys all: With no weight taken out and no kickback, it betters every other Bimmer in achieving a confident, reassuring feel. Also unlike the M3, the M5's steering has no trace of woolliness in its action.

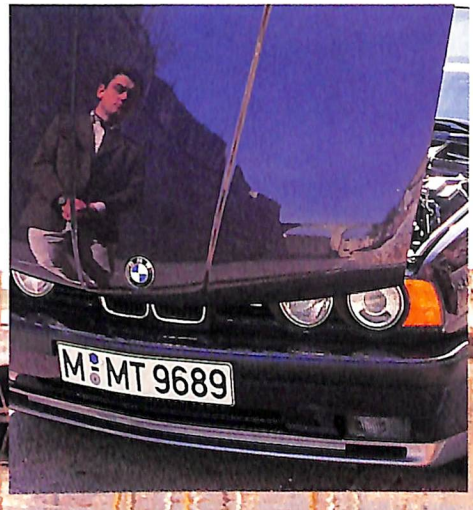
Intemperance

The bogey time for refueling would normally be ten minutes, but this is Italy. All the attendants spot the incoming BMW for what it is, a high-speed conveyance on a mission of urgency, and surge to assist in pouring in almost 20 gallons of fuel, cleaning the windshield and headlamps and trying to sell us oil. Thanks to their eager and well-intentioned work, we were lucky to get away with a mere 15 minutes.

BMW claims a 465-mile range, but it's not that far to Cremona where 125 minutes later, by the side of the meandering and swollen Po, the credit card-melting process was repeated. The on-board computer blinked that we were averaging just less than 15 mpg, which gives some idea of the speed with which Northern Italy was passing beneath us, toll stops notwithstanding.

It had taken an hour running along the coast from Monte Carlo to Genoa and another to reach Piacenza. Beyond the Po Valley and up toward Brescia, early morning mist clung to the flat, fertile fields of Lombardy. The scene was covered with a diffuse, eerie light that belied an outside temperature of only two degrees centigrade. Poplars and willows stood erect and regular-

➤ ***While the heavyweight is prepared for sun (Monaco) or snow (Brenner Pass), Bibb comes dressed for neither.***

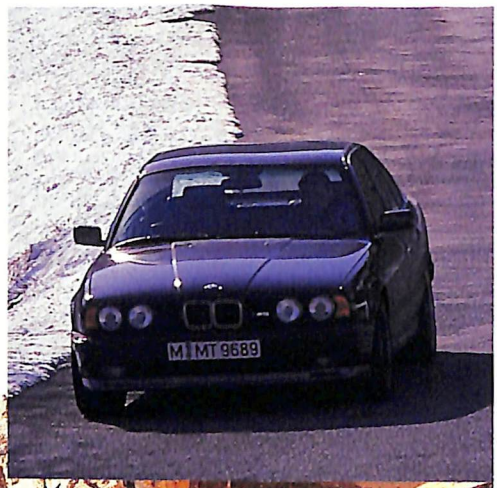


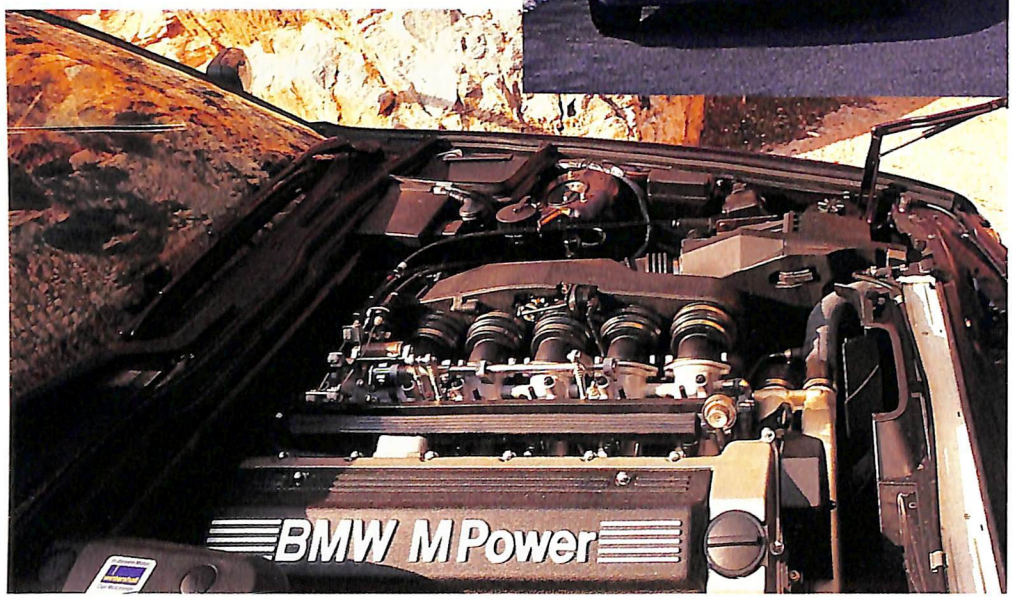
ly spaced across the landscape; equally distinctive were the pantiles on scattered farmsteads and barns.

The second refueling took 25 minutes. Many Italians still don't trust banks or punters with credit cards—if you don't have the cash you must be living on credit, and that's against certain teachings. After much argument and gesticulation, a Eurocheque succeeded where nothing else impressed, particularly not the emergency condom stashed in the wallet. Tolls and the frontier added a further 15 minutes of delay, and it was 11 o'clock before we saw signs for Verona at the foot of Lake Garda.

From here the traffic began to clog. By now lorries had turned out and scores of car roofs were adorned with skis. Had we departed Monaco an hour earlier the run from Verona to the Brenner Pass would have taken around an hour; now, teeming with well-to-do Italians heading for a holiday in the snow, we'd be lucky to reach the Austrian border in two.

➤ ***The good things in life still come in 6-cylinder packages; Munich's most venerable Eurospec powerplant now makes 347 bhp.***





It Just Happens

In this situation the M5 is rather impotent, although less so than a genuine sports car. Nowadays, when traffic density (and belligerents who are just too lazy to use their mirrors) so often forces fast cars to mix it up with everyday dross, riding within a low-slung sports car is anything but subtle, and tends to exacerbate the congestion in one's vicinity rather than relieve it.

The M5 turns heads, but there are few smiles even in car-crazed Italy. In Britain, meanwhile, it's easy to feel uncomfortable in a TVR or Porsche, but less so in the straight-laced M5. One of the car's most welcome features is its elegant, understated, butter-wouldn't-melt appearance. Animosity from the hoi polloi is minimal, and inside the cabin the passengers have the added bonus of limousine-like accouterments.

After three hours of fierce concentration the driver retains a cool head. The air conditioning is first rate, as are the seats. Throughout ride comfort has been of the highest order, but the most pleasing aspect is the way in which the BMW engineers have tackled noise suppression; fully extended, the 3.8-liter straight-6 sounds so sublime that the driver is easily seduced into rapture, yet it remains calmingly distant and never obtrusive. Tire roar is similarly absent and the capable if mid-range (press-fleet issue) Blaupunkt music box is rarely swamped. An indication of the M5's cocoon-like qualities is given if one catches the horn button by accident; its report is barely audible inside the cabin, and so apparently distant that one instinctively checks the mirrors.

Expansion Chamber

As with all BMWs, the ergonomics of the M5 are in a class of their own. Whether a 5-foot jockey or a 300-pound wrestler, the vast range of adjustments permit an excellent driving position. Every switch is perfectly placed and operates with a satisfying click, clunk or thud. Tactility is first-rate undoubtedly, but most important, the driver is kept in touch via ultra-sensitive controls that reach new heights of precision for a 4-door production car.

The throttle is instantaneous. BMW Motorsport's new 3.8 breaths considerably easier than its less-massaged cousins through the benefit of larger inlet valves and ports and BMW's single-butterfly throttle mechanism. Six individual coils provide sparks under the watchful eye of the latest Bosch Motronic engine-management system. Response is no longer better by well-set carburetors; a minuscule nudge on the organ-pedal of a throttle is enough to make the massive car spring forward like Sir Winston Churchill's bulldog straining to get at Kruschev's foreign minister. At 1800 rpm no fewer than 221 lbs.-ft. of torque are on call, with a mind-blowing 300 lbs.-ft. available at 4750. Besides Motorsport, the M in M5 could easily stand for muscle.

Meaty yet perfectly weighted, the clutch pedal is no more tiring to operate than that on a mundane grocery-getter. Pulling away sharply, it's as if you can feel the tires gripping through the pedal itself; likewise the gearshift, which has all the feel and precision common to lesser Bimmers of every stripe. The brakes display a similar level of tactility; though equipped with ABS, they display none of that mushy pedal feel common to most computer-controlled binders. The servo-assisted system with its huge, vented rotors not only stops this big car with alarmingly effectiveness, it does so with rare and thrilling clarity.

Much of the tautness in the controls is achieved through the highly tuned suspension. Geometry and hardware are standard 5-series, enhanced by adaptive electronic dampers. Sway, squat and dive are measured front and rear along with road speed, steering angle and acceleration and braking rates; all these inputs are then assessed centrally, the BMW's electronic brain instantly

processing and tweaking each shock absorber accordingly. Comfort and Sport settings are selected manually, but as usual there's a failsafe to ensure that the driver isn't caught with a sloppy car in a tight situation. That said, while both modes are discernible to the driver, Comfort is never too far from taut and Sport is never the least part uncomfortable.

Alpine Grace

Earlier in the week we had plenty of time to assess the M5's handling and roadholding and the effectiveness of the EDC. Apart from high-speed autobahn work, my itinerary had required me to charge over many high, narrow passes in the French Alps. As mentioned, as only the front seats were taken I believe the supremely agile M3 would have been a more useful tool there, but the M5 acquitted itself well regardless. Devoid of traction control, the big sedan nevertheless amazes with its ability to put down the lion's share of its 347 bhp with minimal wheelspin. Even on bumpy and icy roads the suspension is sufficiently compliant to maintain traction; equally amazing is the way in which the double-pivot front struts permit this heavy car to turn in so quickly and accurately, even in situations where awkward camber variations and dismal road surfaces could be expected to degrade performance.

Even in these seemingly united times, the Austrian border is rarely free from delays, and today was no different. We were stalled for around 45 minutes while the other queue tailed back into Austria for at least ten miles. Unlike in Italy, police action in greater Germany's satellite is relentless and speeding is heavily penalized, so it was almost three o'clock as I veered around the city of Innsbruck. Catching my five o'clock flight was beginning to look tenuous; perhaps dessert at home was all I could hope for. To add to the problem, once into Germany the traffic density precluded speeds anything like those achieved in Italy.

On handing the car back to BMW I could find but three small faults: The leather is so good it looks false, and it's difficult to know how the tanners were able to make such a natural product look so manmade. This is hardly a problem, but the lack of that classy aroma that Connolly-supplied leather brings is a serious omission. Somehow, somewhere in the electronics there also appeared to be a slight gremlin that manifested itself at around 3000 rpm; a slight and very faint hiccup that a good service should certainly cure. And lastly, not even my German colleagues could fathom how to de-fog the windscreen without turning the cabin into a sauna.

In reality, the churlish and insignificant nature of these complaints amount to a serious compliment for BMW's incredibly desirable motorcar. Short of Ferrari's 456GT I don't think that anything comes close in its ability to cover long, loping strides with grace, comfort, security and ease. Add the requirement of a truly comfortable and useful back seat, and the BMW M5 stands alone.

Tailpiece

I did miss my flight—by ten measly minutes—and so raced on up to Frankfurt via Stuttgart. Gaining an hour in the air, the eight o'clock Lufthansa flight would have me back at Heathrow by half past, meaning my driveway in Hampshire could be reached by 9:15. I would make it—*just*.

Waiting for takeoff I slumped happily in my seat, took a stiff bloody mary, reflected on the pleasant rigors of the drive and waited. And waited. And waited. At 8:30, the captain announced the plane had a tire puncture and would be delayed by 90 minutes. Ah, if only everything ran as faultlessly as the BMW M5.

Specifications

1995 BMW M5

➤ General
Vehicle type: front-engine, rear-wheel-drive sedan
Structure: steel unibody
Market as tested: Germany
MSRP: $78,700
Airbag: std., driver and passenger

➤ Engine
Type: Longitudinally-mounted inline-6, iron block and aluminum head
Displacement (cc): 3795
Compression ratio: 10.5:1
Horsepower (bhp): 347 @ 6900 rpm
Torque (lbs. ft.): 295 @ 4750 rpm
Intake system: SEFI (Bosch)
Valvetrain: two overhead cams, four valves per cylinder

➤ Transmission
Type: 5-speed manual
Ratios
1st: 3.51
2nd: 2.08
3rd: 1.35
4th: 1.00
5th: 0.81
Final drive: 3.91

➤ Dimensions
Curb weight (lbs.): 3950
Wheelbase (in.): 108.7
Track, f/r (in.): 58.2/59.0
Length (in.): 185.8
Width (in.): 68.9

➤ Suspension, brakes, steering
Suspension, front: double-jointed MacPherson struts with coil springs and antiroll bar
Suspension, rear: semi-trailing arms with coil springs and antiroll bar
Steering type: recirculating ball, power assisted
Wheels, f&r (in.): 18x8.5 & 18x9.5
Brakes, f/r: 12.4-inch vented disc/12.3-inch solid disc
ABS: std.

➤ Performance
0-60 (sec.): 5.9
Standing-start kilometer (sec.): 25.2

Just A Small Affair

We're pretty sure we know what it's like to compete in a vintage rally, but how about throwing one? Rich and Jean give the inside line.

To:
Jay Lamm, Editor,
SPORTS CAR INTERNATIONAL
Novato, California

From:
Rich Taylor, East Coast Editor,
SPORTS CAR INTERNATIONAL
Sharon, Connecticut

Dear Jay,

I know you wanted to hear how "your" Tour 1000 went, even though SCI's share of the sponsorship accounted for maybe one-onegazillionth of the overall tab. In short it was great—not that I was so sure things would work out that way. Back in May of 1993, when Jean and I organized the first New England Tour 1000, we figured it would be easy. We'd just get a bunch of neat old cars, drive a lot of curvy roads and race up hillclimbs, give some money to charity, eat and drink and laugh with a bunch of interesting people... I mean really, what's so hard?

Well, when it came time to plan the '94 running, we'd learned a thing or two; no matter how simple it might sound at first, running an event like the Tour takes a lot of time, money and sweat. Of course on the other hand, we met some fabulous people, drove outstanding roads and just generally had a blast.

So the question remained, did we really want to go through it all again?

Stupid question; of course we did. Report to follow shortly.

Rich Taylor

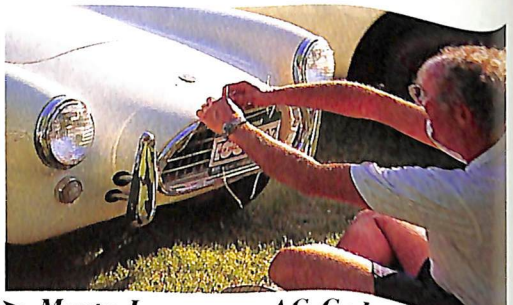
Sunday

As we'd done the year before, our tour-going contingent assembled on a Sunday afternoon in late May at Manchester, Vermont's Wilburton Inn. The 45-car strong Tour parked on the lawn overlooking the Battenkill Valley for an impromptu concours while we affixed special Tour 1000 license plates made by the State of Vermont.

So far, so good—Jean and I had nearly everyone accounted for, the hotels and restaurants all responded to our last-minute checks and everyone was looking pretty chipper. Plus, this year we'd made sure to line up enough sponsors and support crews, including of course SCI.

Among the cars present were Dr. Peter Williamson's newly-restored Type 51 and Type 55 Bugattis, Marc Perlman's 1937 Delahaye 135S Le Mans racer, three Bentleys, three Aston Martins, five Porsches, five Ferraris, two Jaguars (Bud Lyon's D-type came back again), two Mercedes, two ACs, two Cobras, three Mustangs and even offbeat quasiexotica like George Reitenour's 1-owner 1936 Studebaker, built for him the day he was born: George's mother was a Studebaker. (Or, more specifically, a member of the Studebaker *family*.) Then there was Murray Smith's Chevy-powered 1955 HWM F1, Bob Lutz's 1955 Chrysler 300—yes, *that* Bob Lutz—and my own well-traveled 1958 Devin SS just for starters.

As the *hosts du jour*, Jean and I also made Sunday night our first distribution of loot. Everybody received warm jackets, hats, sweaters, Louis Vuitton carry-on bags, goodie bags full of Vermont-made products and another bag of Armorall liquids and towels for cleaning en route. We also handed out route books before our official timing and scoring crew—Walt Kammer and Iain Tugwell—gave their Famous Navigator's School to those teams looking for the unfair advantage. Be the end of Sunday night we



➤ ***Marty Langsam, AC Cobra Mk. I***

➤ ***Scott Taylor & Marguerite McIntyre, 1956 Morgan +4 Super Sport***

➤ *Karl & Madeleine Larson, 1958 Porsche Speedster GT (Mt. Ascutney Hillclimb)*

➤ *Murray Smith, 1955 HWM-Chevy (Hale's Hillclimb)*

➤ *Ron & Mauricette Mulacek, 1958 AC-Bristol*

were already a day into the trip without *one* major crisis. Jean and I looked at each other with hopeful expressions....

Monday

Unlike other old-car events, all 978 miles of the Tour 1000 are timed, either as a TSD rally stage (in which you try to zero a checkpoint on time) or as a special stage in which you race as fast as you can go.

Up before dawn, we checked on last-minute details, located the few teams still working on their cars and made sure everything was go for breakfast. Then, (reasonably) bright and early, we started at 1-minute intervals flagged off by Jo Bradley of the Vermont Department of Tourism. (Always good to make friends with the locals, you know....) Our publishing chums at Hemmings Motor News really came through again, showing up this morning with one of their vintage trucks, so every participant received yet another set of clothing and goodies. *Gee,* Jean and I thought. *We were outdoing ourselves....*

The morning run took us from Manchester north to Calvin Coolidge's house at Plymouth, then south along the spine of the Green Mountains to Grafton and lunch at the Grafton Old Tavern, a colonial inn popular with world-class gourmets like Mark Twain and Rudyard Kipling. Another meal come and gone without a fatality, I fired up the Devin again and set off after the pack.

In 1993 we'd had almost no mechanical breakdowns, which of course makes the organizers' jobs a heck of a lot easier. Not so this year: If you discount the two cars that started on Tuesday instead of Monday due to engine trouble on the way, the first breakdown of the Tour was a Shelby Mustang that came up lame just 11 miles from the starting line. We continued on while the Tour's official mechanic—the indefatigable Jack Daly of Paul Russell and Company—worked flat-out from Mile 11 until the day after the event. Fortunately, in addition to Jack, we had four other professional vintage mechanics on hand, namely Tim Johnson, Robert Broadbent, Scott Lefferts and Gary Preslar—all of whom stayed busy.

Monday afternoon we rallied to Ascutney State Park, where the State had closed the road up the mountain for our first hillclimb. The Mt. Ascutney hillclimb is only a few miles, really, but it's all second- and third-gear stuff with hundreds of left- and righthanders, a 1-lane bridge and two hidden switchbacks that scared the pants off me and Jean every time we thought about someone going in a bit too hot. This year, for insurance reasons, everyone had to wear a helmet during the hillclimbs, but even then...*geez.* No troubles, thankfully.

Chrysler Corporation served as the manufacturer of choice, and that made our jobs a lot easier. They not only contributed handsomely to our charity but brought eight cars for support: two Eagle Talons, a Jeep Grand Cherokee and a Chrysler LHS for the checkpoint crews, a V10 Ram Pickup and a Neon for the photographers and two Vipers for the racers to use if their vintage cars broke down.

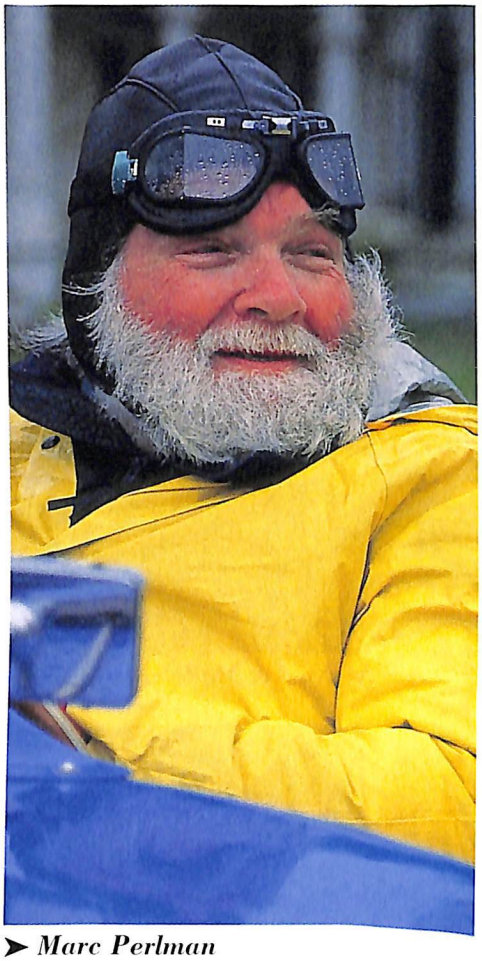
From Ascutney it's just a short rally stage to our overnighter at the Woodstock Inn owned by the Rockefeller family, and dinner was at Chris Balcer's Prince and the Pauper, generally considered the best restaurant in Vermont. Two up, two down—all the rooms and meals came off fine. We were getting luckier than I could have hoped.

Not that everybody was having it so easy: At about one in the morning I was getting business wrapped up for the night when I thought I should wander into the parking lot to check how Jack Daly was coming in sorting out the continuing electrical gremlins in Bob Lutz's Chrysler 300. Jack was out there beavering away, but there was the president of Chrysler, too—his sleeves rolled up and working on the car with Jack. When I left an hour later they were still huddled over the fender, deep in discussion.

Tuesday

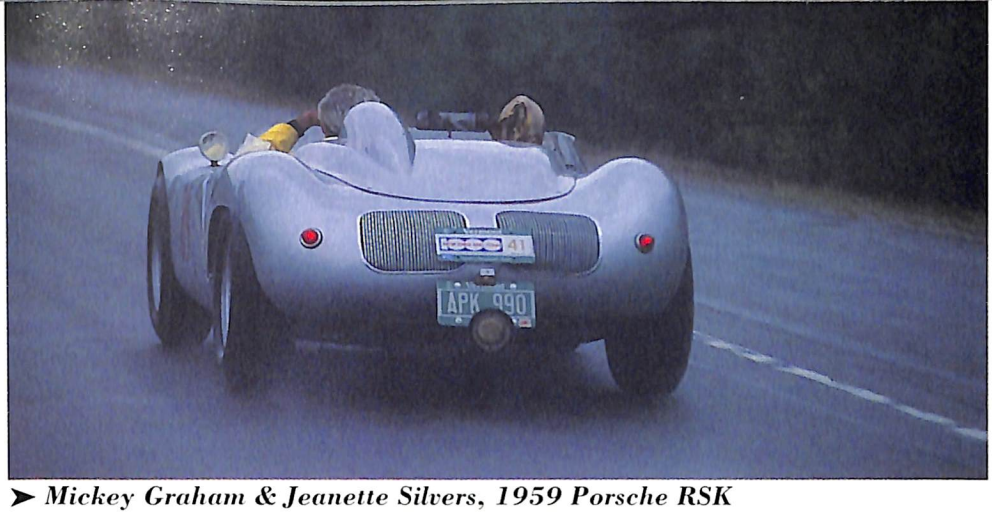
When we'd rousted a few late stragglers and finally got started with the driving, the route began with a challenging set of roads from Woodstock over the Connecticut River into New Hamphire and then across the White Mountains on the soaring Kancamagus Highway, through the aptly-named Bear Notch and then over to Mt. Washington—the highest, meanest peak in New England.

The Mt. Washington Hillclimb is very different from Ascutney, and this was another bit I was definitely looking forward to but also a little nervous about. Washington is much more open and considerably faster than Ascutney, and it has sheer cliffs dropping hundreds of feet from the edge of the road. Combined with the hundreds of spec-

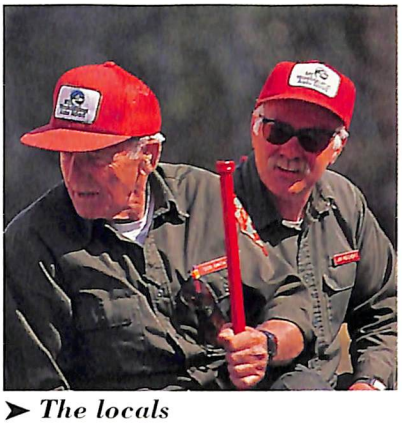


➤ ***Marc Perlman***

➤ ***Henry & Rocky Grady, 1962 AC-Bristol***



➤ *Mickey Graham & Jeanette Silvers, 1959 Porsche RSK*



➤ *The locals*

➤ *Dr. Peter Williamson & Laurie Oosthoek, Bugatti Type 55*

➤ *Marc & Renee Perlman, 1937 Delahaye 135S*

tators lining the course—we'd put the word out in the local papers just for fun—the Tour participants knew they'd all have to be on their best behavior. At least I *hoped* they knew it. Fortunately, once again the participant selection process paid off—no errors, no crises, no dented metal and it was great fun to boot. After Mount Washington, everybody breathed a sigh of relief and geared up for the calmer rally run into Maine on Route 113. This is a rolling, twisting, curving piece of perfectly-maintained asphalt through a National Forest, high enough that the pass is closed in winter. Route 113 brought us back through North Conway to the White Mountain Hotel, a new resort built on the side of the mountain in the style of a Victorian grand hotel with fabulous views, a friendly staff, comfortable rooms and a pretty restaurant.

Best of all, the White Mountain Hotel has a brand-new access road on the side of the mountain that we closed off to create Hale's Hillclimb. We attacked the hill from three in the afternoon until dusk, with enough time for everybody to drive any of the Chryslers, each other's cars or their own cars on repeated runs. I guess some people were shocked, but the hot setup actually turned out to be the all-wheel-drive Talon. Vintage iron may be thrilling to drive and contemplate, but you can't often beat modern technology to the finish line.

Wednesday

It rained. And rained. And rained. "Oh, boy," we thought, looking out the window in the dark one more time. I'm used to running the topless, heaterless Devin at high speeds in the rain, but some of our charges might not have been so sporting, I imagined. Turned out to be a silly worry—if they're crazy enough to sign up for the Tour, they're crazy enough to love this stuff as much as we do. No complaints from anyone.

There were no hillclimbs scheduled, but it was going to be a long 300-mile day regardless—all the way from North Conway near the Maine border to Basin Harbor on Lake Champlain, by way of Lake Willoughby up near Canada. We hit the telephones making all the requisite last-minute confirmations, checked up on the scoring teams and mechanics and did our best to whip up enthusiasm for some rain-soaked roadstering.

That didn't turn out to be too hard, as Wednesday included some of our favorite roads, like New Hampshire 302 past Bretton Woods, Vermont 232 through Groton State Park, 108 over Smugglers Notch and Route 17 from Waitsfield to Bristol. Still, it was a long day by any standards: We pulled into the overnight parking lot at Basin Harbor and a dozen of our people were washing their cars in the rain, laughing, talking and throwing soapy sponges at each other. Marc Perlman drove up in his topless, windshieldless 135S Delahaye—soaking wet from head to toe—and said, "Wanna go for a ride and try her out?" Jean looked at me and smiled: "If they're all so happy, I suppose I'd better be happy too!"

Thursday

This was supposed to be a relaxing, scenic day running south along Lake Champlain from Basin Harbor. In spots, the road is literally *along* the lake; your tires get wet if the wind is from the west. We'd planned it as sort of a gradual calmdown from the demanding roads of the White Mountains. The rain continued all the way to our morning checkpoint in Fair Haven, but it cleared and warmed by the time we reached Bennington in southern Vermont. The ever-vivacious Hemmings crew bought us lunch, gave us tours of their offices and bookstore, conducted our end-of-trip "concours dis-elegance" and voted for the Hemmings' Employees Choice Award to be given at the awards banquet later that night.

A short loop through New York State brought us back through fashionable Arlington, Vermont to Mt. Equinox for the final event of the Tour—the Mt. Equinox Hillclimb. Mt. Equinox is over five miles of seemingly vertical roads ranging from 1st-gear hairpins to "The Flats," where you can grab fourth for a moment or two—assuming, that is, you can successfully ignore the sheer drop on either side. I took station down below at the start and Jean went to the top to see to the finish line.

All 45 cars were able to race up Mt. Equinox in the dry before a new weather system brought a violent thunderstorm that stranded half our group on top of the mountain for more than an hour. Luckily, we had already laid on drinks and hors d'oeuvres at the mountaintop hotel.

Naturally, I wound up anxiously awaiting their return at the bottom of Mt. Equinox while Jean and the gang at the top were enjoying what they later claimed was the best party of the trip! That bit of unplanned excitement was followed by the victory banquet, held at Hildene—the Georgian Revival estate of Robert Todd Lincoln, Honest Abe's son.

Awards

Everybody wins some prize on the Tour. The major trophies went to Marc and Renee Perlman, who received the Vintage Motorsport Vintage Spirit Award for their undampened enthusiasm in the topless Delahaye 135S; Bob and Denise Lutz, who received the Vermont Governor's Cup for their persistence and good humor despite recurring electrical problems; and Jim and Catherine Skyrm, who earned the Louis Vuitton Cup for their stylish drive in a 1963 ASA Mille.

Studebaker heir George Reitenour's navigator Alfred Hadley won the Rally Magazine Best Navigator Trophy, and Mike and Ruth Viny's 1954 Mercedes 220A Cabriolet received the Hemmings Employees' Choice Award. In terms of outright skill, well-known vintage racer Murray Smith and navigator John Lamm (of Road & Track fame) won the event overall in Murray's one-off 1955 HWM-Chevrolet. Second overall were Frank Filangeri and Sean O'Malley in a 1962 Jaguar XKE; third went to Canadians Tom and Heather Appleton in their 1967 Ferrari 330 GTC.

Winding things down with a quick stroll through the hotel in the wee hours the next morning, Jean and I began to realize the 1994 Tour 1000 had just come off pretty much as planned. Our racers came from as far away as San Francisco, Miami and Toronto to get sunburned, rained on and very tired, but also very happy. We donated $15,000 to the Gary Gaboury Fund of the Vermont State Police plus thousands more to the Friends of Hildene Society. And since you asked me to write down how it all went, I'll take the opportunity to grandstand some generous sponsors along the way: Our major aides were Chrysler Corporation, Louis Vuitton, Hemmings Motor News, Armorall and the State of Vermont; other sponsors included Sports Car International of course, Vermont Life, Automobile Quarterly, Vintage Motorsport, Rally, Robert Bentley Publications, the Sharon Mountain Press and Minisport Restorations.

So.... Are we going to do it again? You bet. Why? Because it's fun!

Your Pals,
Rich & Jean

➤ *Opening concours (Wilburton Inn)*

➤ *Peter Williamson*

➤ *Hmm, now <u>where</u> were those heated-seat controls?*

➤ *The next New England Tour 1000 runs May 21-26, 1995; $2995 registration includes everything but fuel. Entries are restricted to 50 sports, racing or GT cars built before January 1, 1968. Contact: Tour 1000, Jackson Hill Road, Sharon CT 06069, 800-645-6069*

➤ *Jerry & Ginny Morice, 1956 Austin-Healey 100M*


S PR 37

FOUR SCORE

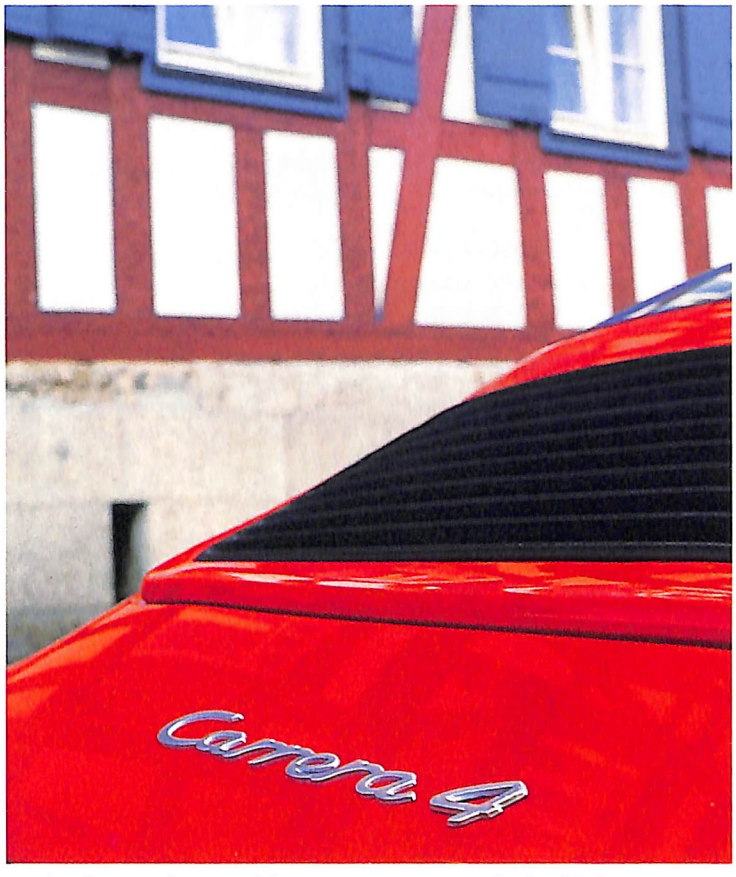
Our Man Kuah hits the Alps for the unveiling of the new Carrera 4. Photos by the author.

It would take a brave (or suicidal) driver to make the new Carrera 4 slide on dry tarmac, so Porsche availed itself of the services of one Walter Röhrl—erstwhile rally champion and now a Porsche test driver—to demonstrate the handling and grip of their finest sports car on loose surfaces.

The test circuit was a tightly coned course on a 4-acre concrete plinth in an old quarry. Liberally coated with stone dust and punctuated with puddles of water, it was the sort of place you'd expect to find a brush-bashing sport-ute rather than a high-tech supercar.

Still, it took only a moment to see why Porsche had arranged this show. Where a 2-wheel-drive Carrera would have spun its wheels, wiggled its tail and struggled off the line, the Carrera 4 simply threw four dusty roostertails, gathered up its skirts and rocketed away. Where a Carrera 2 would have understeered badly when the driver applied steering at speed on this surface, the Carrera 4 turned in smartly on cue.

I was looking at where we were going rather than the speedo, but my chauffeur had used up all of first and second gears in the sprint for the cones at the first turning point, so we must have been doing about 70 mph when he jinked the wheel left and then right to negotiate the first chicane. The car slid for an instant in response to each input as centrifugal force and sheer momentum broke its traction, but swift correction at the helm showed just how stable and composed the Carrera 4 is at the limit—and beyond. Front-to-rear weight transfer is well controlled and traction on loose surfaces is more than sufficient for the driver to adjust direction at will.



➤ ***As far as the neighbors are concerned, decklid script is about all you get for your $5000. Whaddo they know?***

There are no nasty surprises here—surprises of the sort one sometimes found on the old Carrera 4. On the limit, that car could go from mild understeer to lurid oversteer if you hesitated or your inputs were less than precise. Röhrl had made his point: It was obvious that the new Carrera 4 is so well behaved it will make even the most average wheel jockey look pretty good indeed, while the true genius seems nothing short of invincible.

The cross-country route between Nuremberg and Stuttgart was even more enlightening. On smooth, fast surfaces there seemed to be no limit to the roadholding. Of course, if you take the racing line through bends you're not imposing much lateral load on the tires even at 3-figure speeds, but on the tighter bends it's apparent the Carrera 4 is everything the outstanding Carrera 2 is and more. Turning in there's a smidgen of understeer, plenty of feel through the steering and a lot of data at the seat of your pants. You can plant your right foot down much earlier than in the C2, knowing that even if you hit a damp patch midway through the bend all you need is a quick correction at the helm to correct the slide; this car largely compensates by itself.

Intoxicated as I always am at the finesse of the new Carrera chassis, I was getting slightly frustrated at not being able to play with the tail of the car in tight bends at sane speeds. Then, four miles from my return to the beautiful Vellberg Castle where the launch was based, I took a wrong turn

PHOTO ©PORSCHE

➤ ***Carrera 4 coupe with Carrera 2 coupe and roadster; all reflect the complete 993-series ground-up redesign introduced with the 2-wheel-drive platform last year.***

and found myself on a road that twists and turns capriciously up the hill. With hairpins aplenty and a liberal sprinkling of gravel, this seemed the perfect test for the AWD system.

With a clear line of sight through an uphill hairpin, I braked firmly, took second in a heel-and-toe downchange and turned in, stomping on the gas just before the apex. I felt the four rubber contact patches squirm for an instant as they hit the gravel and the rear wheels moved gently outward in response. Just a slight correction at the wheel was all that was needed, and the smooth transfer of torque to the front end pulled the car through the bend as the rear pushed with diminishing force. It was all over in a couple of seconds, and then the car was heading straight and rocketing up the hill to the next bend. Here was proof of the Carrera 4's exquisite handling in my very own hands.

I charged up and down the hill a couple more times, reveling in the marvelous brakes Porsche has given the 993 cars, the synergy of the chassis and engine and its overall appeal as a drivers' car. That the complete C4 package costs a mere $5000 more than the 2WD version seems nearly unbelievable.

➤ ***Overeager driver inputs to the C4's honking cross-drilled brakes get ameliorated by 3-channel Bosch ABS 5.***

Indeed, Porsche has pulled something of a hat-trick with the new Carrera 4. Though its AWD predecessor was just a mere tick slower in acceleration and top end than its 2WD sister, it did carry a significant weight penalty (about 220 pounds). Now, thanks to new technology in both design and material, the new AWD system tips the scales at just half that, making its presence feel almost negligible on a road car already loaded with a/c and power everything.

The Carrera 4 boasts the same 161 mph top speed as the Carrera 2; through the gears, however, better traction off the line trims 0.1 second off the 0-100km (62 mph) time, dropping the figure from 5.6 to 5.5 seconds. Fuel consumption is just 0.1 liter/100km worse in this application—an insignificant amount.

It seems the best solutions are often the

All Wheel, All the Time

➤ One is often tempted to hold AWD up as a modern solution to a time-honored problem. In fact, it's not a new idea at all. Read on:

1903: Though predated by AWD steam- and electric-powered wagons, most experts point to the 1903 Spyker racing car—which later won the Birmingham Hillclimb—as the first practical AWD automobile. It might also have been the first car successfully powered by an inline-6.

1904: Paul Daimler, son of Gottlieb, incorporates the FWD Wagon Co. in Wisconsin. He designs and builds a 4-wheel-drive military car but is unsuccessful in selling the concept abroad.

1908: Wisconsin blacksmith and tinkerer Otto Zachow develops a CV-jointed AWD conversion for his REO automobile. Two years later, he enters business with some neighbors and forms the Four Wheel Drive Auto Company (also called the FWD Co.); the firm will go on to become one of the country's most successful builders of 4WD trucks for military and civilian use.

1932: In France, Ettore Bugatti debuts his Type 53 Grand Prix car, essentially traditional but for full-time AWD. Only moderately successful, he abandons the idea quickly. At the same time, American constructor Harry Miller is commissioned by the FWD Co. to build two AWD Indy cars; one FWD-Miller is V8 powered, the other carries a Four. The latter car places fourth at Indy in 1936, the second-highest AWD finish at the Brickyard. (Bobby Unser brought an Offy-powered AWD home third in 1969.)

PHOTO IMS

1936: FWD Miller, 4th at Indy

1938: Miller's new mid-engine AWD Gulf Oil Specials appear at Indy, but their best finish is tenth place in 1939.

1939: Englishmen A.R. "Tony" Rolt and Freddie Dixon work toward creating an AWD roadracer built around the engine of Rolt's ERA racecar. The War intervenes, but they continue work again after the armistice.

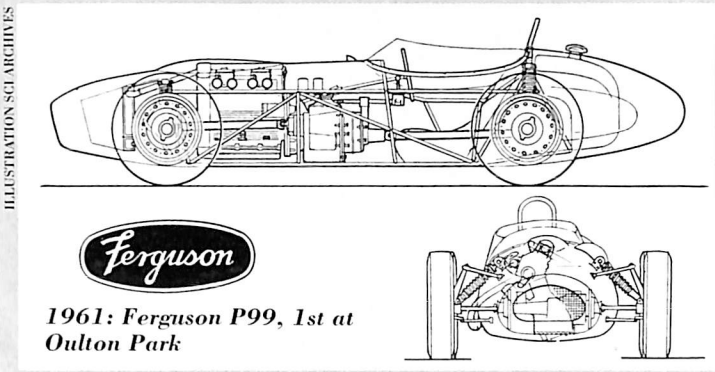
1940: Having won the U.S. Army's design competition, Bantam receives a contract to construct a light 4WD military transport soon called the Jeep. Willys-Overland and Ford will later assume production due to their vastly greater manufacturing capacities.

1946: Dixon and Rolt reunite and eventually create R1, affectionately nicknamed "the Crab." An impractical single-seat test rig, it nevertheless is enough to bring 4WD tractor magnate (and aspiring safety pioneer) Harry Ferguson into the partnership.

1947: Cisitalia head Piero Dusio contracts Dr. Ferdinand Porsche to design an AWD Grand Prix car with a supercharged 12-cylinder engine. The resulting Type 360 races only once, six years later in Argentina, and only with RWD engaged.

1950: Harry Ferguson Research is incorporated to research, design and construct AWD street cars. A number of prototypes and special-order customer vehicles will be built in the years to come, but the firm's primary mission becomes the development of advanced, practical drive-system hardware.

ILLUSTRATION SCI ARCHIVES



1961: Ferguson P99, 1st at Oulton Park

1956: Rover's T3 turbine-powered concept car opts for AWD.

1961: Having designed a front-engine AWD GP car with Coventry Climax power, Harry Ferguson Research contracts Stirling Moss to lead their team of P99 GP cars. After several disappointments, in sheeting rain Moss walks away from the field for a win at the last race of the season, a non-points GP at Oulton Park. The P99 chassis goes on to enjoy a distinguished career in hillclimbing.

1964: BRM enters the Type 67 at the German Grand Prix and Studebaker enters a Novi-powered STP Special at Indy, both with AWD and both without success.

1966: Jensen introduces its Interceptor FF, a special version of the Chrysler-powered Interceptor with Ferguson Formula AWD. Only 316 of the hyperexpensive GTs are sold before production ends in 1971.

1967: Andy Granatelli's gas-turbine AWD Indy car almost wins the Indy 500. All-wheel-drive reappears at the Brickyard frequently until being banned in 1970.

1969: Colin Chapman's Lotus 64 appears, quickly followed by other AWD F1 cars from Matra, Lola, McLaren and Cosworth. None are successful.

1975: Subaru introduces AWD on its U.S.-market cars. Snow-belt sales are excellent.

1979: AMC's Eagle sedan arrives with sophisticated Ferguson-based viscous AWD.

1980: Having quietly developed a competition version for FISA rallying, Audi introduces the Coupe Quattro road car at Geneva. It introduces AWD to the worlds of international rallying and sports cars.

1981: Porsche teases the press with an AWD 911 concept car at Frankfurt; two years later at the same show, the "Gruppe B," aka 959, is revealed.

1982: Lancia, Opel, Bitter, Toyota and Alfa Romeo all introduce AWD automobiles, mostly homologation specials for rallying. Before decades' end, both exciting and prosaic production AWDs would appear from Pontiac, Ford,

PHOTO AUDI

1987: Sport Quattro, 1st in PRO Rally—again.

Mitsubishi, Mazda, Peugeot, BMW and others. Most will be canceled by 1992.

1988: Audi 200 Quattro sedans win SCCA Trans Am championship.

1989: Porsche introduces the AWD 911 Carrera 4.

simplest ones. The magnificent Porsche 959's suspension and AWD system were state-of-the-art in 1984, which is to say gloriously sophisticated but also heavy, costly and complex. The original Carrera 4 of 1989 was a paragon of simplicity in comparison, and its replacement is simpler still. At the same time it is more technologically sophisticated, utilizing what Lotus founder Colin Chapman would have called *elegant engineering.*

The previous model relied on a fixed 31%/69% torque split front to rear kept constant with two electronically controlled wet multiplate clutches. The new Carrera 4 is able to apportion its power infinitely and progressively, the earlier car's heavy and complex planetary differential giving way to a light and compact viscous diff mounted ahead of the gearbox. This link between the axles provides full-time AWD, with a minimum of 5% of the torque going to the front axle.

The front/rear torque split varies to optimize acceleration and stability. Under normal acceleration on a dry road about 25% of the power is sent forward; this increases to 40% under deceleration. On snow and ice, the front gets a maximum 41% of the torque under acceleration. The 6-speed manual gearbox is the same as the 2WD Carrera's except for slightly different ratios on some gears and the provision in the casing for a driveshaft take-off.

PHOTO PORSCHE

➤ ***Alas, Porsche's other big '95 intro—a semiauto Tiptronic S with wheel-mounted clackers—can't be had on the C4.***

While the viscous diff takes center stage in the proceedings, it has a supporting cast in the form of two additional differentials. The first of these is what Porsche colorfully calls a "dynamic driving differential." This acts like a conventional limited-slip diff with a nominal 25% locking effect at the rear wheels under power. Under deceleration, the locking effect rises to 40%, which produces a higher yaw moment. This creates a tendency to understeer when the throttle is feathered, a useful stabilizing trait in a car with a tail-heavy bias. Thus, the old 911's drop-throttle oversteer is noticeably absent and directional stability through corners is exemplary.

If the dynamic driving differential controls stability and traction on the way into a corner, then the ABD (Automatic Brake Differential) helps on the way out, with the proviso that it operates only up to 44 mph to preserve the brake pads. ABD is standard on the Carrera 4 and an option on the Carrera 2—essentially, it's just an example of the automatic-braking form of traction control, applying the binders to the offending wheel or wheels when spin is detected.

Tests in Sweden in snow and ice were very enlightening. Using the Carrera 4 as a traction baseline, attempts to accelerate to 60 kph from rest on level ground took 30% longer in the Carrera 2; up an 18% gradient, the Carrera 2 took 40% longer. Another test involved the same 0-60 kph run on a surface with different coefficients of friction from side to side. Assuming the same baseline of a Carrera 4 with ABD and dynamic LSD engaged, a stock Carrera 2 slipped and slid to 60 taking 290% more time!

So how will you know when you're confronted by a Carrera 4 on the road? Apart from the fact that on a wet roundabout it'll be the only car still going along at warp speed, the visual telltales are limited to white front turn-signal lenses, a red rear light strip and titanium-colored decklid script, brake calipers and gearshift insert. (If the car is stationary you can also read the Carrera 4 script on the alloy wheel centers.)

With the launch of the C4, we can once again state that Porsche's venerable 911 just gets better and better. When it was brought out last year, the 911/993 was applauded for finally taming the tail-happy handling of this classic once and for all. Now the Carrera 4 picks up the accolade of best-handling true-production supercar to boot. The more expensive Ferrari F355 is faster still, but not as secure at the limit (and more than a handful in the wet), and the forthcoming AWD 911 Turbo, with its rumored sequential turbos, should outperform the Ferrari all around, of course. Perhaps Porsche's problem then will be that when it builds the perfect supercar, where can the firm go from there?

Frankly, one thinks that would be a nice problem to have.

Riding with (the Other) Uncle Walter

➤ Few people have as much performance experience with AWD as recently signed Porsche hotshoe Walter Röhrl, whose '82 FISA World Rally Championship Driver's title with an obsolete Opel Ascona 400 so impressed the juggernaut Audi team that they brought him on board for '83. By the end of the decade, Röhrl even had a Pikes Peak win and a seat with Audi's Championship AWD IMSA GTO team to his credit, gaining as much notoriety on tarmac as he'd previously enjoyed on snow and ice.

➤ So really, then, you'd think I'd have had more faith. Unhappily, I'm not stouthearted by nature, and have driven enough rallies to know how difficult controlled, 40-degree 4-wheel drifts in gravel really are. Ignorance, in this case, would definitely have been bliss. Still I strapped in for two hot laps of a muddy, slimy gravel pit with Röhrl and the new Carrera 4, unconvinced that I wished to do this thing but merely determined not to be upstaged. Röhrl, ever the Continental gentleman, sensed my unease and floored the damn thing anyway.

➤ His turns, both footbrake and E-brake—and brother, it felt like lots of both—were flawless, exact and fluid. Or at least they would have appeared that way to persons willing to keep their eyes open. All the while, Uncle Walter was nattering merrily away about how willing the C4 is to turn in (unlike the old Sport Quattros), how we rally types can appreciate these things and how even and predictable the front and rear breakaway points were. We were traveling due south while pointed due east at the time. He was not looking at the road. He was looking at me. I knew this because I refused to focus beyond the windshield. Taking journalists on racer rides is a time-honored tradition that I wished, briefly but intensely, would go away.

➤ Driving myself later, everything Röhrl said about the controllability of this car and its hyper-friendly, mock-RWD behavior was confirmed to my satisfaction. Of course I did notice my passenger was intently examining the floormats at the time.

—Katrina Mueller-Jackson

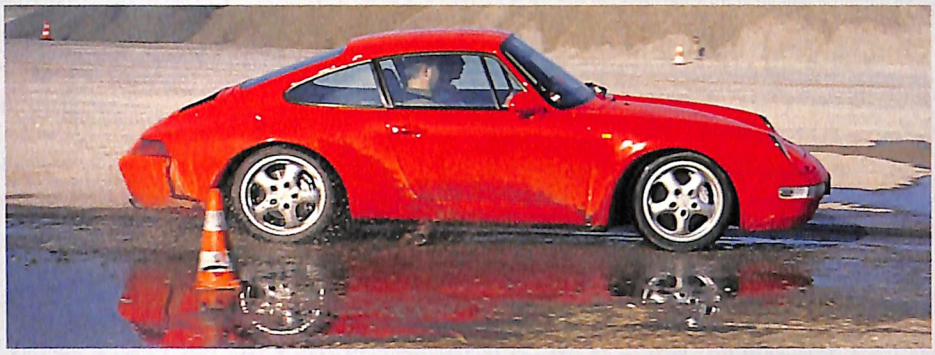
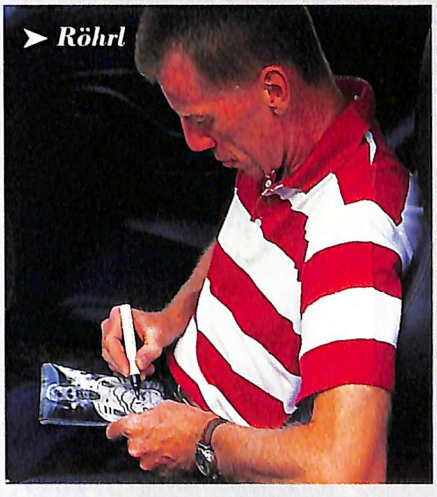


PHOTO COLMAN



➤ Röhrl

PHOTO COLMAN

SPECIFICATIONS

1995 PORSCHE CARRERA 4

➤ General
Vehicle type: rear-engine, all-wheel-drive coupe
Structure: steel unibody
Market as tested: United States
MSRP: $65,900
Airbag: std., driver and passenger

➤ Engine
Type: longitudinally-mounted flat-6, aluminum block and heads
Displacement (cc): 3600
Compression ratio: 11.3:1
Horsepower (bhp): 270 @ 6100 rpm
Torque (lbs. ft.): 243 @ 5000 rpm
Intake system: EFI
Valvetrain: one overhead cam per bank, two valves per cylinder

➤ Transmission
Type: 6-speed manual
Ratios
1st: 3.82
2nd: 2.05
3rd: 1.41
4th: 1.12
5th: 0.92
6th: 0.78
Final drive: 3.44

➤ Dimensions
Curb weight (lbs.): 3175
Wheelbase (in.): 89.4
Track, f/r (in.): 55.3/58.0
Length (in.): 167.7
Width (in.): 68.3

➤ Suspension, brakes, steering
Suspension, front: MacPherson struts with lower control arms, coil springs and antiroll bar
Suspension, rear: subframe-mounted multilink with long/short arms, coil springs and antiroll bar
Steering type: rack and pinion, power assisted
Wheels, f&r (in.): 17x7 & 17x9
Tires, f&r: 205/50ZR17 & 255/40ZR17
Brakes, f/r: 12.0-inch vented disc/11.8-inch vented disc
ABS: std.

➤ Performance
0-60 (sec.): 5.4
Top speed (mph): 161
EPA fuel economy (city/hwy mpg): 16/23

ZEALOTRY!

About halfway through my 10-lap stint as passenger in Steve Millen's 300ZX IMSA GTS car, my eyes caught Millen's for just an instant. He wasn't smiling and neither was I. His look said, "Can you believe this?" My look replied, "No."

It had taken more than half a year for the Nissan Motorsports team to find enough time in their frenetic schedule to arrange for this day of testing at Willow Springs, and when I first pitched the team on the project they were fresh off their overall win in the 24 Hours of Daytona last January. But by the time I finally climbed into the cockpit to see what Millen and his Z were really all about, the team had also won the 12 Hours of Sebring and the sprint race at Road Atlanta. Even more significantly, Millen and co-driver Johnny O'Connell had placed their 300ZX Twin Turbo fifth overall at the 24 Hours of Le Mans.

Undaunted, Millen and Nissan returned to seal both the Driver's and Manufacturer's Championship in IMSA's Exxon Supreme GT Series for 1994. Not a bad comeback for a tough Kiwi who had to be pieced together with titanium plates and screws after a monumental shunt with his own teammate at Watkins Glen last year.

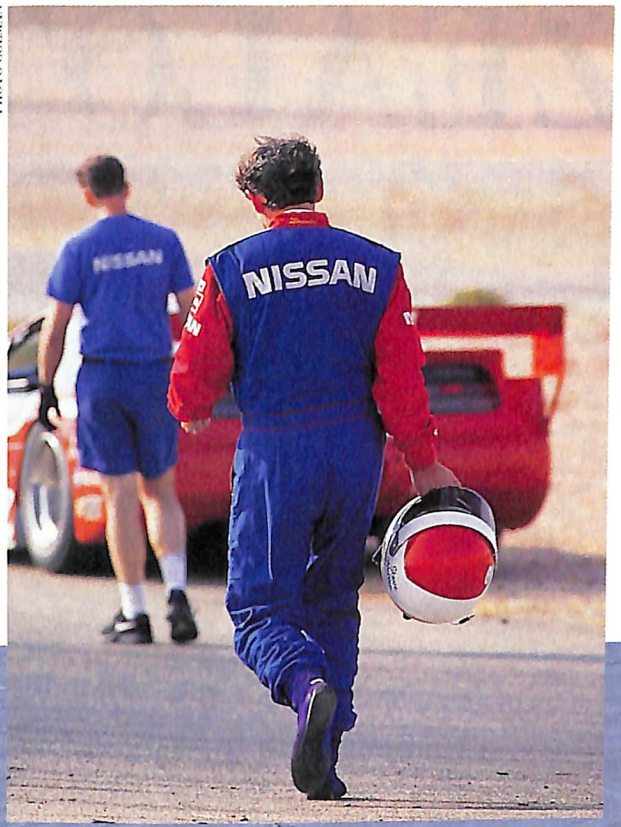
And what did *you* accomplish in the last six months?

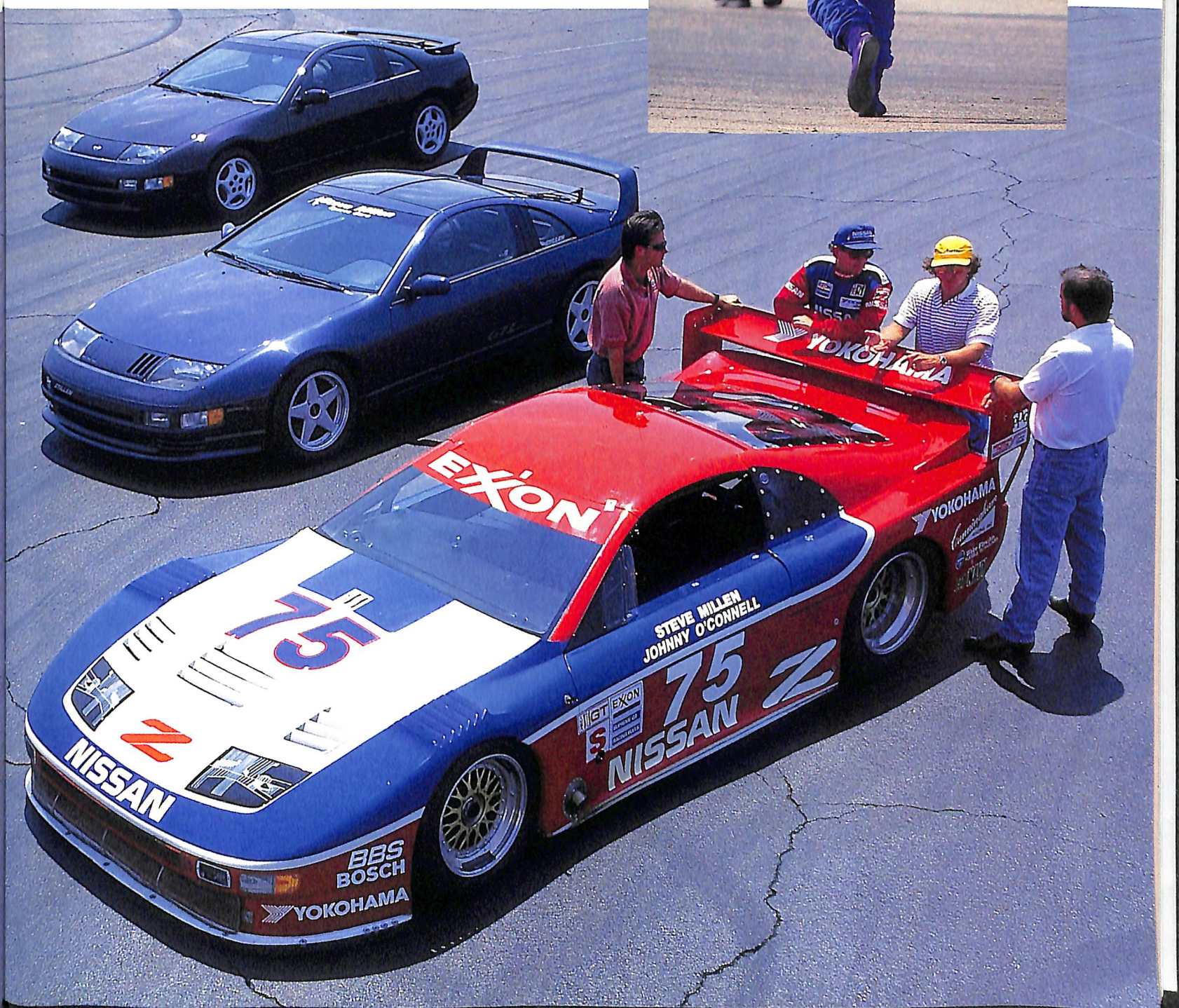
Just Desserts

IMSA rewarded Nissan's outstanding success at Daytona and Sebring by dropping the allowable boost for the twin-turbo Z from 95 inches of mercury to an absolutely piddling 57 inches. At least to hear the Nissan supporters tell it, the impetus for the

Dave Colman and Steve Millen team up to wrestle three very different ZXs around Willow; Scott Dahlquist risks life, limb and lens.

PHOTO COLMAN





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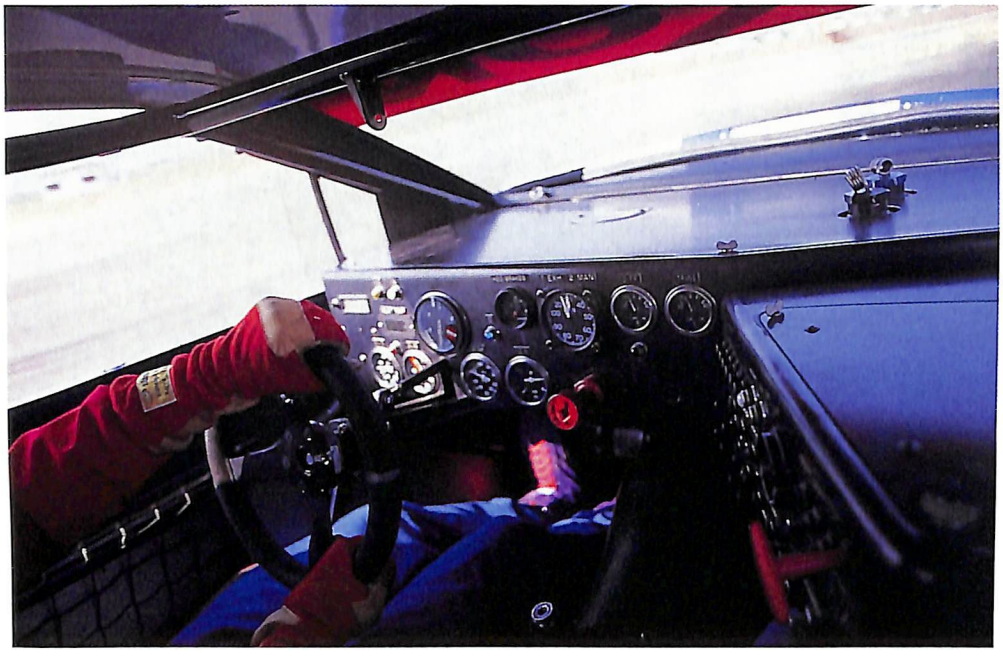
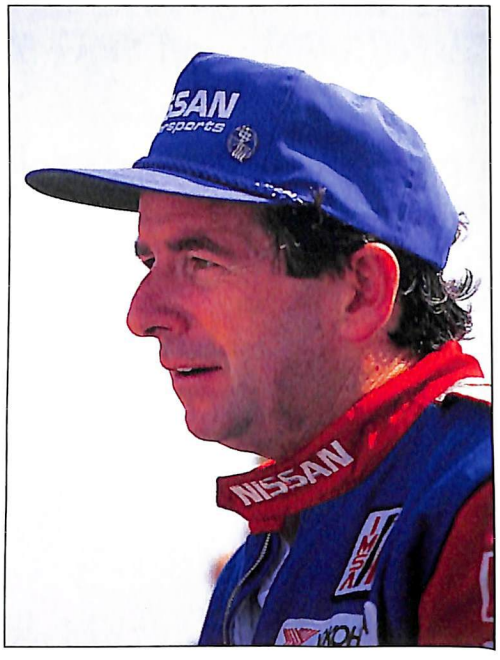




change came from GTS-class archrival Oldsmobile, who in Millen's words, "conned" IMSA into hamstringing the Nissan team with such a reduced boost level that the Oldsmobiles "completely blew us off on the straights at Watkins Glen."

Since then, IMSA has upped the allowable standard to 61 inches, or 15.3 psi of manifold pressure. Nissan is scrambling to compensate for the lost boost with higher compression and altered camshafts, but now it appears IMSA will ban turbos altogether next year in GTS. In fact, Nissan competition boss Frank Honsowetz passed along that cheering bit of news to Steve Millen as I sat between the two of them in the motorhome at Willow Springs.

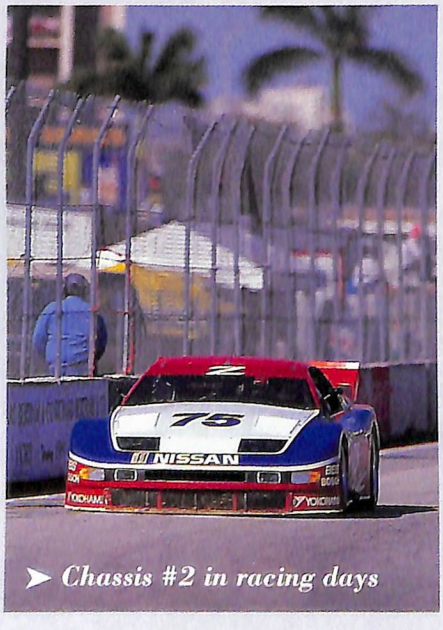
The car the team brought to Willow Springs is an early example of the breed, number two of seven racing chassis built since the inception of the program. Last raced in '92, it still runs the full-boost specs of over 95 inches of mercury; in those halcyon days before IMSA's restrictions shifted into top gear, the 300ZX Twin Turbo made so much horsepower that absolutely nothing could keep Millen from winning both the driver's and manufacturer's championships that year.

Of course, from my standpoint the fact that today's Willow Springs test mule is considerably more potent than even the current racecar is A Good Thing. The more horsepower the better, and 725 seems like a pretty good number to pin on the V6 in this ride-and-drive car. This compares admirably to a figure of 630 horsepower for the current racecar, obviously no slouch in itself.

Display of Arms

Prior to test day, I'd been nosing around the Air Force Flight Test Center Museum at Edwards Air Force Base, located a couple of mirages away from Willow Springs. One of the displays there paid tribute to the inimitable Colonel Stapp, who in 1955 strapped himself onto a rocket-powered test sled to measure the human body's reaction to extreme G-force loadings.

After ten laps with Millen, I began to understand what Stapp had experienced. By the time I was drawn and quartered in the postal slot that passes for the Nissan's cockpit I had my best race face in place. But the instant Millen graunched the Z into gear, he nodded devilishly as if to say, "Ready?," and then without waiting for a reply

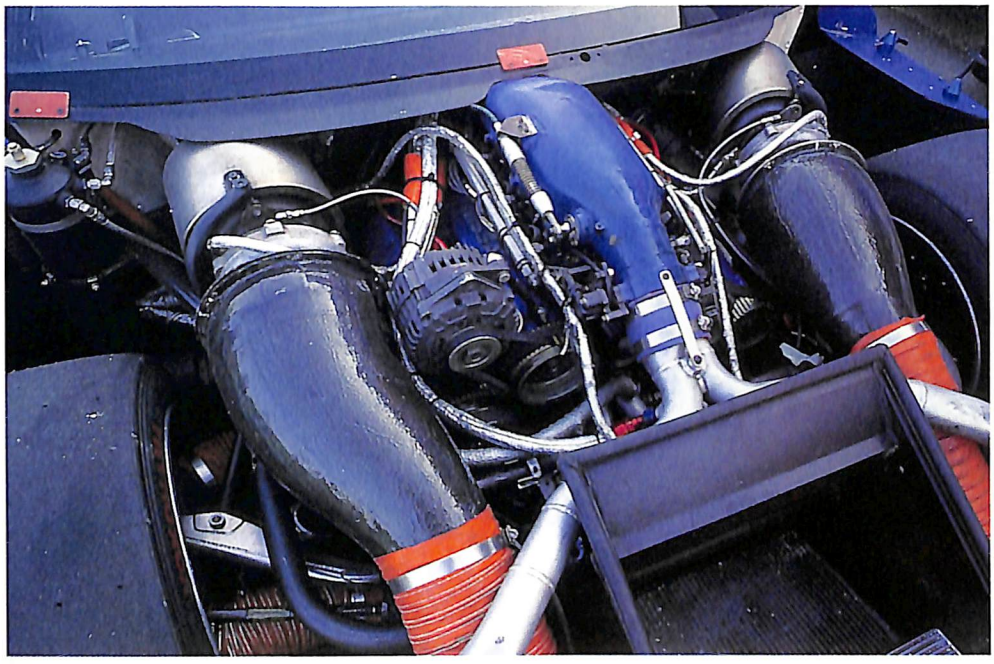


➤ *Chassis #2 in racing days*

Chassis History, Cunningham IMSA 300ZX Racers

➤ *#1: Currently raced in Latin America; Costa Rican ownership*
➤ *#2: Former racer with high-boost engine, now used for development and PR (ride & drive car)*
➤ *#3: Static car for auto shows and dealer displays*
➤ *#4: Current backup racecar*
➤ *#5: Steve Millen's primary 1994 GTS mount, low-boost engine; winner 1994 Sebring 12-hour*
➤ *#6: V8 prototype (unfinished)*
➤ *#7: Eric van de Poele's primary 1994 GTS mount, low-boost engine; winner 1994 Daytona 24-hour*
➤ *#8: Johnny O'Connell's primary 1994 GTS mount, low-boost engine*

➤ *Left: Steve Millen, the Kiwi word for racedriver. Below: Despite rumors to the contrary, IMSA GTS's twin-turbo V6 engine bay was not designed by the NYC Sewer Commission.*



dropped the clutch and launched us with such an afterburner rush I thought we we'd reach V1 and rotate right straight over backwards. No question about it, I was early-apexing the learning curve.

The GTS car peaks at about 7500 rpm in fifth on the so-called straight of the street course. According to Honsowetz, 7500 rpm equates to 147 mph in the short-geared test mule, but given the context in which that speed is reached, it might just as well be 347 mph. Running an IMSA GTS car flat-out on Willow's street circuit is like uncorking an Indycar in your hot tub; the street-course straight is just over a quarter-mile long, curving and rising sharply onto an off-camber plateau that mimics the Balcony turn on the adjacent full Willow Springs course.

Imagine yourself at the drag races, strapped into a sub-11-second quarter-mile missile that's capable of breaking the timing beam at 150 mph. Then imagine that the drag strip suddenly veers up and away to your right; that's how Millen and I scrabbled through Turn One. With each pass up the hill, Millen held his braking a little later, diving into the apex deeper. Finally, he kept the power down all the way into the apex, with the tail hung out about 30 degrees to our direction of travel, seemingly satisfied that he had at last reached the Nissan's limit of adhesion.

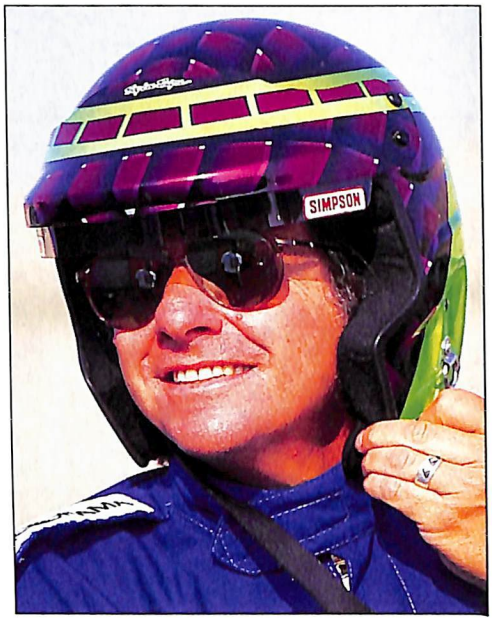
Witlessly, I had decided to don my freshly painted Troy Lee Design helmet for The Ride, and as my head slugged to and fro, I tried to keep my spiffy hardhat from scuffing itself against the cage. The effort went for naught, as my neck muscles simply weren't up to the task of stabilization. An out-of-body experience swept over me as my head bobbed like a Slinky and my eyes randomly orbited in their sockets.

Shifting Sands

It was so early in the morning that the sandy Streets of Willow course had yet to offer any grip. Clouds of windblown desert sand issued from under the Nissan as Millen struggled to coordinate yaw and pitch. We were sideways absolutely everywhere, but the former rally star was loving it all, cranking in more and more opposite lock to compensate for slip angles so extreme we were often looking at where we'd just been.

Dead-center on the face of the dash, more prominently displayed than even the rev counter, a pair of boost gauges gyrated

ZEALOTRY!



wildly to and fro with each upshift, each sprint to the next apex. I found myself mesmerized by this pair of explosive needles, proof positive that science can affix metronomes to even the most volatile beat. As the wastegates stuttered and squealed and the boost built and bled, I lapsed into a state of passive tranquility, utterly confident of Millen's sensational ability to place the Z in exactly the same spot lap after lap.

Reverse Psychology

It was an uncanny skill I had noted earlier in the morning, when Millen had unhesitatingly drifted his flying mount past our prone and intrepid photographer—the young (and at this rate not likely to get much older) Scott Dahlquist—without so much as deviating an inch from his line on pass after pass. Now I watched from inside the Z as the dancing toes and skimming palms of the master made it all happen in such a blur that I couldn't tell where the technique stopped and the genius began.

Only once in the course of the run did I have second thoughts about being strapped, Stapp-like, to the rocket sled: Millen had tired of attacking the course in the usual clockwise fashion, so he tossed the Z into one of those bootleg U-turns like Vittorio Brambilla used to pull with reckless abandon at Long Beach. Just like that, we were headed in the other direction, my gradually accumulated sense of well-being cut adrift like a Mariel refugee. It would take some time to adapt myself to the mirror image topography of this counter-clockwise lappery, but Millen was not about to proffer the opportunity for acclimatization.

With a few eye-bulging cuts and thrusts, we were suddenly perched on the top row of the Balcony turn, plunging now backwards onto the straight, faster than ever before. Just as I began to envision what a series of barrel-roll flips would be like at such an insane speed, Millen cut short my reverie as he veered unaccountably up the pit road which parallels the short straight. I assumed he would be off the power in an instant and headed for the barn, but I was very wrong indeed. Instead, our ferocious pilot kept his Simpson boot hard in the throttle as we dropped off the steep hill. At the last possible moment, he swept back onto the racing surface from pit lane and continued to accelerate at ballistic pace all the way down to the end of the skidpad. In a morning full of spikes and peaks, that single moment stands clear as the *epiphany du jour*. In the OhSoCool parlance of the pro racer, that maneuver *definitely got my attention.*

In conversation later with Frank Honsowetz, I was surprised when the preeminently self-assured team boss—a talented driver himself—confided that when Millen pulled that same stunt on him, Honsowetz was genuinely frightened. "It's the only thing he does here that has that effect on me. When he dove onto the pit apron, it scared the hell out of me."

The racing 300ZX Twin Turbo is a noisy, beastly proposition. It squeaks and judders over bumps and pavement changes like a semi, and its phenomenally effective megabrakes squeal and whistle under the force of deceleration. But the bottom line is sheer speed, and the combination of Millen and his mount are so quick together, so well rehearsed a pair, that they absolutely lay waste to a short track like the Streets of Willow Springs. The speeds the Millen Z generates on this bambino course are so out of proportion to the condensed surroundings that the ZX reminds you of a slot car, bulleting along at a scale 300 mph.

By the time tire temperatures had warmed to operating range the water temperature had risen beyond, to over 230 degrees, signaling an end to the session. As we trundled back to the pits, I realized my cognition system had developed a misfire: Logical thought, which had been so pure and focused at speed, was now incapable of functioning at anything less than full tilt. The Clayton Cunningham Nissan team changed my black box, but to no avail. My DNA had DNF'd.

The Drive

Plans for 1995 call for a limited-edition Stillen to be sold at Nissan dealerships across the country. This will mark a big step

➤ *Dave Colman looks cool and collected before his bout of cerebral Millenitis. Stage 6 Stillen (below) causes the same effect on the street as the GTS on the track.*

forward for Millen's brainchild, which is currently available only though his retail facility in Costa Mesa, California.

Millen, who's working closely with Nissan competition boss Honsowetz on the project, had hoped to debut his latest incarnation at Willow Springs but the car had yet to reach completion. When it does arrive at your local dealership, Millen promises his '95 Stillen will have special body modifications and wheels available only on dealer-sold models. The rear wing will be higher and wider than the current production model—more like an F40's than ever. In addition, this version of the Twin Turbo will offer a carbon fiber dashboard insert and console cover as cosmetic proof of its citizenship in the Extreme Supertuner Club. Its engine specification will offer more power than the stock ZX turbo but significantly less than the Stage 6 Stillen that will still be available direct from Costa Mesa.

We had a chance to prod, poke and otherwise molest just such a Stage 6 Stillen at Willow Springs. Of course, after having had my chromosomes rearranged by the racecar ride I found the street Stillen somewhat tame by comparison, but when the time sheets were posted, it outran the stock ZX Turbo by four seconds a lap on the Streets course. At least a couple of those seconds are attributable to the fact that the Stillen was shod with 17-inch Yokohama 008RSII DOT competition rubber while the stock '95 ZX-T was forced to make do with Goodyear Gatorbacks in a 16-inch flavor. That difference alone was monumental, as the Stillen continually hewed to a tight and tidy line while the stocker drifted wide of the mark. As Honsowetz observed of the stealthy stock Z that the Nissan folks in Carson had unwrapped the night before the test, "This has got to be the only new car still delivered with Gatorbacks. I wonder why it doesn't at least have GS-Cs?"

Tires aside, there are a host of more important—important and much more expensive—changes that differentiate the Stage 6 Stillen from the stock ZX-T. Leading the way is a completely reworked turbo system which utilizes all the tricks of the tuner's trade. The intercoolers are 30% larger than stock, the Garrett turbos produce 25% more airflow and the electronic valve controller allows preselection of boost settings, with options available up to 200% above stock. The controls for this unit, as well as a slick tell-tale boost gauge, are incorporated into the glovebox of the

SPECIFICATIONS

Cunningham Racing Nissan 300ZX IMSA GTS

➤ General
Vehicle type: front-engine, rear-wheel-drive coupe
Structure: tubular steel frame with composite body panels
Market as tested: Competition
MSRP: mucho, mucho dinero
Airbag: no

➤ Engine
Type: longitudinally-mounted V6, iron block and aluminum heads
Displacement (cc): 2960
Compression ratio: state secret
Horsepower (bhp): 620
Torque (lbs. ft.): 525
Intake system: EFI with two injectors per cylinder and two intercooled turbochargers
Valvetrain: two overhead cams per bank, four valves per cylinder

➤ Transmission
Type: 5-speed manual (Hewland)
Ratios (as tested):
1st: 3.00
2nd: 2.57
3rd: 2.20
4th: 1.76
5th: 1.47
Final drive: 3.10

➤ Dimensions
Curb weight (lbs.): 2550
Wheelbase (in.): 102
Track, f/r (in.): 64/62
Length (in.): 178
Width (in.): 79

➤ Suspension, brakes, steering
Suspension, front: parallel A-arms with coil springs and adjustable antiroll bar
Suspension, rear: parallel A-arms with coil springs and adjustable antiroll bar
Steering type: rack and pinion, power assisted
Wheels, f&r (in.): 17x14 & 17x14.5 (BBS)
Tires, f&r: 340x650x17 & 350x740x17
Brakes, f/r: 14-inch vented disc/13-inch vented disc
ABS: no

➤ Performance
0-60 (sec.): 3.0
1/4-mile (sec.): 10.7

Stillen 300ZX Stage 6

➤ General
Vehicle type: front-engine, rear-wheel-drive coupe
Structure: steel unibody
Market as tested: United States
MSRP: $62,500
Airbag: std., driver and passenger

➤ Engine
Type: longitudinally-mounted V6, iron block and aluminum heads
Displacement (cc): 2960
Compression ratio: 8.5:1
Horsepower (bhp): 465
Torque (lbs. ft.): 430
Intake system: SEFI, two intercooled turbochargers (Garrett)
Valvetrain: two overhead cams per bank, four valves per cylinder

➤ Transmission
Type: 5-speed manual
Ratios:
1st: 3.21
2nd: 1.93
3rd: 1.30
4th: 1.00
5th: 0.75
Final drive: 3.69

➤ Dimensions
Curb weight (lbs.): 3490
Wheelbase (in.): 96.5
Track, f/r (in.): 58.9/61.2
Length (in.): 169.5
Width (in.): 70.5

➤ Suspension, brakes, steering
Suspension, front: multilink upper/A-arm lower with coil springs and antiroll bar
Suspension, rear: multilink upper/A-arm lower with coil springs and antiroll bar
Steering type: rack and pinion, power assisted
Wheels, f&r (in.): 17x9.5 & 17x9.5
Tires, f&r: 275/40ZR17 & 275/40ZR17
Brakes, f/r: 13.1-inch vented disc (Brembo)/11.8-inch vented disc
ABS: std.

➤ Performance
0-60 (sec.): 4.6
1/4-mile (sec.): 12.9

Nissan 300ZX Twin Turbo

➤ General
Vehicle type: front-engine, rear-wheel-drive coupe
Structure: steel unibody
Market as tested: United States
MSRP: $41,409
Airbag: std., driver and passenger

➤ Engine
Type: longitudinally-mounted V6, iron block and aluminum heads
Displacement (cc): 2960
Compression ratio: 8.5:1
Horsepower (bhp): 300
Torque (lbs. ft.): 283
Intake system: SEFI, two intercooled turbochargers
Valvetrain: two overhead cams per bank, four valves per cylinder

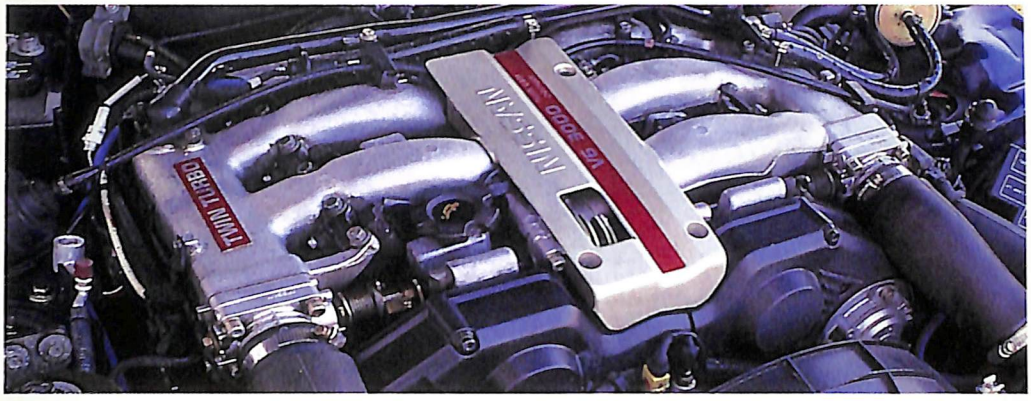
➤ Transmission
Type: 5-speed manual
Ratios:
1st: 3.21
2nd: 1.93
3rd: 1.30
4th: 1.00
5th: 0.75
Final drive: 3.69

➤ Dimensions
Curb weight (lbs.): 3475
Wheelbase (in.): 96.5
Track, f/r (in.): 58.9/60.4
Length (in.): 169.5
Width (in.): 70.5

➤ Suspension, brakes, steering
Suspension, front: multilink upper/A-arm lower with coil springs and antiroll bar
Suspension, rear: multilink upper/A-arm lower with coil springs and antiroll bar
Steering type: rack and pinion, power assisted
Wheels, f&r (in.): 16x7.5 & 16x8.5
Tires, f&r: 225/50ZR16 & 245/45ZR16
Brakes, f/r: 11.1-inch vented disc/11.8-inch vented disc
ABS: std.

➤ Performance
0-60 (sec.): 5.7
1/4-mile (sec.): 14.3

➤ ***Deep breathing exercises punch the Stage 6 engine (below) up 165 horses to 465 overall; the stock 300ZX Twin Turbo (bottom) was already powerful enough to scare us silly.***



Stillen; drop the lid and you've got yourself a real entertainment center. Larger fuel injectors, racing NGK plugs and a stainless steel exhaust system finish off the spec-list upgrades. In this form the output is about 460 horsepower, and the best part of the deal is that the Stage 6 setup is completely DOT/CARB legal.

On the track, the peakier Stillen is actually slower than the stock ZX-T out of tight turns, and it thus becomes important to maintain the pace on your approach. As soon as the mutant Garretts spool up, however, the Stillen is gone like a bad dream, charging hard to the next apex and leaving the stock Z—itself wickedly fast—looking like a 2-ton stone that's been chained to the pavement. Millen has the demo car tuned to provide just a hint of understeer at all times, and it's virtually impossible to unload the Yokos enough to provoke a tail-wag. Even the maestro himself had a tough time inciting his creation to step sideways during the photo sessions.

Bump Stops

While the go power and adhesion of the Stillen are beyond reproach, it's the brake upgrade that transforms this street car into a racer of great potential. The drilled and ventilated Brembos with 4-piston calipers kept the Stillen's pedal firm and predictable for lap after lap at Willow. Even with nine hard applications per lap in 100-degree desert heat, the brakes never came close to fading. It's no wonder that Shawn Hendricks is currently leading the Bridgestone Supercar Championship series in a Millen-supported Stillen 300ZX-T.

Yet while the Stillen will indeed leave the stock 300ZX Twin Turbo sitting in the abundant desert dust, there's actually no need for owners of the unmolested street car to fret. This is still one of the finest packages ever to emerge on the sporting scene: Even after five years of production, the Twin Turbo offers cutting-edge performance and superb comfort. Its low-end response is superior to that of the peakier Stillen, and this asset makes it more rewarding to drive on the street than its turbo-laggard brother, which truly shines in situations much closer to racing. Adding to the hegemony of the stock turbo is the wonderfully precise Super HICAS system, now completely electronic rather than hydraulic as in the past.

This change in telemetry eliminates the nervousness of the previous 4-wheel steering arrangement. Turn-in is quick, placement is accurate and the best part is that you're no longer aware the car's rear wheels have a mind of their own.

So then. If you've simply got the burning need to speed, I'd say get yourself a stock Nissan 300ZX Twin Turbo. It's more than quick enough to bust so many state laws you'll be too arthritic to shift a 5-speed by the time you get your license back. Now if you want to scald yourself with mind-numbing hyperdrive, then what the heck—a Stage 6 Stillen will do the trick and have plenty of kick left over. And if you want to go on a 10-lap acid trip without the mess and bother of drugs, then just hop into Millen's racing Z. He'll show you what psychedelia is really all about. ○

COMPETITION

RACING IMPROVES THE FEES

"Racing Improves the Breed." "Win On Sunday, Sell On Monday." Does any of this make sense? Competition Editor Jonathan Ingram examines the underlying myths behind factory participation.

For many years I had the distinct impression that every factory engineer working in motor racing had a bit, if not a whole lot, of Enzo Ferrari in him. The Commendatore, of course, was the ultimate racer—a man who single-handedly established an entire chapter of production-car history simply to finance his racing teams.

Factory engineers often seem like Ferrari in the sense they appear far more interested in racing than in building cars for the street. This explains two things about modern motor racing: First, why so many factory engineers left their jobs to become full-time racers employed by teams. Second, why these same factory engineers were the front-line participants in the ongoing myth-making about how "racing improves the breed." After all, the predilections of everybody in the racing department needed some justification to the board of directors beyond the sheer joy of engaging in automotive competition.

Today, engineers, racing teams and the public at large are not as often burdened by that bromide about improvement of the breed, though it still subtly creeps into most factory ads based on racing conquests. It's not that this highly cherished chestnut was

PHOTO WEBB

ever a lie, exactly, nor even that it's necessarily misleading. But in an era when airbags are used in the German Touring Car Championship and electronic engine management systems derived from street cars are crucial to mind-popping rpm and efficiency in racers, the factories can make a better case that production-car technology does far more to improve motor racing than vice versa.

Some of the best racing available to both participants and fans is now done by actual street cars with slight alterations for the track. Virtually anyone with a suitably large bank balance can buy and race factory-built GT-class cars in the ultimate endurance events at Daytona, Sebring, Le Mans or Spa, among others. In the U.S., IMSA's Firestone Firehawk series or the SCCA's World Challenge, both highly successful professional showroom stock classes, are among the healthiest branches of roadracing.

In fact, in the highest echelons of circuit racing—Formula One and IndyCar—the emphasis is now on excluding the latest developments of street machinery, such as traction control (a byproduct of street-car ABS), electronically operated automatic transmissions (developed to make production cars shift more smoothly and attain better mileage) and active suspension (developed for racers and road cars in tandem). After several years of at least *assisting* in the development of these far-out high-performance advantages, however, they were outlawed from F1 this year, and with the exception of the now-illegal traction control, IndyCar wrote them out of its rulebook before they ever got started.

More than anything else, such bans underscore the creed of Ferrari, himself a reactionary curmudgeon when it came to technological advances—il Commendatore firmly believed that racing was primarily conducted *for racing's sake.*

Sanctioning bodies have essentially agreed with that concept, and now many have concluded that people are as interested in seeing good old automotive competition as looking at technological showpieces. Technology now common to everyday people haulers has been eliminated for the sake of competitive balance and larger fields through lower costs. In place of what many consider the disgusting concept of driver aids comes a more sporting emphasis on a driver's ability and safety at the price of cornering speeds and lap times.

***MAKE HAY:** Le Mans was linchpin to Jaguar (opp.) and Panhard publicity, but did it really improve the cars?*

In today's relative absence of the explicit platitude on racing improving the breed comes another aged and hard-working favorite: "Win On Sunday, Sell On Monday." Yet even this old tune loses some of its zing on further examination, because most customers are smart enough to know that assuming a factory's racetrack victory means it builds better cars for the showroom is a little like believing the University of Alabama has better students whenever its football team wins a game.

To be sure, companies that take the risk of motor racing do make a general statement about their abilities when they win—or lose. And the enthusiasm, dedication and focus required to start and maintain a racing program does perhaps say a thing or two about the management and talent pool offered by a company. The technology required to win races requires a special emphasis, and these purpose-built cars admittedly have far more firepower, cornering capacity, strength-to-weight ratios, etc. than street cars. But what little crossover technology *is* achieved by their creation can usually be tested or researched without racing. To insiders none of this is exactly news, but the reality of the technology gap between production cars and racing cars was recently driven home for good by the ban of computer-driven electronic aids in F1, the pinnacle of technology and still home to Ferrari's chosen team.

PHOTO MERCEDES-BENZ

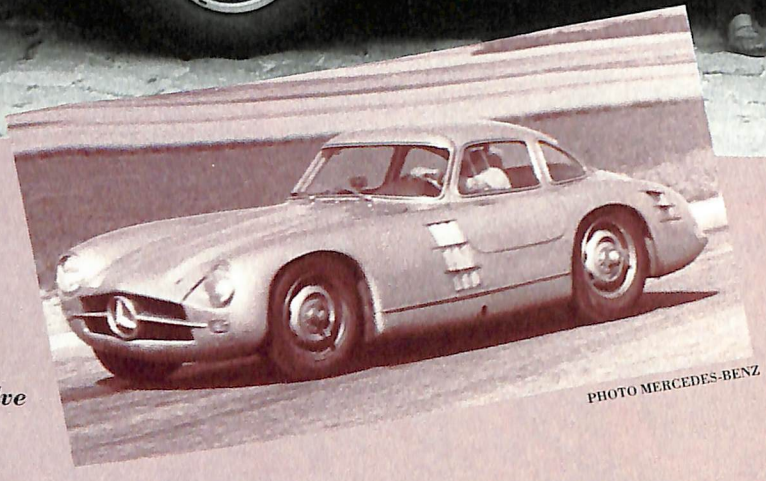


PHOTO MERCEDES-BENZ

LINEAGE: Prototype (inset) and final (with Moss, Fangio and Kling) 300SL road cars did evolve from racer.

Porsche, the only other company to have sustained a serious commitment to motor racing without pause for the last four decades, acknowledged the beginning of the end nearly a decade ago. "Motor sport has largely come to the end of its importance as pacemaker for technical automobile progress," reads a 1986 brochure from Porsche outlining the role of its famed racing department at Weissach. "Development work and experimentation, all their installations today, can largely do without the race track as a test bed." This from a company whose reputation is more closely tied to racing than any other and whose first actual car was raced by founder Ferdinand Porsche himself (successfully, the company notes).

The brochure appeared in the middle of a decade of dominance by Porsche in endurance racing, which began with a 1-2-3 sweep at the first Group C event held at Le Mans in 1982. Porsche's dominance resulted largely from its expertise with electronic engine management systems in a series where power was regulated by fuel allocations. That electronic system was built from street-car technology—the demands of which are far more complicated than racing due to the added factor of emission controls—and applied to racing.

This is precisely the message which Porsche or any manufacturer engaged in racing would be wiser to portray: *"Because of our company's technical abilities on the street, we know how to build cars that can win on the track."* But their message remains blurred, because the companies continue to sell the sizzle of racing and not the steak.

Companies have learned that racing is simply the best way to convey an image of technical superiority to younger buyers, whether racing improves the breed or not. *That's* why they continue to pump millions into motor racing—not because the lessons learned in competition can't usually be found more easily elsewhere.

In the coming year, Mercedes-Benz and Toyota are expected to make their debut in CART's IndyCar series with race-specific DOHC V8 engines. These companies provide textbook cases of why manufacturers go racing and where their priorities are when it comes to pushing the envelope of technical knowledge. Each company's main priority is to heighten the awareness of its products among younger buyers and boost public relations in general.

Mercedes has already scored a major victory by winning the 1994 Indy 500. The company joined team owner Roger Penske and Ilmor Engineering to build a pushrod V8 turbo which produced an estimated 100 more horsepower than the existing Ford and Ilmor DOHC V8 turbos due to a special rule giving pushrod engines extra turbo boost. The fact that Mercedes, which hasn't produced a pushrod automobile engine for the street in nearly four decades, built one for Indy this year tells you the company was far more interested in winning the race by taking advantage of the rulebook than updating its own corporate technology.

The whole project was executed in less than a year and succeeded where Buick had failed so many times with its own (production-based) pushrod turbo, so Mercedes certainly scored major points for its image as a technology leader—even though it was racing-engine constructor Ilmor, not Mercedes, that was most responsible for the motor's construction.

Mercedes public relations head A.B. Shuman says there *is* some technology spinoff from running a pushrod engine at

9000 rpm around Indy for 500 miles. When the rulemakers at Indy reduced the '95 boost advantage for pushrod engines, though, apparently that spinoff became less important: Mercedes will return in 1995 with a DOHC V8 built by Ilmor.

As indicated by full-page newspaper ads after Al Unser Jr. won the pole and the race under Mercedes pushrod power, the emphasis of this program was on image. This also explains why Mercedes used another company to build its race engines and was wholly upfront about that fact. It is no different than the approach to the Indy 500 by Ford today or Chevrolet from 1985 through 1993. Both firms' engines were designed and produced for IndyCar racing through Cosworth Engineering and Ilmor, respectively, racing specialists rewarded handsomely for their efforts.

The majority of the people who watch the race recognize only the brand name of the automaker, of course, not the supplier—especially after those full-page ads.

Toyota will take a decidedly different approach to IndyCars by building its own DOHC V8 turbos in-house for several seasons before turning the project over to an American-based factory unit. This approach underscores the other major attraction to motor racing beyond marketing—as Honda has done in both Formula One and IndyCar, Toyota will cycle engineers from the production side through the racing program. The object is not to generate technology per se, however, but to create a human test bed—one that teaches engineers how to solve problems more quickly by giving them the short deadlines and instant feedback of motor racing.

Even so, like Mercedes—which will begin selling sport-utility vehicles built in Alabama to a market far younger than its current demographics—Toyota's main emphasis in racing will be on its image among younger buyers in the marketplace. "We're upholding (Toyota's) image of high quality, top-notch technology and reliability," said the company's racing director, Les Unger. As with Mercedes, there's also a public relations side to this sporting sell; an IndyCar racing team shows that the company both honors and wants to participate in American culture.

So just where does the development of race technology toward influencing production cars later fit into Toyota's motivations? If it ranks at all, this aspect comes in a distant fourth behind advertising, public relations and training engineers to work faster and more creatively. "When we get the engine developed, we'll say 'It's neat, it works, can you adapt it to production cars?,'" Unger states.

To some eyes, it's easy to pinpoint when the production industry first began overtaking motor racing as the progenitor of technical development in automobiles. The first Arab oil embargo inaugurated Americans' emphasis on lighter cars with better aerodynamics and smaller, more efficient engines. Worldwide competition, notably from Japan, then accelerated the need for all automakers to push the technical-development envelope in these areas.

Others, however, see this as a conclusion from a false assumption—within modern automotive history, it can be argued that rac-

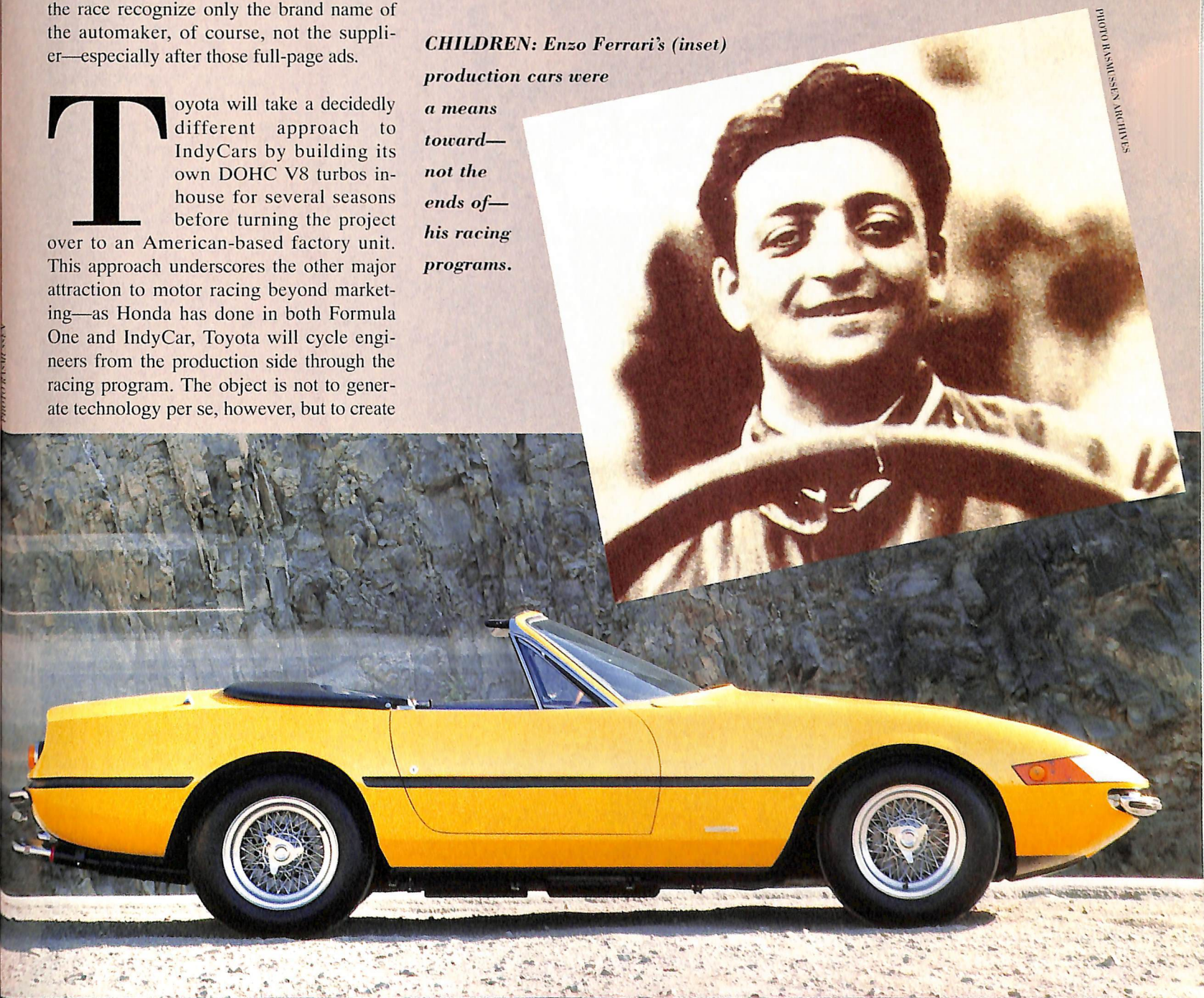


PHOTO RASMUSSEN ARCHIVES

CHILDREN: Enzo Ferrari's (inset) production cars were a means toward—not the ends of—his racing programs.

ing has *never* led production cars in the creation of meaningful technological advances. Disc brakes, fuel injection, high-compression engines and seatbelts are the most common examples cited of racecar hand-me-downs to the street, yet all these were in fact aircraft-industry developments more than autoracing ones. Racing should certainly be credited in these cases, but more for widely popularizing these much-valued technologies than inventing them.

Not that U.S. automakers have ever been eager to embrace the need for increased technology (or even to acknowledge the fuel crisis) in any case. What better example of the effects of aerodynamic trickery on the efficiency of cars than the McLaren M-16, which first appeared at Indy in 1971? Coupled with bigger tires, a rear wing and side-mounted radiators, the M-16 increased speeds at the Brickyard by leaps and bounds. In U.S. production cars, however, it was not until the 1983 Ford Thunderbird that aerodynamics were acknowledged in the American market—a decade after the M-16 and the first oil embargo.

Bob Riley, one of those factory engineers who left to become a full-time racer, explains why Ford and others took so long to acknowledge a need for less aerodynamic drag in car design. "They were hung up on the idea that rounded corners were feminine, not masculine," said Riley.

CARRYOVER: ***Jag's XK Six and current V12 both powered street cars first, Le Mans winners later.***

Certainly there *have* been plenty of incidents where racing has improved the breed, says Riley, who during the 1960s introduced Ford's production engineers to the idea of bump-steer for street cars. Previously, "They hardly bothered with bump-steer," he said. "They thought it was just a minor thing that tires should be set up for...to improve longevity and wear."

In the decades after the oil embargo and the success of Japanese exports, manufacturers rolled up their sleeves and brought to bear armaments beyond the wildest dreams of most race teams. Riley cites modal analysis, used for fine tuning of car bodies and suspensions, as the best example. "Modal analysis enables you to hook up the sheet-metal from the car body to a suspension so you can see where the deflection is in the cars," he said of the computerized test method. "You can actually *see* the body panels breathe. But that type of equipment is far more expensive than most of your race teams can afford."

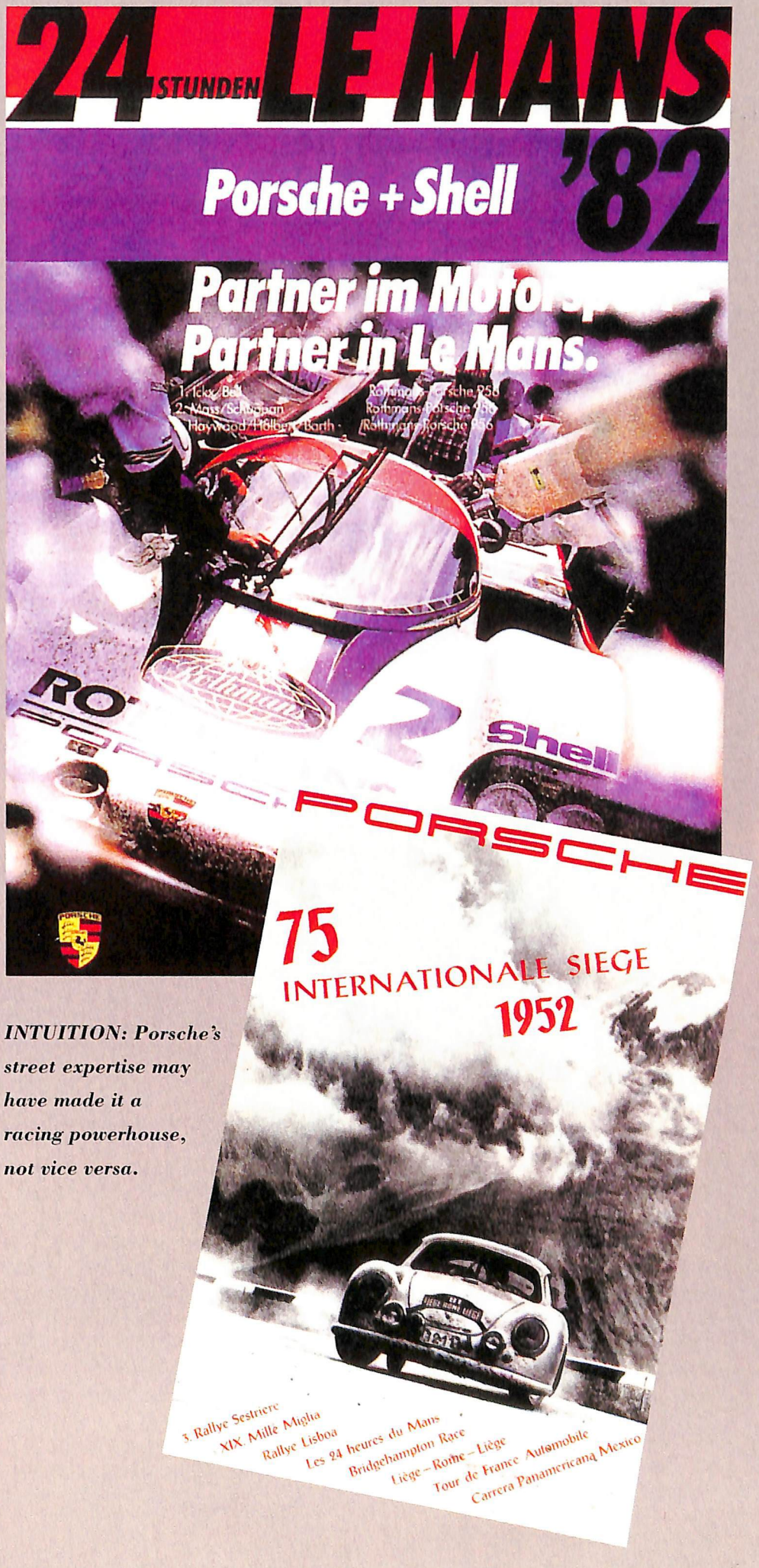
Motor racing, meanwhile, eventually headed in the opposite direction to save costs and keep a level playing field. Dan Gurney's Toyota Eagle Mk III ruled the final two years of IMSA's Grand Touring Prototypes—a series considered the all-time ultimate in sports-car technology—but the team was barred from carrying items readily used by the manufacturer in production vehicles. "We couldn't have an electronic wastegate on the turbos or use ceramics in the engines," said Gary Reed, project manager for the firm. "There was a lot of technology common to street cars we couldn't use in racing."

If racing improves the breed at present, those improvements are largely byproducts of the use of the sport as a marketing tool. Formula One still improves street-car technology "by leaps and bounds" according to Tony Dowe, who managed the Ligier team briefly in 1994. "Honda has put all its Formula One engineers to work on emis-

sions problems. When manufacturers want to know about the relationship between cylinder design and certain types of fuel, they come to Formula One teams," he adds. But couldn't these projects—or more precisely the training payoff of these projects—have been accomplished without racing? "Yes," Dowe says, "but in racing you get a lot of other benefits."

The arena where technology is most readily transferred to street machines, not surprisingly, is now GT racing, where the entries come right off the assembly line. Even Porsche acknowledges some rebirth of its racing heritage in street cars. The racing department and production engineers "have never worked together as closely as in the last three years," said Alwin Springer, director of the company's U.S. racing effort, where the firm competes in IMSA's Supercar and the SCCA's World Challenge as well as in Supercup events in Europe. He cited the improvement of the reliability and longevity of the 3.6-liter turbo engine as a significant contribution from racing to the company's production hardware.

Nor is motor racing dead as a free-for-all testbed. Chrysler is considering an entry into endurance racing in 1996 at Le Mans with a car that represents sheer blue-sky thinking: The Patriot is a sports-prototype built to IMSA's current World Sports Car specifications driven by a turbine spooled up by liquefied natural gas, a special high-speed flywheel and regenerative energy derived from braking. The key to using these unique power sources will be their coordination by an electronic black box; in theory, the hybrid car will be able to apply 700 horsepower to the ground.



INTUITION: Porsche's street expertise may have made it a racing powerhouse, not vice versa.

The fact the majority of companies currently pursue racing primarily as a marketing tool may be the best circumstance for the sport, its fans and the manufacturers. It confirms that the sport needs no justification for its existence; people simply find automotive competition compelling to watch. While there may be a purpose as a vehicle for the sales of cars and sponsors' products, fans surely do not go to the track to shop. The sizzle of the sales opportunities merely keeps the necessary cash flowing from manufacturers. Racing itself is the steak. That means racing *is* ultimately carried out for racing's sake; there must be a little Enzo Ferrari in all of us. ○

TZ1, Com

Joanne Marshall drives and photographs a Giulia Tubolare Zagato, the brilliant little Alfa that could.

It all came about by accident—by an accident in the 1956 Mille Miglia, to be precise. Enthusiastic privateers, the Leto di Priolo brothers totaled their brand-new, Bertone-bodied Alfa Romeo Giulietta Sprint Veloce on the home leg between Radicofani and Siena, when the policeman red-flagging a dangerous, mud-covered bend had disappeared to answer the call of nature.

The damage to the Sprint Veloce was so serious it would have cost just as much to repair it as to build a new car. The second avenue was taken, and it led to Carrozzeria Zagato's door in Milan. Kitted out in smart new aluminum panels, the Sprint Veloce Zagato (or SVZ) had distinct, if rather squat, Bertone overtones, but pure Zagato hallmarks showed through in its rounded panels and tapered tail.

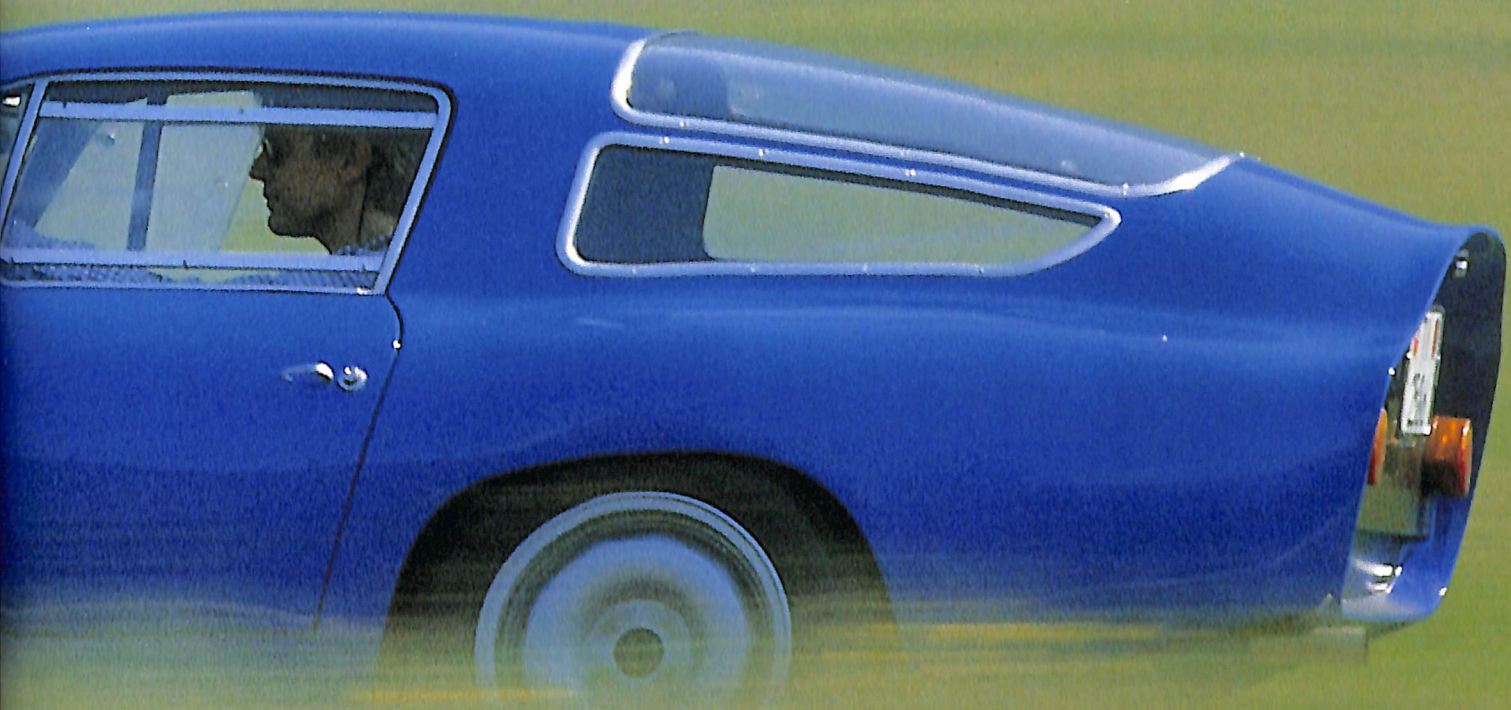
More importantly, it had a lower frontal section and was even lighter (by around 44 pounds) than Bertone's Spartan competition special had been. This was Zagato's *raison d'être*, of course, and the results spoke for themselves; better aerodynamics meant the SVZ was nearly six mph faster in top speed, capable of hitting close to 118 mph on the Mille Miglia's long straights.

Ruling Class

Much to Alfa's dismay, the subsequent series of SVZs ruled the 1300cc-class roost over the firm's own production cars for four seasons, and they snapped uncomfortably at the heels of some far bigger-engined rivals as well, Maserati and Ferrari paramount among them.

Miffed by this upstart's success, Alfa and

petition 0



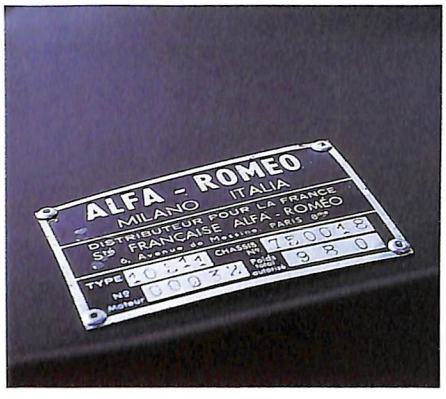
Bertone tried again in 1957 with the gorgeous Sprint Speciale prototype, but by the time it reached production in 1959 that car had sprouted heavier steel bodywork and greater creature comforts, Alfa Romeo having succumbed to the obvious importance of street sales over smallbore racing primacy in the GT ranks.

And so, after 14 SVZs had been built for well-heeled privateers, Alfa Romeo simply gave Zagato the green light (and the bare chassis) to build a definitive and official version of the car instead, to be called Giulietta SZ. Ironically, the coachbuilder was allowed to work on the Giulietta SS's shorter (88.6 versus 93.7-inch) chassis and more powerful (100 versus 90 bhp DIN) running gear, so top speed reached an impressive 124 mph. The incredibly rotund SZ (quickly nicknamed the Easter Egg by factory hands) was then launched at the 1960 Geneva Show.

In the meantime, Alfa's small-displacement twincam had reached its power development peak—somewhere in the race-tuned neighborhood of 130 bhp @ 7500 rpm—and the SZs were losing their competitive edge in the 1300cc class to the ultra-lightweight Lotus Elites.

The only way forward was to up the car's top speed, so at the end of 1960, Elio Zagato had a long, ungainly, but functional aluminum tail riveted to an SZ in the hopes of improving its aerodynamics. Assisting in the stopwatch duties on the car's test runs was a young designer named Ercole Spada—the same man who would quickly rise to chief of design for Zagato in the 1960s and again in the 1990s.

➤ *Like a GTO left in the dryer*



➤ *Don't leave Rome without it*

Empirical road testing included lapping the circuit at Monza the wrong way—not as oddball as it sounds, for the track's long straight is on a slight incline—and bashing up and down the Milan-Bergamo autostrada. "At the time," recalls Spada with a rueful grin today, "that stretch of autostrada was trafficked by slow-moving baby Fiats and had just three lanes, the middle one reserved for head-on collisions. But we managed to reach a maximum 227 kilometers per hour (141 mph)."

Still, the bulky rear overhang with its concurrently high polar moment of inertia had detrimental effects on the car's cornering agility. Eventually, Zagato came to a compromise. "Following the Kamm principle," Spada continues, "we took a hacksaw to the aluminum protuberance and lopped most of it off, losing only a couple of kph in the process."

The car debuted—driven by Elio Zagato himself—at Monza in June of '61 and immediately took pole position, easily outrunning the round-tailed cars in the process. Thirty of the new style were built, differing in detail substantially from the earlier version; the Kamm-tail model was longer, narrower and lower, although weight went up 33 pounds to 1727 overall. The hoodline was made lower and the nose became slimmer, as did the line of the fenders. In a moment of inspiration, the hood's trailing edge was finished off in a kink over the windshield wipers to reduce turbulence and drag—standard practice today, but *terra incognita* to Zagato's minions at the time.

On the Tube

After a busy, pluri-victorious racing career, the SZ's development ceased in 1963; back in 1959, Alfa's chief engineer Orazio Satta and development manager Giuseppe Busso had already set to work with a clean drawing board toward making an ambitious, purpose-built GT racer to replace it.

The definitive chassis of this effort was delivered to Zagato for bodying in January of 1961, and the real novelty lay in that chassis. Rather than carry on with the Alfa/Zagato practice of adapting existing production monocoques for racing, this new car had a low, wide, tubular spaceframe chassis that weighed just 136 pounds. High structural rigidity was ensured by reinforcing the rear suspension mounting points with a transverse pressed-steel insert, while at the front a large-diameter elliptical tube provided bracing at cowl height for the front suspension and engine mounting points.

Unlike the live-axle SZ, the Giulia Tubolare Zagato, or TZ as it quickly became known, featured independent suspension and disc brakes all around. The front did at least retain the Giulietta's double-wishbone setup, though it received new arms with separate springs and telescopic shocks—these latter inclined to keep the wheelarches as low as possible—and an antiroll bar.

The engineering that went into the rear suspension was rather more novel. The disc brakes were mounted inboard next to the limited-slip differential to reduce unsprung weight—a process continued through the GTV6s of the 1980s—and the driveshaft acted as the suspension's upper link. The lower link was formed by a wishbone located via longitudinal and radius arms with an antiroll bar attached.

The TZ's running gear consisted of essentially the same pieces set to debut in the Alfa Romeo Giulia saloon for 1962, including a bigger 1570cc version of Alfa's classic all-aluminum twincam Four. The TZ's powerplant did differ significantly in detail from the sedan's, though—weight-saving measures called for magnesium-alloy castings for the clutch housing and gear-lever turret, for example, and the engine was so seriously canted over to allow for a plunging hoodline that a new sump, bell-housing and intake manifold had to be made for the application.

With a little extra noodling—adding two twin-choke Weber 45 DCOEs, an uprated camshaft and a compression ratio of 9.7:1—the standard TZ-spec Four packed 112 bhp @ 6500 rpm and 98 lbs.-ft. of torque @ 3500 rpm. That was respectable power indeed when allied to a low 1452-pound curb weight: Further race-tuned to 160-170 bhp and spinning easily to 7500 rpm, this 1.6-liter engine guaranteed dread-nought-level performance from Zagato's light cruiser.

Zagato's bodywork for the initial two prototypes was a long time in coming, at least for Alfa's urgent need to combat the ever-present threats from Lotus and Porsche. The Milanese coachbuilder was going through one of its most florid eras and demand for the existing SZ was high, drawing personnel not only from the TZ project but from other lucrative prototype work for Aston Martin, Lancia and Bristol as well.

Oddly enough, the first prototype, delivered in October of 1961, was a roadster. It proved aerodynamically inefficient during testing at Monza, reaching only 129 mph. Due to teething problems in the handling department as well—the rear suspension was working on its bump-stops, making the car an understeering pig at racing speeds—Alfa's high-tech new hotrod failed to lap Monza any faster than the SZ it was supposed to replace.

The next TZ to leave Zagato's Via Giorgini works was a closed coupe with a slightly longer tail similar to the one already in use on the SZ, and the improvement was immediate. Top speed rose to 133 mph and lap times at Monza dropped from just over two minutes to Sanesi's record of 1:51.2. The definitive version would be quickly arrived at, its hoodline being lowered still farther to produce a degree of downforce and the tail getting its characteristic tulip shape to reduce drag.

The concept may have dated to 1959 and the first road testing to 1961, but the Alfa Romeo Guilia TZ1 truly reached its development apogee in 1964—the same year it won its displacement class in GT racing at all the major international events, including the Sebring 12 Hours, the Targa Florio, the Nürburgring 1000 Kilometers and the 24 Hours of Le Mans.

The car was eventually succeeded in 1965 by the even more exasperated TZ2, Spada and Zagato's *pièce de résistance*. Without doubt, the TZ2 was one of most delectable sports cars of '60s, second only

➤ *Butt-end of champions*

Theater of the Obscure: A Readers' Guide to Romeos and Giulias

➤ *To the uninitiated, Alfa Romeo seems to have named an annoying array of cars either Giulia or Giulietta Somethingorother, with a couple of letters thrown in at the end for good measure. In the case of the TZ1's progenitors, a little clarification is definitely called for.*

PHOTO MARTIN

➤ ***The Giulietta Sprint:*** *Introduced in 1954, the Bertone-styled Giulietta Sprint (and later Sprint Veloce) coupes were the firm's front-line production-based racing car through the end of the decade.*

PHOTO MARTIN

➤ ***The SVZ:*** *Constructed as privateer-financed customer cars, more than a dozen so-called SVZs—essentially rebodied Sprints—were constructed by Zagato. The cars ran to great success in international competition. Actual coachwork varied, but Zagato's egg-shaped theme held sway throughout.*

PHOTO MARTIN

➤ ***The SZ:*** *Tired of being trounced by SVZs, Alfa commissioned Zagato to create refined versions of the car with the factory's blessing. This became the SZ series, of which more than 215 were produced. The round- and short-tail models comprise the two main subsets.*

➤ ***The SS:*** *Bertone's own more stylish (but bulkier and less competitive) successor to the Sprint Veloce. Too heavy for meaningful competition, it became a stylish grand tourer.*

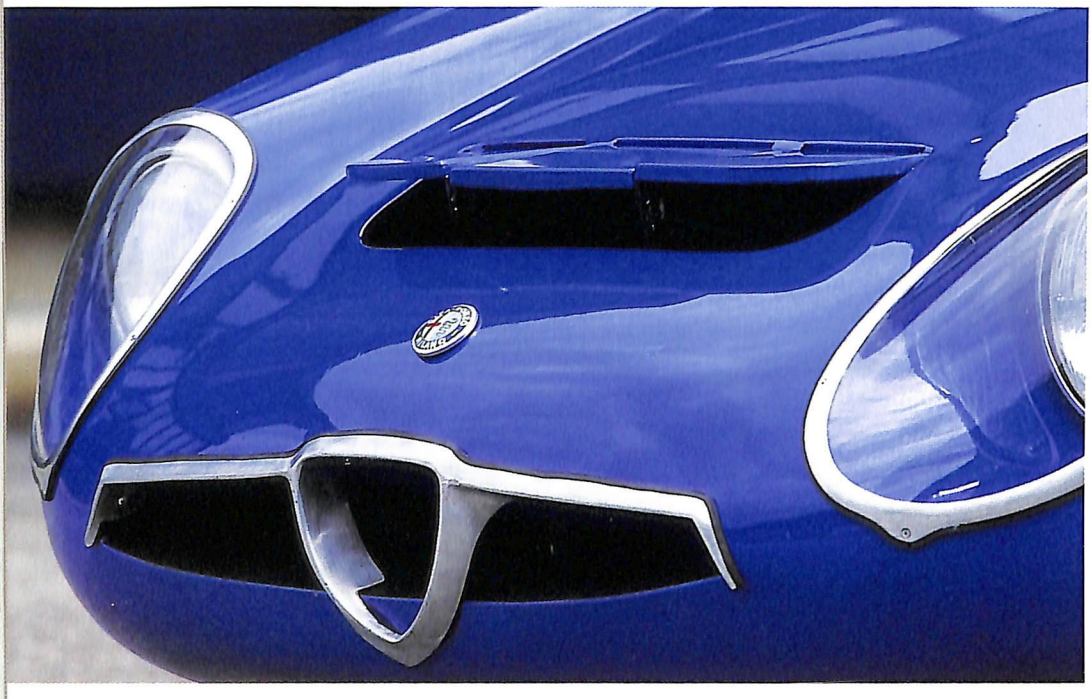
➤ *After the production-based SZ, Alfa's tube-framed TZs took over the firm's competition duties, and that brings us up to date with the story. Now the only question is, couldn't Alfa think up some more names? —Keith Martin and George Stradlater*

➤ *Personal trainers to the stars*

in its aggressive animalesque grace to the Ferrari GTO. But if the TZ1's career was rather brief overall—its major wins spanning a period between Monza in 1963 and Sebring in 1965—then the TZ2's was nothing but a brilliant 1965 flash. Both models would quickly be replaced in Alfa's grand vision by the Giulia GTA touring car and Carlo Chiti's 1960s masterpiece, the Alfa Tipo 33 sports-racers.

Driving Reign

The car I'm testing is a particularly representative model of the TZ's breed. Chassis #750018 is an earlier car built at the beginning of 1964, perhaps most unusual simply in its not being red. The color is accounted for by 750018's being originally destined for France and privateer Jean Rolland, though it did end up painted in more traditional Alfa livery prior to its recently completed restoration. Along the current and conservative lines of restoration thought, this TZ has been subject to almost



➤ *Vents are a factory-blessed hatchet job*

holistic intervention, the restoration artisans only touching the original metalwork where strictly necessary. It's the same approach long used in the art world—after all, if you set about restoring a Rembrandt you don't replace the canvas.

Most emblematic of this approach is the large clamshell hood. On the driver's side is a fist-sized panel gap caused by years of owners, mechanics and admirers repeatedly lifting the 1-piece hood from that side. It's been straightened as far as possible, but the thin-gauge aluminum has understandably been stretched. This hood has simply been left in place, warts and all, rather than replaced. This quest for originality and respect for the car's well-earned patina are things that SCI has been trying to champion for years, so we heartily applaud the current owner's decisions.

Indeed, you should actually beware of any dead-straight TZ1. Like many other handbuilt racers of that era, few if any had perfect curves even when they left the factory. If they look absolutely straight now, you're almost certainly looking at a replica part—or maybe even a replica car.

Given its originality and years of use, then, this TZ1 is perfect in every respect, witnessing years of painstaking research by its proud Swiss owner. Every part is original, right down to the aluminum kick strips—one of those little trim items that were usually the first bits to get pitched overboard in the hunt for light weight.

Revealed Truth

On the road, the TZ1 is one of those performance revelations that the '60s sometimes throw back at you, making one wonder just where all the fuss about progress comes from. Okay, the decibels are outstanding for their presence, the ride is lively and the legitimate period rubber squirms around on its tread blocks even at modest cornering speeds. But this Alfa also presages everything you'd ever want from a modern sports car—nimbleness, faithful road manners, punchy acceleration, tight, telepathic steering and wheelbarrow-loads of character. As a driving experience, the TZ1's total lack of excess flab impresses even the most jaded modern driver.

The blue racer looks low and purposeful but seems even more so when you try to get in. It's amazing how compact this car is, with its bodywork shrink-wrapped around precisely engineered spaces for the suspension, powertrain and driver. Climbing into Zagato's early form of wraparound seat requires the tortoise-like ability to retract your head into the space most of us keep reserved for neck and ribs.

Once in, the TZ1 simply envelops you. With a helmet in place headroom would be quite a squeeze, and I can't help wondering whether drivers in the 1965 Nürburgring 1000 Kilometers developed their own Gurney bumps in the roof just through repeated jumps off the Flugplatz.

There's really nothing to learn from inside the cockpit—it's all bare essentials,

with a nice, upright steering wheel and the traditional Giulia gearshift sitting comfortably a palm's span from the attractive wooden rim. The all-important rev counter is placed right-bang in front of your eyes, while the less noteworthy speedo is perched off above the shifter. Three minor gauges (plus a fourth for fuel) monitor the other essentials—water and oil temperature plus oil pressure. All-around visibility is excellent, although the low roofline over the windshield takes a little getting used to, rather like peering out of half-closed eyelids on a hairy Morning After.

Good thing it's *not* a Morning After, however, as firing up the engine confirms the cabin's excellent abilities as a mechanical resonance chamber. Running a genuine 160 bhp, the high-compression (11.4:1) Four snorts moodily to itself at idle, although the firing is remarkably smooth for such a cooking unit. Squeezed tight up against the firewall, there's no doubt it's sharing passenger space with you. The metallic chorus is completed by the whining differential, especially when cruising casually in top gear.

This TZ1's engine was originally built by Virgilio Conrero, one of the SZ and TZ tuning maestros that catered to privateers unsatisfied by the official Autodelta setup. In more recent years, 750018's concerto has been conducted by the magical hands of Angelo Chiapparrini, a Milan-based tuner who prepares and races (to spectacular effect) his own Alfas, including two delectable TZ1s.

The venerable Alfa twincam in this form is truly magnificent—on a constant throttle it's crisp and duly progressive despite the two big-throated, twin-choke Weber 45DCOEs and seething cam. Having said that, the real action only starts to boil up between 5000 and a merry 8000 rpm, evidence of this small mill's high state of tune and the light weight of the car it's intended to propel. As is usual in such a gargling setup, mash the throttle anywhere below that rev range and the fuel/air mix sticks in the Webers' throats like overconcentrated mouthwash in the maw of a hopeful deb. Rather than offering up a sophisticated sizzle, this aggressive 4-banger thunders and rasps its disapproval at low revs, only to blare stridently after 4500 is cleared.

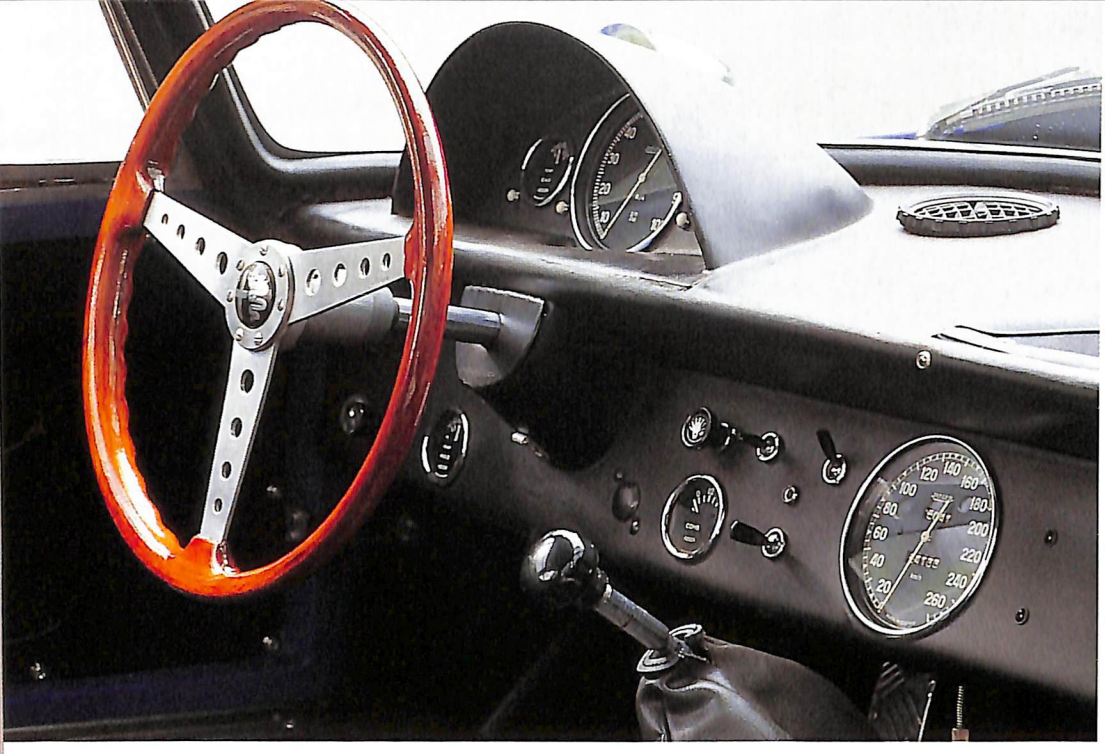
My Name's Sybil

Once the engine is on cam, the entire personality changes. When left to churn about sluggishly, the TZ1 feels a mite reluctant and bullish. As road speed rises and the engine spins faster, though, it becomes alive and fluent, rewarding human precision with mechanical precision, the velvety throttle response encouraging you to drive tidily and build up speed around corners.

Constant power through bends reveals stunningly accurate feedback provided by the worm-and-roller steering, and the car's handling feels poised and cat-like in its bal-

➤ *The van delivers*

➤ *Calling Dr. Kamm*



➤ *How to play hide-and-seek with your gauges*

ance. The tubular chassis eradicates the earlier SZ's dainty, ballerina-light cornering style, despite its 2-inch shorter wheelbase and only marginally wider (0.3-inch) front track. The TZ1 also stands two inches lower than the SZ, and its lower center of gravity gives the car greater precision and stability.

The TZ1 shows strong grip on its narrow 155-15 tires, and its modest understeer gives way to a pleasingly neutral cornering stance before the tail breaks gently away. Snapping the throttle shut in mid-bend reveals an understandable shortcoming with such unyielding period tires; the nose tucks in, encouraging the usually well pegged-down rear to lift and step briefly out of line.

Of course, the TZ is definitely more skittish once grunt overcomes grip. Funnily enough, that makes this old car feel more chuckable and communicative than a faster GT of the modern vein. In the real world, then, the TZ1 would seem the superior handling car—it can be reasonably hard work winding on the steering in tighter bends, but its flat ride and strong grip through high-speed sweepers make it tremendously rewarding at rapid cross-country speeds.

The gearbox gives immense satisfaction as well. It's basically the same as that found in the last-generation Alfa Spider, and that means slightly long throws between cogs. Lightning-quick changes are out of the question, but almost telepathic wrist movements accomplish everything necessary. The plus side of this transmission includes a sensation of oily precision and the positive feel that's imparted when you get the cogs to

Carlo Chiti and Alfa Romeo

➤ This larger-than-life engineer started his career with Alfa Romeo in 1952, where he worked for five years on experimental racing projects until being tempted away by Ferrari. Four short seasons later he was part of the famous Ferrari walkout of '61, going to the ill-fated ATS group before moving into full-time directorship of Alfa's quasi-works Autodelta team in 1964.

➤ Ing. Carlo Chiti brought glory back to the Milan-based manufacturer with two World Sports Car Championship titles and a return to Formula One exactly 30 years after Alfa took the first World Championship in 1950. Recently history had turned full circle, with his own Motori Moderni factory employed in building and servicing the monstrous 420-bhp V6 engines used by the Alfa 155 V6 TIs in the German Touring Car Championship.

➤ Chiti started Alfa's heroic Autodelta racing arm in 1963 with a commission to assemble 100 TZ1s. Speaking to me shortly before his death in July of '94, the great engineer described the operation thus: "At the beginning, ours was a small organization—just a handful of workers, no more than seven or eight. Alfa sent us Zagato's bodies and the running gear, and we tested and assembled the cars.

➤ "The TZ1s were initially race-prepped by Alfa with engines tuned by Conrero, and were entrusted to the Milan based team of Scuderia Sant' Ambreous. Subsequently, Autodelta took over some of the development for racing in Group 3 GT. Then, after Sebring in 1965, we transferred lock, stock and barrel to the outskirts of Milan—to be closer to Alfa Romeo—and took over preparation and team management of Alfa's racing program.

➤ "On average, 15-16 TZs raced every week and Autodelta had to keep them on the track, either giving full technical assistance or supplying parts. Clearly, our advantage over other... suppliers was that being responsible for development work, we could offer the latest improvements."

➤ Chiti's all-consuming passion for his creations meant he was always present at race meetings to monitor the various teams' progress. During endurance races he would sleep little and stoke his reputation as a big eater: It's said that at one long-distance event he nervously munched his way through 18 chickens.

➤ "What were the TZ1's most memorable races? But that's 30 years ago or more!," Chiti responded to my question, his eyes widening in mock horror. "Well, there <u>was</u> the 24 Hours of Le Mans when the car came home on three cylinders but still managed third place all the same. My real regret was that neither the TZ1 or TZ2 lasted long enough. With our arrival at Settimo Milanese we became Alfa's racing alter ego, and new projects were already under development to contest two other categories—Touring Cars with the Giulia GTA and the World Sports Car series with the Alfa 33. The TZ's success was short-lived compared to what the later cars would go on to do."—Joanne Marshall

SPECIFICATIONS

1964 ALFA ROMEO TZ1 (factory delivered)

General
Vehicle type: front-engine, rear-wheel-drive coupe
Structure: tubular steel frame with alloy body panels
Market as tested: competition

Engine
Type: longitudinally-mounted inline-4, aluminum block and head
Displacement (cc): 1570
Compression ratio: 9.7:1
Horsepower (bhp): 112 @ 6500 rpm
Torque (lbs. ft.): 98 @ 3500 rpm
Intake system: 2x2bbl. carburetors (Weber DCOE)
Valvetrain: two overhead cams, two valves per cylinder

Transmission
Type: 5-speed manual
Ratios
1st: 3.26
2nd: 1.99
3rd: 1.36
4th: 1.00
5th: 0.85
Final drive: 3.25

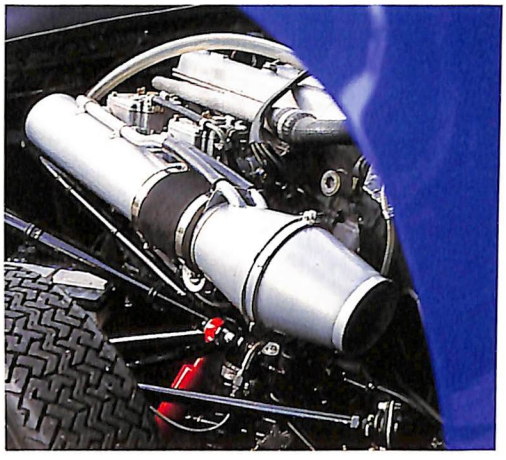
Dimensions
Curb weight (lbs.): 1450
Wheelbase (in.): 86.6
Track, f/r (in.): 51.2/51.2

Suspension, brakes, steering
Suspension, front: double wishbones with coil springs and antiroll bar
Suspension, rear: transverse arms with coil springs
Tires: 155-15
Brakes, f/r: disc/disc (Girling)

entwine perfectly at the end of each throw.

When it comes right down to it, it was a pity the TZ1's star burned so briefly while its TZ2 successor lived even shorter still. The Tubolare Zagatos had everything going for them—looks, power and performance—but they simply arrived at a time when the other cars in their class had developed mid-engine configurations and Alfa's racing intentions had moved on to touring cars and pure sports prototypes.

Still, the TZs did prove how serious Alfa was about getting back to its racing roots, and the involvement of Carlo Chiti alone (see the accompanying sidebar) make them irresistible pieces of history. Following Chiti's lead, Alfa Romeo would even go back into F1 eventually, hoping and bring the heat and sizzle of a racing image back to its clients' minds. In the meantime, it was the Giulia Tubolare Zagatos that kept the fires of this worthy heritage stoked.



➤ *Homemade trumpet*

➤ *Yes, it's <u>that</u> Giulia twincam Four*

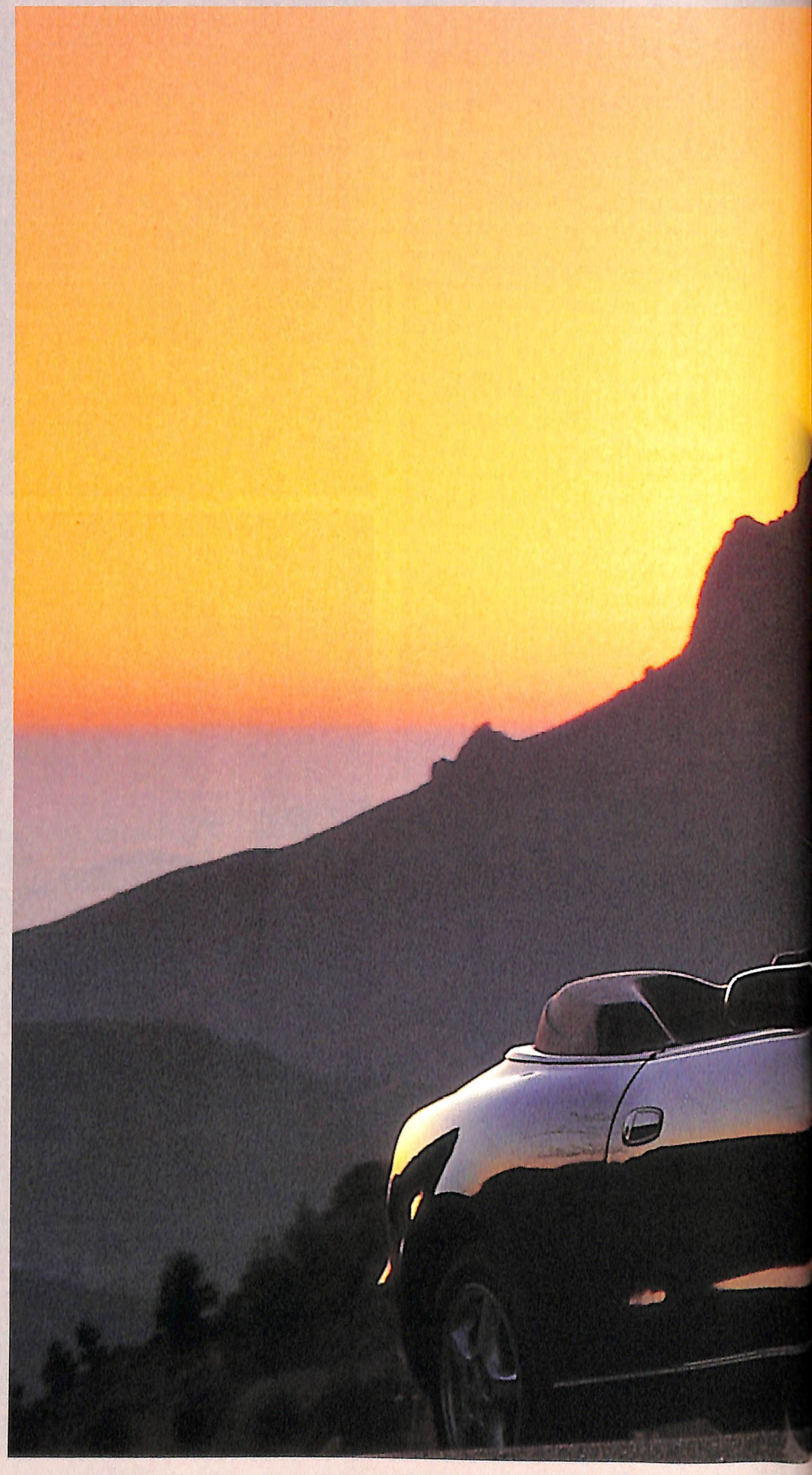
The Latin rhythms of the Gypsy Kings floated up from the cab of the Celica Convertible. For a moment, it seemed to the young couple they were driving in the South of France, not the Pacific Coast Highway. Quiet elegance and young love inundated the surrounding motorists, so much so that a man in a passing Buick felt decidedly nauseated.

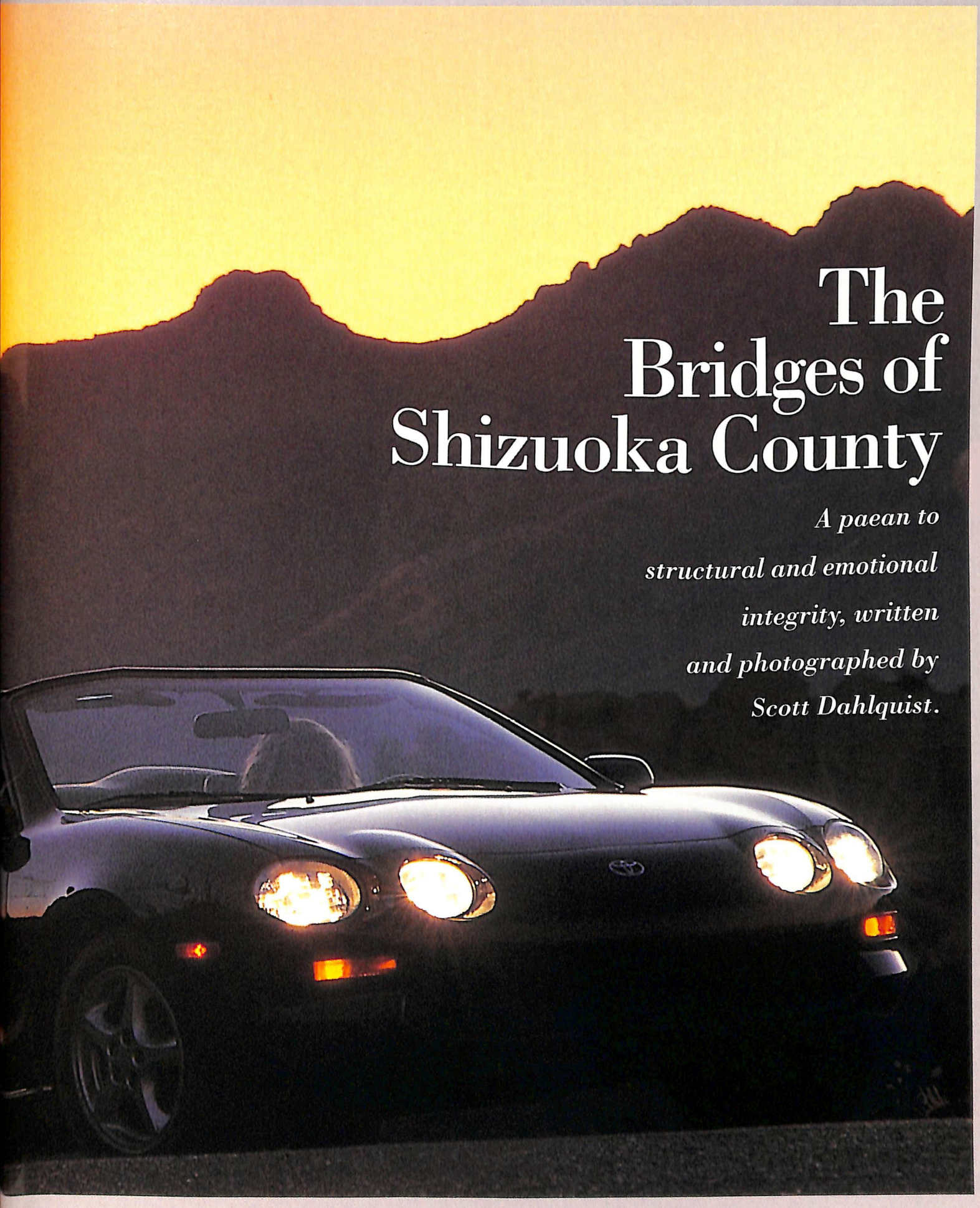
Normally he drives too aggressively, but today he enjoyed how quietly and comfortably the car glided along the highway. It was a perfect moment: He enjoyed talking while soaking in the warm sun and smelling the sea. He was a true enthusiast and the Celica felt wonderful on the wide, twisting highway—at the calm speed of 45 mph the noises of wind and engine were practically nonexistent.

A smile from his friend told him she was completely comfortable, and he didn't care about driving any faster. And with 2755 pounds of the steel and plastic holding them down like so much emotional flotsam while only 130 dashing horses propelled them forward, this was probably a good thing. Not for a long time had he cruised so effortlessly without feeling the uncontrollable urge to slice madly through traffic.

Now they were heading north from Venice Beach, where too many people had asked questions at the coffeehouse. Dusk was near; he turned on the curious twin headlights and noticed how luminous they were. Onlookers had admired the monochromatic front bumper and grilleless front intake, but she loved the sweptback looks. At the coffeehouse an especially hirsute Beatnik had talked of how the rakish windshield and flush door handles made the car look like it was going 20 mph even standing still. A tougher, more experienced soul, he grunted his assent while only half-accepting the words behind it. "*Yes,*" he thought to himself. "*Handsome.* Ah, but for how long? Styling can be so much like my attraction to redheads—painfully tenuous!"

At that moment they were picking up speed in North Malibu, the burnt-out hills from last year's fires looming to their right. Now, for the first time, they could see the twisty canyon roads previously obscured by 20 years of dense undergrowth. Today it

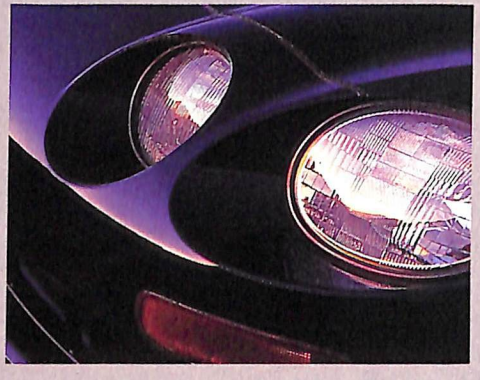




The Bridges of Shizuoka County

A paean to structural and emotional integrity, written and photographed by Scott Dahlquist.

At the coffeehouse, an especially hirsute Beatnik had talked of how the rakish windshield and flush door handles made the car look like it was going 20 mph even standing still. A tougher, more experienced soul, he grunted his assent while only half-accepting the words behind it.



looked as if the very pavement had been melted onto an alien topography of red rock and burnt wood by Salvador Dali.

She suggested climbing into the hills, hoping for a better view of the sunset. He turned on the next road he saw, just after sliding some faster-paced music in the CD player. The 220-watt high-output system's eight speakers made it seem as if the Stone Temple Pilots were playing a set in the rear seats. Pleased, he sang the words from his favorite song, "Driving Faster in My Car...," and accelerated as they climbed Decker Canyon Road.

Unconsciously, as a release from his leisurely cruise up PCH, he began to pick up speed with each corner. He became more focused on the road. His last distraction was noticing his friend, also concentrating ahead. The twincam 16-valve revved eagerly, even if it tended to thrash at speed. He had no choice but to push: Its power, like that of *all* pleasurable acts, only came on strongly above 4000 rpm.

He knew the 2.2-liter dynamo would be able to push the convertible faster on the empty straights coming up near Mulholland, but for now he felt drag, hesitancy. It was like a weight—subtle but there, holding back his progress. Was it his own fear of rejection, or was he feeling once again the gravitational pull of nearly 200 additional pounds in a chassis whose coupe form already felt hefty, even at a mere 2560? He dared not wonder.

Still, as velocity increased on the hilltop highway, they were undeniably comfortable. Moving faster than 65 on this crumbly, used mountain road would put most convertibles in distress, but he was happy and secure. Toyota had engineered his Celica to be 20% more rigid than last-generation's model, with a strategically reinforced body and subframe to help reduce cowl shake. Losing its top in an ASC conversion didn't materially alter this, at least not as much as his own breakdown had years before.

Of course, he also realized that this sophistication, coupled to ABS and leather and a stereo/tape/CD—items that seemed so necessary in his ethos, so decadent and cold in hers—added greatly to its pricetag of more than $28,500, up $4500 from the base. *Yes,* it was a lot! *Yes,* it was in fact *obscene!* Yet the car's feel was nearly identical to that of the fabled Audi Cabriolet. Almost, but not quite, as good as the Saab 900 Convertible, that paragon of virtue on earth. What was $28,500 to creatures such as these!? *Tripe!* How could others—those

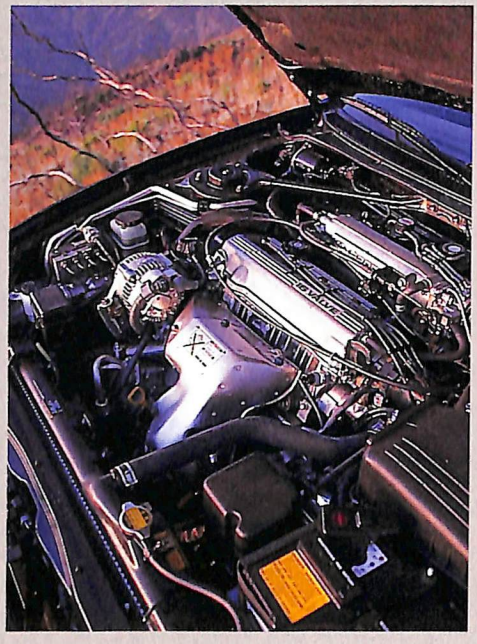
➤ *Celicas arrive from Japan in coupe form and are converted to convertibles by ASC in California. Amazingly, the firm's work is often better than production-line offerings; 3-layer top uses electric motors rather than hydraulics, allowing manual operation in an emergency.*

nattering, weasel-mouthed scribes back at the office—*how could they not understand?*

The road began to undulate along the edge of the hill. He slowed hard for the fast-approaching corner. The brakes were outstanding, their optional ABS biting mildly into his foot. Heel-and-toeing into the corners, he knew these very brakes provided the ideal complement to the car's smooth cornering, its feeling as if on rails. The flawless clutch, the clean, slick shifter—all tactile, all efficient. Cold, clean, rewarding, impersonal; it was too much like...*her.* His friend, bag in hand, looked at his face. "These pretzels are stale," she moaned petulantly. As if the world were *meant* to be fresh, as if moisture wasn't *supposed* to get into open baggies.

The road became more twisty, he was using 2nd and 3rd on the 5-speed, easily matching the revs, keeping the ride smooth. Seats comfortable and gauges clear and legible, he realized how near to perfection were

Nearing the valley floor they passed an orange grove and could smell the sweet blossoms hanging thickly in the air. A few miles later they hit a cool pocket of the pungent, freshly cut aroma of hay, rich in their nostrils. Soon they entered dairy country, where he slammed on the 4-wheel discs.



➤ ***A far cry from the days when Celicas were meant to be entry-level transportation, the GT's leather package is optional but power windows and locks come standard. Venerable 2.2-liter Four offers 130 horses and 145 lbs.-ft. of torque, but flat delivery curve makes it feel like much more.***

the ergonomics of this car. The rack and pinion steering also gave him excellent guidance and information—things he could never get from his own father.

Now, as a man himself, he knew this canyon well and set up for an upcoming asymmetrical off-camber corner perfectly. Decreasing radius...trail-brake softly for the late apex...hard acceleration to the next corner. Sweepers, variable-radius hairpins, 90-degree right- and lefthanders, even dusty off-camber corners: The car handled it all flawlessly, its body rolling hard to the outside but its tires always planted.

While slow off the line, the topless Celica provided completely neutral handling characteristics. Only once was he reminded of its front-wheel drive—the thing his parents had said would be his ruin. It was in a symmetrical corner, too, when a little canyon critter skittered across the road in front of them. With a quick diversionary flick of the wheel the car went into a slight push. *"Ah, yes. Front-wheel drive,"* he thought suavely, pulling off at the next overlook to let the adrenaline die down and his bladder stop vibrating.

There was a beautiful vista and they watched the sunset together. After 20 minutes of relaxing silence she told him she was hungry. He turned the Celica and started down the other side of the hill, down from their mountain, down toward civilization. Nearing the valley floor they passed an orange grove and could smell the sweet blossoms hanging thickly in the air. A few miles later they hit a cool pocket of the pungent, freshly cut aroma of hay, rich in their nostrils.

Soon they entered dairy country, where he slammed on the 4-wheel discs, pulled over and rushed to remove the 1-piece boot and raise the 3-layer top. Gratefully, he acknowledged it was a simple push-button task. As the electric motor strained to raise the roof, he thought, "Perhaps this is the noisiest part of the car." What irony. He stood back from putting the folded boot in the trunk, realizing the Celica Convertible looked a lot like the Coupe when the top was up. "How transient we are!" he mused. "How quickly we can change!"

As the car moved back on the road they both were looking forward to Italian food at Adriano's. He pictured himself sipping a cool glass of Pinot Grisio and reminiscing over a day of sun, sight, smells and thrills. She looked tired but happy and suggested taking in a movie and some ice cream later. He just smiled. "A movie," he thought. "Yes, life is like a movie. But it is perfect."

Later, outside Adriano's, in a space marked Handicapped Only, a large iron hook was moved into place and raised on its cables. And at last, its connection was complete—a pensive yet loving embrace between his Celica and the tow truck.

SPECIFICATIONS

1995 TOYOTA CELICA GT CONVERTIBLE

➤ General
Vehicle type: front-engine, front-wheel-drive convertible
Structure: steel unibody
Market as tested: United States
MSRP: $28,621 (est.)
Airbag: std., driver and passenger

➤ Engine
Type: transversely-mounted inline-4, iron block and aluminum head
Displacement (cc): 2164
Compression ratio: 9.5:1
Horsepower (bhp): 130 @ 5400 rpm
Torque (lbs. ft.): 145 @ 4400 rpm
Intake system: EFI
Valvetrain: two overhead cams, four valves per cylinder
EPA fuel economy (city/hwy mpg): 22/29

➤ Transmission
Type: 5-speed manual
Ratios
1st: 3.29
2nd: 1.96
3rd: 1.32
4th: 1.03
5th: 0.82
Final drive: 4.18

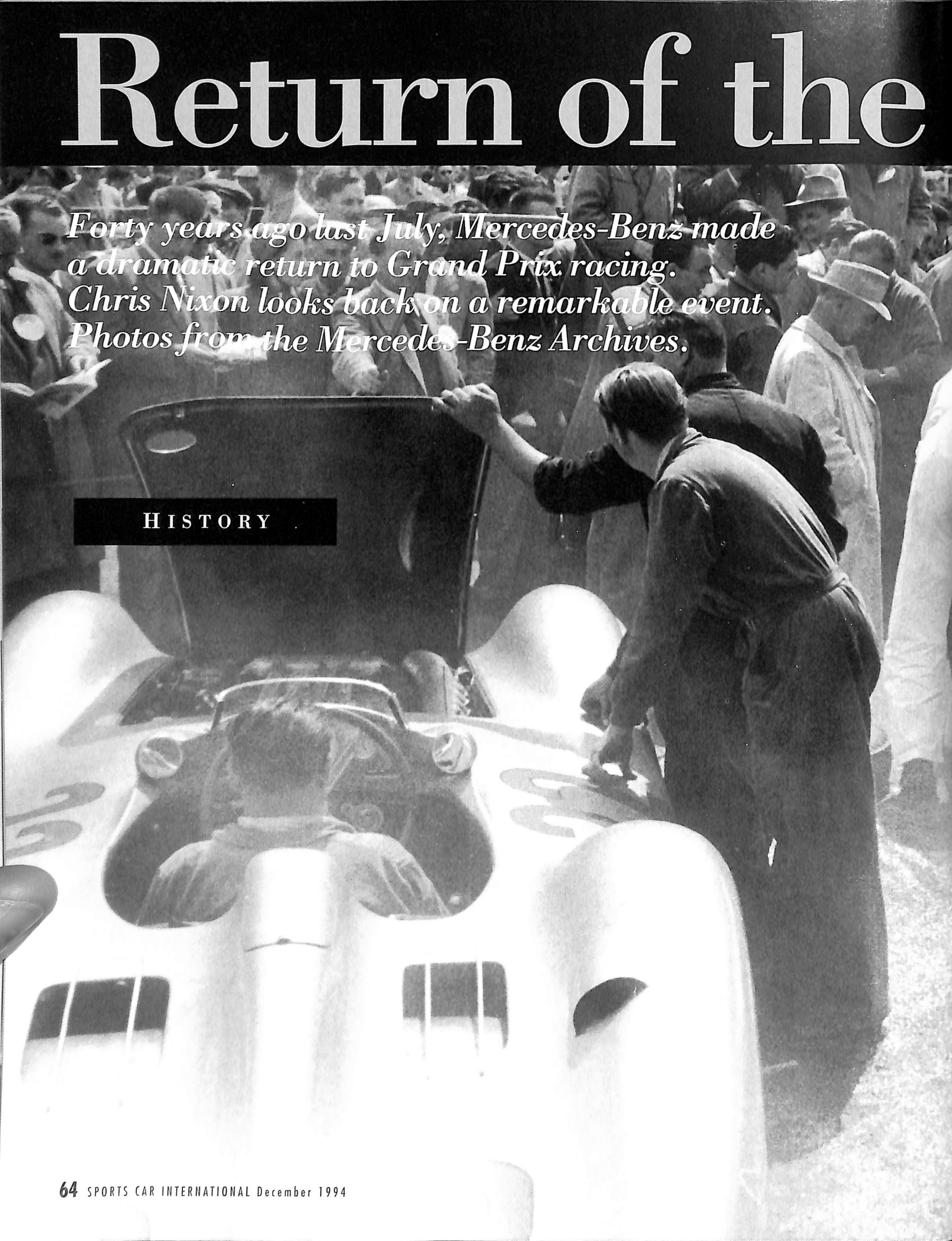
➤ Dimensions
Curb weight (lbs.): 2755
Wheelbase (in.): 99.9
Track, f/r (in.): 56.9/58.9
Length (in.): 177.0
Width (in.): 68.9

➤ Suspension, brakes, steering
Suspension, front: subframe-mounted MacPherson struts with coil springs and antiroll bar
Suspension, rear: subframe-mounted trailing arms with lateral links, coil springs and antiroll bar
Steering type: rack and pinion, power assisted
Wheels (in.): 15x7
Tires: 205/55R15
Brakes, f/r: 10.8-inch vented disc/10-6-inch disc
ABS: opt

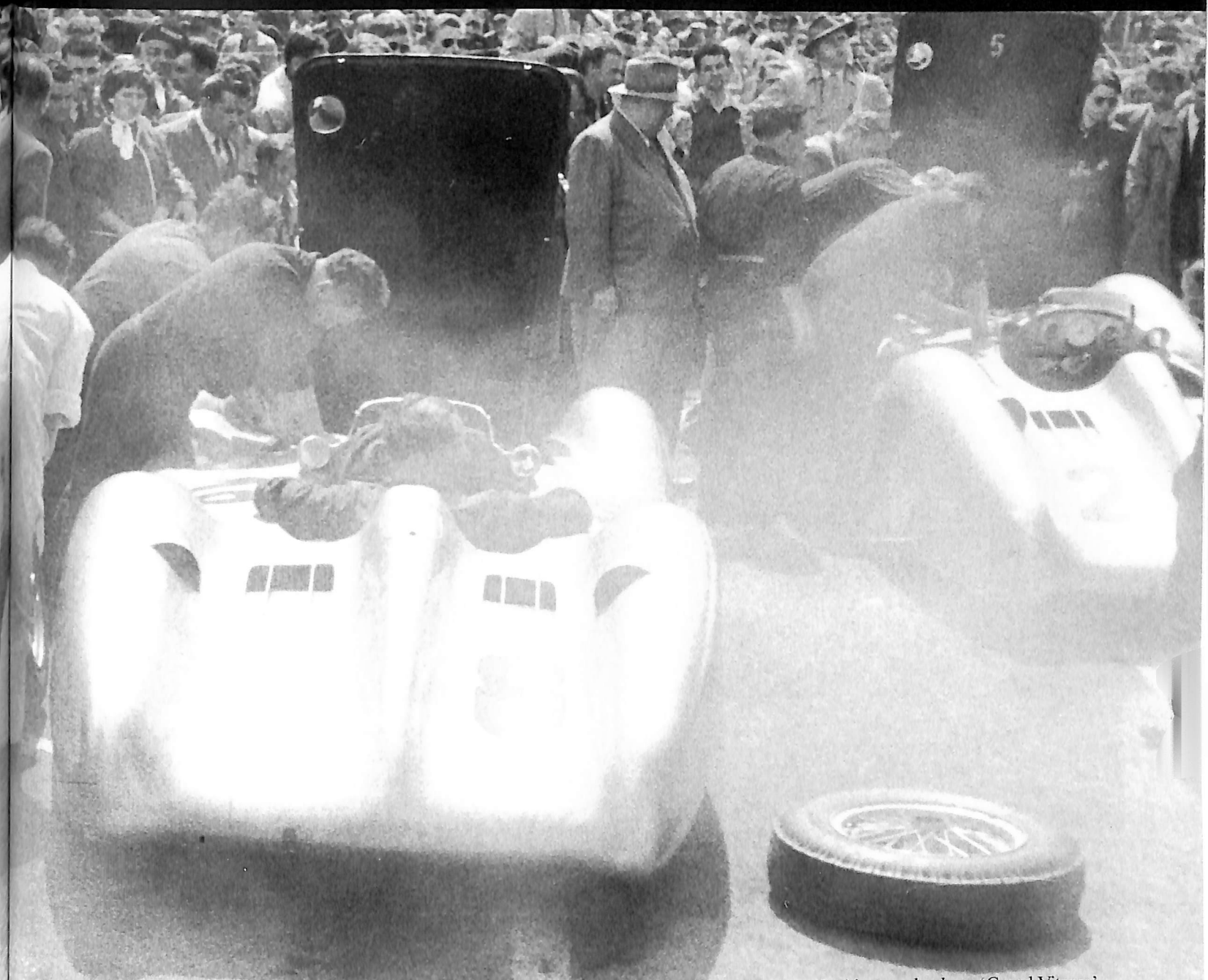
Return of the

Forty years ago last July, Mercedes-Benz made a dramatic return to Grand Prix racing. Chris Nixon looks back on a remarkable event. Photos from the Mercedes-Benz Archives.

HISTORY



Silver Arrows

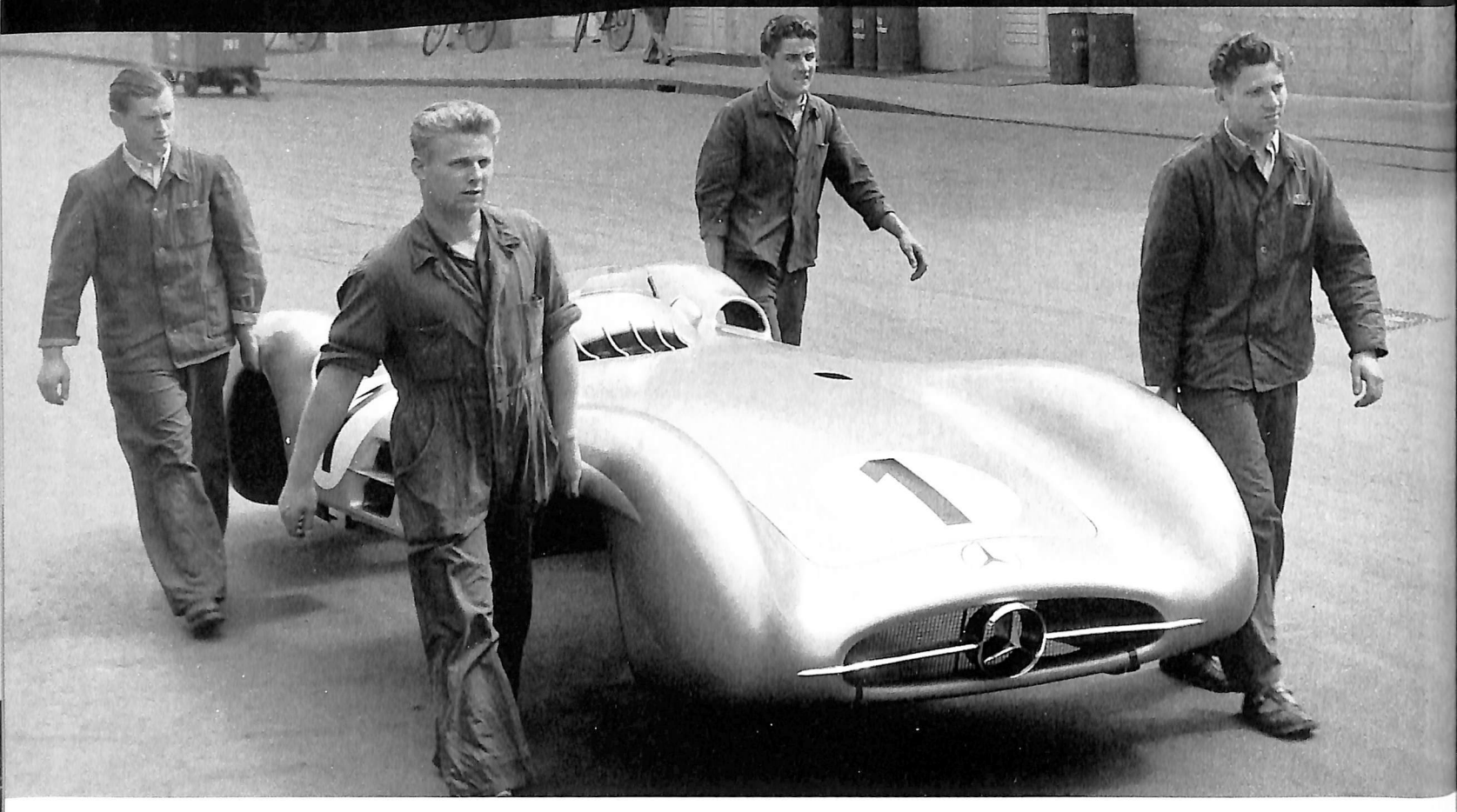


Reims, Monday July 5, 1954: *"So, there you are, they're back, and e'en the ranks of Tuscany could scarce forbear to cheer. By 'they', of course, we mean Mercedes-Benz, as if you hadn't guessed. This circuit suited them admirably and it is possible their wind-tunnel form profited from the high and gusty wind on the long straight past the pits. They were tremendously fast. Looking across the gently undulating cornfields to the return straight, the Mercedes could be seen simply walking away from everything else. Neubauer in charge again, a little more rotund, but otherwise pre-war. Organization on precisely the same lines. Splendid lorries, complete mobile workshop, 38 mechanics, supersize pit signals, absorbed time keepers and chart keepers with nine stop watches. The lot."*

With those words, Rodney Walkerley described the return of Mercedes-Benz to Grand Prix racing 40 years ago, writing under his *nom de plume* 'Grand Vitesse' in The Motor. The erudite and urbane Walkerley had witnessed most of the great battles between the Silver Arrows of Mercedes-Benz and Auto Union in the 1930s, and he was, of course, at Reims in 1954 for the French Grand Prix and Mercedes' postwar comeback.

The Germans were not ready for the first Championship Grand Prix of the season in Argentina (January 17) or even the second in Belgium (June 20),

A stunning, all-enveloping body harked back to the streamliners which Mercedes and Auto Union raced at Avus in 1937.



but by making their return in the French GP on July 4 they were able to maintain something of a company tradition. Forty years earlier, no less than five Mercedes cars (the firm was not yet Mercedes-Benz) had been entered for the 1914 French Grand Prix on July 4 at the Givors circuit near Lyon. Three of them had finished 1-2-3, driven by Christian Lautenschlager, Louis Wagner and Otto Salzer.

Twenty years later, Mercedes-Benz returned to Grand Prix racing and the new 750kg formula by entering three cars for the French GP at Montlhéry, near Paris, on July 1, 1934. This time, driven by Rudolf Caracciola, Luigi Fagioli and Manfred von Brauchitsch, they suffered an ignominious defeat, as all three retired. However in the next six years, until the outbreak of World War II, the team from Untertürkheim, near Stuttgart, scored 28 wins in 47 starts—ten more than Auto Union, its closest rival, had managed from the same number of races.

Twenty years on at Reims, as Rodney Walkerley implied, Mercedes had avenged that Montlhéry defeat, with a 1-2 victory in which Juan Manuel Fangio and Karl Kling simply pulverized the opposition. Mercedes-Benz served notice they were back with a vengeance, and determined to continue their prewar dominance of Grand Prix racing.

From the Rubble

The return of the Silver Arrows began in 1947, when the Mercedes-Benz workforce—such as it was—was still rebuilding its factories out of the rubble to which they had been reduced by Allied bombers in 1944/45.

In his book The Mercedes-Benz Racing Cars, Karl Ludvigsen revealed that Team Manager Alfred Neubauer had found two 1939 W154 Grand Prix chassis and four 3-liter, supercharged V12 engines on the premises. Then, two complete cars were discovered on a used-car lot in Berlin!

By September of 1950, two of the Grand Prix cars were being driven 'round the Nürburgring in preparation for some races in Argentina in February of 1951.

Three W154s were sent to South America to be driven by 1939 European Champion Hermann Lang, Karl Kling and 1950 World Champion Dr. Nino Farina. However the organizers demanded that local hero Juan Manuel Fangio drive one of the cars, explaining that otherwise no one would turn up to watch. Farina was dropped from the team (to his great disgust), but he didn't miss much in the end; all three Mercedes cars were trounced in both races by Jose Froilan Gonzalez in a 2-liter Ferrari!

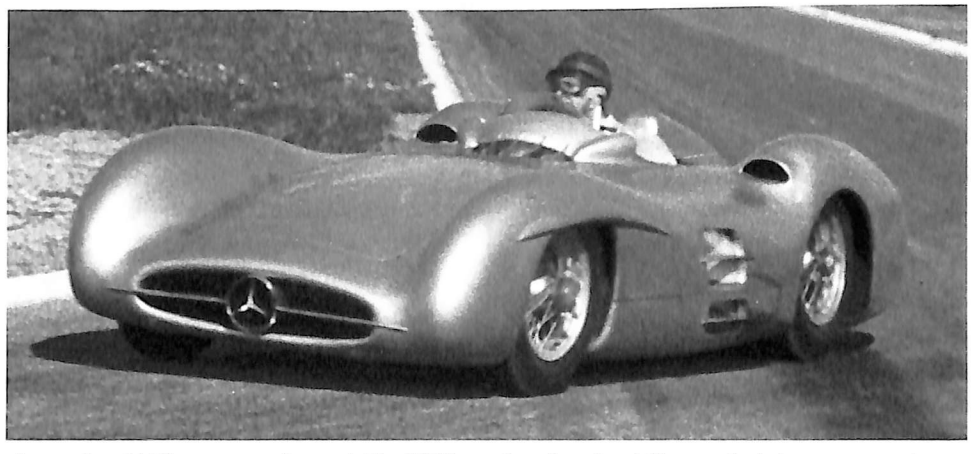
The 1950 GP season had been dominated by the supercharged 1½-liter Alfa Romeo 158s driven by Fangio, Farina and Luigi Fagioli. These cars had originally been built

➤ ***Preparing for the French GP, Fangio looks rather skeptical about Team Manager Alfred Neubauer's (far right) opinions. Directly behind Fangio is the great Rudolf Uhlenhaut. Earlier (bottom), Mercedes had arranged solitary access to the Reims circuit for testing before the race.***

in 1938 for the 1½-liter Voiturette Formula, as the Italians were fed up with being soundly beaten by the supercharged 3-liter Mercedes and Auto Unions in Grand Prix racing. In a fit of pique they had decreed that all domestic GPs in 1939 would be for 1½-liter machines—thus, they believed, excluding the Germans. But history would show they had reckoned without Mercedes' legendary ingenuity; in a matter of months the Stuttgart concern secretly designed and built two supercharged V8-powered 1½-liter cars and entered them in the lucrative Tripoli Grand Prix. Libya, of course, was then an Italian protectorate.

The Italians were distinctly miffed, but there was nothing they could do. They had to watch as the new W165 Mercedes entries of Hermann Lang and Rudolf Caracciola destroyed the opposition and won with ease. The little Mercedes were never raced again; somehow both survived the war in Germany, however, and in 1945 they found their way to Switzerland, where Mercedes' star driver, Rudolf Caracciola, had lived since 1927. Rudi tried to get one to America for the 1946 Indianapolis 500, but he was frustrated by bureaucratic red tape.

That same year, the first postwar Grand Prix racing formula was chosen: Displacement limited to 4½ liters unsupercharged or 1½ liters supercharged. By 1950 the Alfa 158s were dominating GP racing just as Mercedes had done in the '30s. The first race of 1951 was the Swiss Grand Prix, and a visiting Alfred Neubauer came away convinced that any future racing program by Mercedes would need the services of racewinner Juan Manuel Fangio. He had also taken a look at the two W165 Mercedes, which were then languishing in the garage of the company's Swiss importer.



If a prewar design such as the Alfa could do so well, reasoned Neubauer, the W165 could do even better—particularly with Fangio at the wheel. The current Formula One rules seemed set for a long run and so, prompted by Neubauer, that summer Mercedes decided to build five new W165s and five spare engines, aiming to return to GP racing in 1952. Neubauer was ecstatic: He had been team manager for Mercedes since 1926, and now his beloved racing cars were about to be back in action once again.

Within weeks of this decision, however, clouds of doubt began gathering over Untertürkheim. To begin with, the British Grand Prix at Silverstone brought the first defeat for the Alfa Romeos, when Froilan Gonzalez in the new 4½-liter V12 Ferrari led Fangio home by a whopping 25 seconds. Two weeks later, Scuderia Ferrari rubbed the nose of Alfa Corse in the dirt once more, with Alberto Ascari winning the German Grand Prix at the Nürburgring, again with a 4½-liter car. Needless to say, the Mercedes technical hierarchy turned out in force to watch this race, and the group was deeply perturbed by what it saw.

The very next day, Mercedes decided that even a brand-new version of the 1939 W165 was not guaranteed to beat the Ferraris and the project was summarily shelved. Just in case anyone at Untertürkheim had any lingering doubts, Ascari completed a hat-trick for Ferrari by beating the Alfas on their home ground at Monza in the Italian GP in September. Fangio regained some pride for Alfa Romeo by winning the Spanish GP in October, but the days of the supercharged 1½-liter engine were clearly numbered.

As, it would prove, were those of the current Formula One. At the end of the season Alfa Romeo withdrew from competition, leaving Grand Prix racing essentially to Ferrari and BRM. However, as BRM was in continual disarray and the sport's organizers saw no point in running a series for Ferrari's benefit alone, they turned their attention to Formula Two instead. As a direct result, the Drivers' World Championship was switched to this 2-liter

formula until 1954, when the new 2½-liter Formula One series was to come into force.

Keeping that firmly in their sights, Mercedes-Benz turned their thoughts to sports-car racing in the meantime, and using their new 300 sedan as a starting point, Technical Director Rudolf Uhlenhaut produced the sensational 300SL. In 1952 this car was victorious at Le Mans and the Carrera Panamericana, and very nearly won the Mille Miglia as well.

Despite the success of the 300SL, Mercedes-Benz' management could not make up its mind about going back into Grand Prix racing. Although design studies had been going on since early 1952, it was not until the middle of 1953 that the go-ahead was finally given and a new *Rennabteilung* (Racing) Department set up. This meant that there was no time for any novel approach to the design of the GP car, which was designated the W196. Although when it appeared the new racer looked lightyears ahead of anything else on the grid, every aspect of the Mercedes cars was already well understood by its engineers in the design stage.

The R&D Department

While searching for the best powerplant, Mercedes' engineers carefully considered the V6, V8, V12 and straight-8. The latter soon became their favorite, as it could be laid on its side to keep the engine mass well down in the chassis and give a low, aerodynamic hoodline to the car.

Mercedes also found that while taking the drive from the end of the crankshaft produced enormous torsional stresses, taking it from the center of the crankshaft reduced the problem to an acceptable level. The engine was therefore designed as two blocks of four cylinders each.

In seeking to run the new engine at speeds above 8000 rpm, it was also discovered that traditional valvegear and coil springs were simply not up to the job. This problem was solved by Hans Gassmann, who was in charge of engine design. On his way home one evening he sketched out some ideas on the back of an envelope and presented them to his team the next morning. Gassmann proposed controlling each valve with two cam lobes, one to open it and the other to close it, thus dispensing with valve springs altogether. He called this simple device *Zwangsteuerung*, or "control by force:" Such a valvetrain t is now universally known as desmodromic.

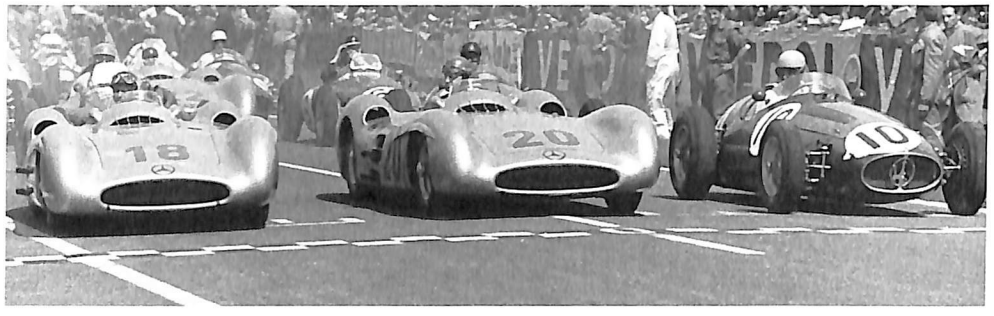
Later, the engineer and his colleagues were very surprised to find that this seemingly novel approach to valve operation had actually been in use in various forms as far back at 1914! Indeed, two of Mercedes' rivals in that year's French Grand Prix—Delage and Schneider—had even used variations of it, but Mercedes was the first to make it really work. In the end, the team found that the admittedly complex desmodromic valvetrain safely gave them more revs than any other solution.

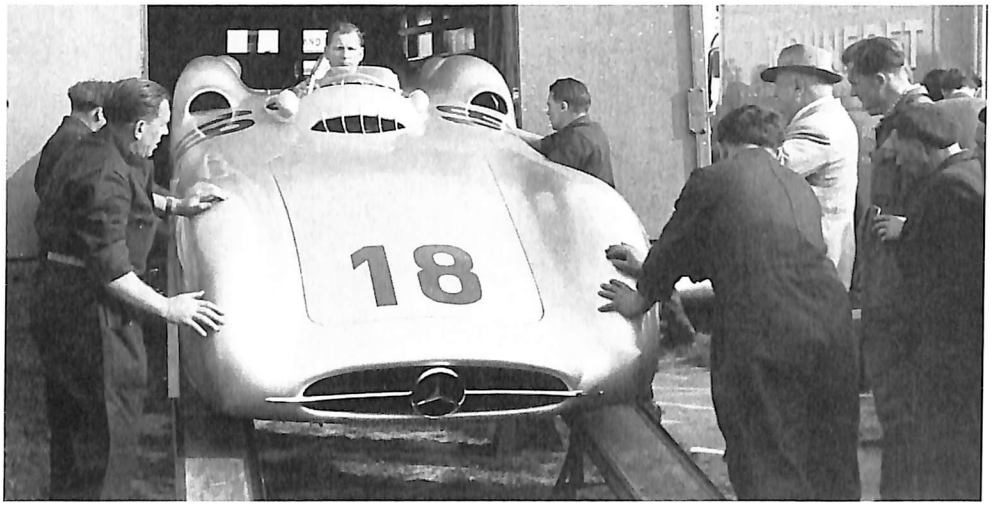
And although Dunlop disc brakes had played a spectacular part in the success of Jaguar at Le Mans in 1953, Dunlop's expertise had not yet found its way to any other racing teams. While naturally impressed with the performance of discs, then, Mercedes stuck with drums for the W196, mounting them inboard both front and rear. This allowed much wider brakes than could be carried on the wheel hubs themselves, and shoes a whopping 3½ inches wide were employed as well.

Using experience gained with the 300SL, the engineers designed a tubular spaceframe chassis made up of 25- and 20mm tubes that weighed just 79 pounds in total. The wheelbase was 92.5 inches with a front and rear track of 52.4 and 51 inches respectively. Suspension was independent all around as on the prewar cars, but the similarity stopped there: The use of inboard brakes meant wishbones and torsion bars (as opposed to coil springs) at the front, and at the rear Mercedes dropped the de Dion suspension they had used so successfully in the 1930s—and which all their Grand Prix opposition was still using—and opted instead for swing axles and torsion bars.

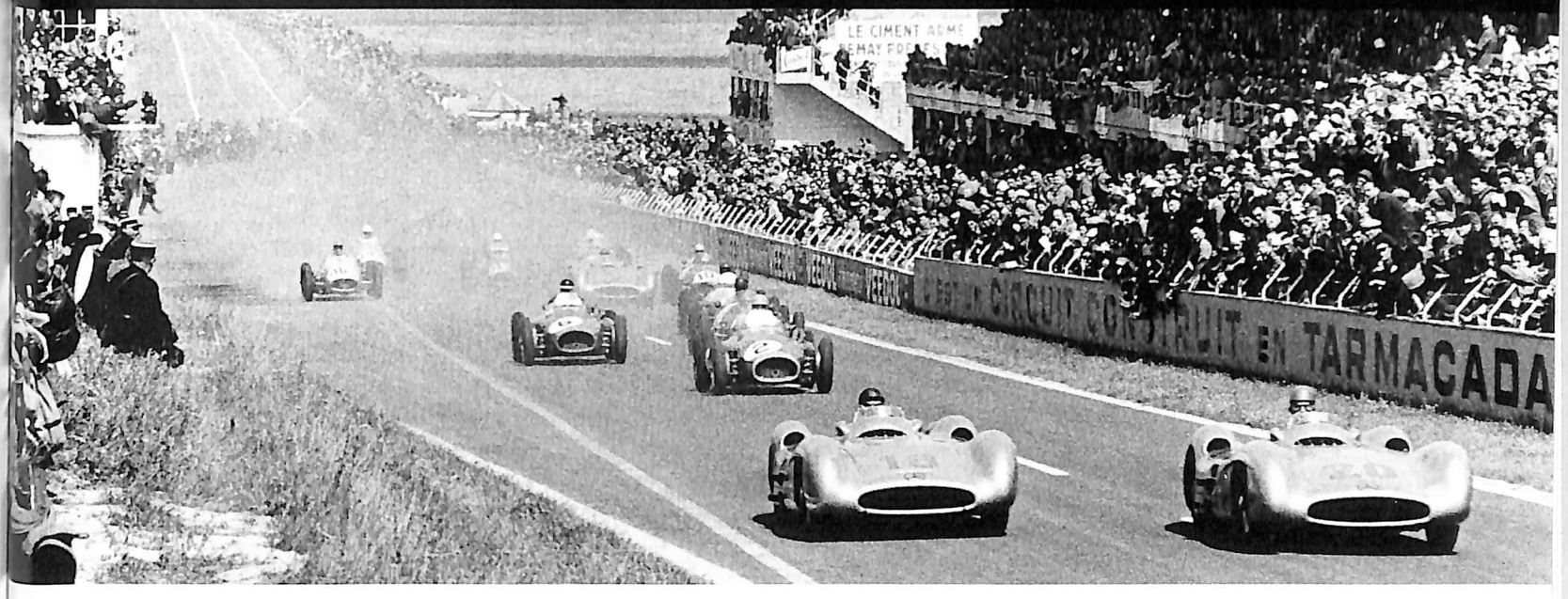
The engine was inclined in the chassis at an angle of 53Þ from vertical; this not only gave a very low bodyline but also meant that the driveshaft could run beside the driver to the rear-mounted 5-speed gearbox, allowing a very low seating position. The engine's bore and stroke of 76x68.8mm provided a capacity of 2496cc; its finished form offered a healthy and reliable 257 bhp @ 9250 rpm.

➤ Fangio, Kling and the Maserati 250F-mounted Alberto Ascari held the pole before the start, but moments later (right) the 1954 season seemed all but over. Ascari is already fading fast with gearbox troubles and the Ferraris of Gonzalez (2) and Hawthorn (6) can barely keep up.





Fangio and Kling swept into the lead from the onset and were never troubled again. Gonzalez strove manfully, but he had to give ground.



In January, 1954, the very first W196 chassis was given a brief run around the Mercedes factory grounds by Karl Kling, who was to be one of the works drivers for the coming season. A few days later, Kling drove the unbodied car at Hockenheim, but shortly afterwards, with bodywork now in place, the new Mercedes was taken to the smooth and well maintained autobahn near Leonburg. The highway closed to traffic for the occasion, Kling gave the W196 a good run to check its high-speed stability, which proved to be excellent.

When the first pictures of the W196 appeared in February of 1954, they caused a tremendous stir. Whereas all other postwar Grand Prix cars carried traditional open-wheel bodywork, the new Mercedes was clothed in a stunning, all-enveloping body which harked back to the streamliners which Mercedes and Auto Union raced at Avus in 1937. A 1:5-scale model had been tested in a windtunnel at Stuttgart Technical College, but no such tests were made of the full-size car—hence Kling's fact-finding run on the autobahn.

By this time, of course, Alfred Neubauer had signed former World Champion Juan Manuel Fangio to lead the Mercedes team, and this would turn out to be a very shrewd move on his part. Backing up the Argentinean Maestro were two German drivers of much lesser repute—the aforementioned Karl Kling and Hans Herrmann.

Driven Men

A Mercedes employee since 1935, Kling had tried to become a racing driver before the war to no avail. He finally got started with a Veritas in 1947 and won the German Sports Car Championship that year and in '48. He was spotted by Neubauer and in 1951 went with Mercedes' leftover 1939 cars to Argentina. The next year he came close to winning the Mille Miglia in a 300SL, and then scored the biggest victory of his life in the Carrera Panamericana.

Hans Herrmann had only taken up racing in 1952, when he was 24 years old. The following year he entered his own Porsche in the Mille Miglia and won his class. This led to a works drive at Le Mans where, with Helm Glocker, he won the 1500cc class. Driving an F2 Veritas, he had also finished a creditable 9th in the German Grand Prix, and his achievements with Porsches won him the German Sports Car Championship.

It was only natural that Mercedes should want two German drivers to back up Fangio, but many people found it odd that Neubauer should sign the inexperienced Kling and not former European Champion Hermann Lang. The latter had served Mercedes brilliantly in the late '30s and won Le Mans for them in 1952, but Neubauer appears to have been convinced that he was now past his best. He did promise Lang a chance in Grand Prix racing, but not until later that season. Although Kling and Lang were the same age (44), it's possible that Neubauer felt the former was hungrier for success and so had more of a future than Lang, who might not be able to live up to his past glories.

As for Hans Herrmann, he was clearly the most promising of the younger Germans available, but his career with Mercedes was very nearly over before it began! Soon after the W196 was shown to the press, he, Kling and Rudolf Uhlenhaut went testing at Hockenheim. During the day an oil hose was repositioned through the cockpit in order to save time, and it suddenly sprang a leak while Hans was doing some 150 mph.

"The circuit was longer then than it is now," he recalled later, "and I was going through the old Staadtkurve when I suddenly felt my feel being scalded by hot oil, which was spewing all over the pedals. My foot slipped off the brake, the Mercedes crashed heavily into a house and I was thrown out. I was not badly hurt, but I was in hospital for three weeks."

Mercedes swept the board, thanks largely to the remarkable Juan Manuel Fangio, who went on to win the German, Swiss and Italian Grands Prix.

The Performance

Mercedes continued testing at the Nürburgring in May. All this time the cars were using Weber carburetors while the upcoming Bosch fuel injection system was being perfected in the Racing Department. The still-indisposed Herrmann was replaced by Lang for this session, but Neubauer promised Hans that he would race at Reims. At the 'Ring, the W196 was driven by Kling, Lang and Uhlenhaut, whose best times were 9:57.8, 9:58.8 and an even ten minutes, respectively. Certainly no driver could take it easy when the remarkable Uhlenhaut was about!

The following month Mercedes went to Reims, where the road circuit was closed for their benefit, and the streamliners did many laps prior to the official practice sessions on race weekend. The engines were still being fed by carburetors, and the team planned to race with them should the need arise.

The Grand Prix racers were not the only new Mercedes out on the circuit, for Rudolf Uhlenhaut also brought along the first prototype 300SL production car, which he put through its paces for several laps as well.

It seems hard to believe at this remove, but with race weekend approaching, Mercedes-Benz was still not convinced they should take part in the French Grand Prix—they were unsure of their fuel injection system and mindful of their failure in the 1934 race. However in the first official practice session on Wednesday evening the Bosch injection system performed well, although its rapid consumption revealed that the W196s could not complete the race on one tank of fuel.

Urgent phone calls were put through to Untertürkheim, and the next day Rudi Uhlenhaut set off for a fast drive home in the 300SL. Overnight, spare fuel tanks were made—to be located beside the driver in the Grand Prix cars—and Uhlenhaut then ferried them back to Reims, where they were fitted in time for the race.

The new Silver Arrows had generated enormous interest around the world and there was a huge crowd to see the four cars unloaded from the Mercedes transporter before the first evening practice session. Team Manager Alfred Neubauer was in his element, conducting the super-efficient Mercedes orchestra of racing support staff and its three soloists—Juan Manuel Fangio, Karl Kling and Hans Herrmann. Here's Rodney Walkerley again, writing in The Motor: *"During the three evenings of practice which were the overture to the 41st Grand Prix of the Automobile Club de France it needed no deep insight to realize we were on the eve of an event pregnant with history—the return of the famous house of Mercedes-Benz to Grand Prix racing.*

"The Mercedes were out on the circuit for the first practice which usually few cars attended, and after half-an-hour Fangio startled the world with a lap in 2 mins 29.4 secs, which is 124.31 mph, the first time any European circuit has been lapped faster than the magic 200 kph. Suggesting this was no super effort he did 2 mins 29.5 secs the following evening!"

This was impressive to say the least, but in truth the W196 did not show any real superiority in practice over its main rivals, the Maseratis and Ferraris. Initially the former were to be driven by Sergio Mantovani and Roberto Mieres, the latter by Froilan Gonzalez, Mike Hawthorn and Maurice Trintignant. Alberto Ascari and Gigi Villoresi were not entered as they were signed with Lancia, whose sensational-looking new D50 GP car was still not ready to enter the Grand Prix fray.

Suddenly, it dawned upon Gianni Lancia that the two Italian teams in the French GP had not an Italian driver between them, so

➤ ***Left: Fangio just can't seem to believe anything Neubauer tells him. Below, the Argentinean set the fastest lap in practice for the British Grand Prix at Silverstone, but the race itself proved a washout. Hampered by a narrow course and a wide car, it was one of Mercedes' few 1954 GP defeats.***

he allowed Ascari and Villoresi to join Maserati temporarily.

Ascari had won the World Championship with Ferrari in the two previous seasons and was regarded by many as Fangio's equal, if not his superior. His countless fans were not happy with Lancia for signing him up before their car was ready and preventing him from defending his Championship and going for a hat-trick. Now, in a 250F Maserati (a car he had never driven before) he showed his stuff by recording a time of 2:30.5; this ensured him a place on the front row of the grid alongside Fangio and Kling, who had lapped in 2:30.4.

Scuderia Ferrari arrived very late, in time for only the final practice session. This was not a problem for Fangio's compatriot, Froilan Gonzalez, who took his Squalo Ferrari around the course in a sizzling 2:30.6. Yet another Argentinean, Onofre Marimon, was fifth fastest in his Maserati, only 2.2 secs slower than Fangio. On paper, at least, it looked as though there was a great race in prospect.

It was not to be. Fangio and Kling swept into the lead from the onset and were never troubled by anyone again. Poor Ascari had his Maserati's transmission fail at the start and just managed to complete one slow lap before retiring. Gonzalez strove manfully to keep his Ferrari up with the two Mercedes and succeeded for a few laps, but then he had to give ground. He had a fierce battle with the third car of Herrmann, and managed—just—to prevent a Mercedes 1-2-3 for a while. Then, on the 13th lap, his Ferrari's engine expired and he was out.

Herrmann set fastest lap at 2:32.9 (121.46 mph) before his engine blew on lap 17, but Fangio and Kling drove on imperiously. By half-distance (30 laps) only eight of the 21 starters were left in the race. Fangio led for most of the time, but Kling was right with him and had his sights set firmly on victory.

"Fangio was obviously the better driver, but I knew the car very well after all the testing I had done," he recalled. "We were seldom more than a second apart and I was in the lead at half-distance, but right at the end I made a silly mistake. I had lost count of the laps remaining and when Monsieur Raymond Roche stood at the side of the track and showed us the checkered flag I thought it was all over. However, there was still one lap to go and Fangio beat me to the line by less than one second."

The two Mercedes were the only cars to complete the full 61 laps and there were only four other finishers, led by privateers Manzon (Ferrari) and Bira (Maserati). The rest of the entrants had been forced into smoky, oily retirement by the relentless pace of the Silver Arrows.

The Fallout

Not surprisingly, the crushing victory of the Mercedes sent the Grand Prix world into a state of shock, and Ferrari and Maserati crept away from Reims to lick their wounds and prepare for the British GP at Silverstone two weeks later. Such had been the superiority of the German cars, however, that it largely seemed they'd be wasting their time.

Our man Walkerley had mixed feelings about the effect Mercedes was going to have on his beloved sport. *"As we see it,"* he wrote, *"Grand Prix racing is about to enter upon its greatest epoch or it is about to dwindle away altogether for a space. Which of these things comes to pass depends entirely on whether the rivals of Mercedes-Benz come back fighting or give it up as hopeless. One can understand that even the most sporting and enthusiastic entrant may begin to lose heart after a season of walking-on parts instead of the star role. The balance of power has been violently upset. Where do we go from here?"*

That balance of power was redressed, if only temporarily, at Silverstone, where Mercedes was soundly (and shockingly) beaten. Normal open-wheel bodies for the W196s were still in preparation at Untertürkheim and weren't ready in time for the British GP, where two streamliners were driven by Fangio and Kling. A distinct advantage on the long, flat-out straights at Reims, they proved to be cumbersome on Silverstone's airfield circuit—so much so that Kling was way off the pace and even Fangio, despite setting the fastest lap in practice, could do little about the Ferraris of Gonzalez and Hawthorn and the Maserati of Stirling Moss in the race. Driving quite brilliantly, Froilan Gonzalez led from start to finish while Fangio was pushed down the field by Moss, Hawthorn and then even Marimon. The inside of the circuit was lined with marker barrels and Fangio battered the beautiful bodywork of the Mercedes against a number of these because he could not see them properly. The covered front wheels combined with the low seating position of the Mercedes restricted his view, his judgment and therefore his speed. To add to his woes, Fangio also lost 4th gear midway through the race. Altogether he had a very unhappy time, eventually finishing fourth almost two laps behind Gonzalez.

From that point on, however, Mercedes swept the board, thanks largely to the remarkable Juan Manuel Fangio, who went on to win the German, Swiss and Italian Grands Prix before the German team stumbled once more and was beaten by Mike Hawthorn and Ferrari in Spain for the season's last race. With their typical combination of ruthless dedication and engineering excellence, Mercedes-Benz nevertheless dominated the 1954 season in undeniable fashion.

Of course one *could* also argue that it was Fangio's remarkable skill that played the major part in making the legendary Silver Arrows' return to racing so successful. In either case, the deed was done.

Featured Edition

The Month of September, 1988...

➤You wanna see *fuggley?* Try the TMC Costin 1600, a quasi-Super Seven space-frame roadster from Ireland that may explain why the auto industry never quite took hold there. Our road test found the car to be charming, quick, light and oh-so-goofy looking. Opposite on the homeliness scale was Spex Design's Spexter, a Porsche 911 Targa whose swoopy Paul Deutschman-designed rebody didn't predate Porsche's own return to the Speedster—that came at the

'87 Frankfurt Auto Show—but outstyled it by miles. Mark Ewing went to Montreal to meet the car and its creators.

➤ Speaking of dinky little cars, John Retsek and Dave Gooley offered up a 1927 Amilcar CGSs as our sports-classic piece, a nifty little (extremely little) piece of 1.1-liter French history. Very neat stuff. Jon Ingram told us all about Jaguar's triumphant return to Le Mans: Many factors were involved and only one other Jag came home in the top 10 positions (the rest of the slots were filled by Porsches).

➤ And while we're speaking of modern history (sort of), Burge Hulett did us a darn fine profile on the Ferrari Daytona used by Dan Gurney and Brock Yates to set the fastest coast-to-coast driving record we know of, 35 hours and 54 minutes from sea to shining sea. The car had since been bought (unaware) by an enthusiastic collector who let it keep him in debt for years until finally making a killing on the resale.

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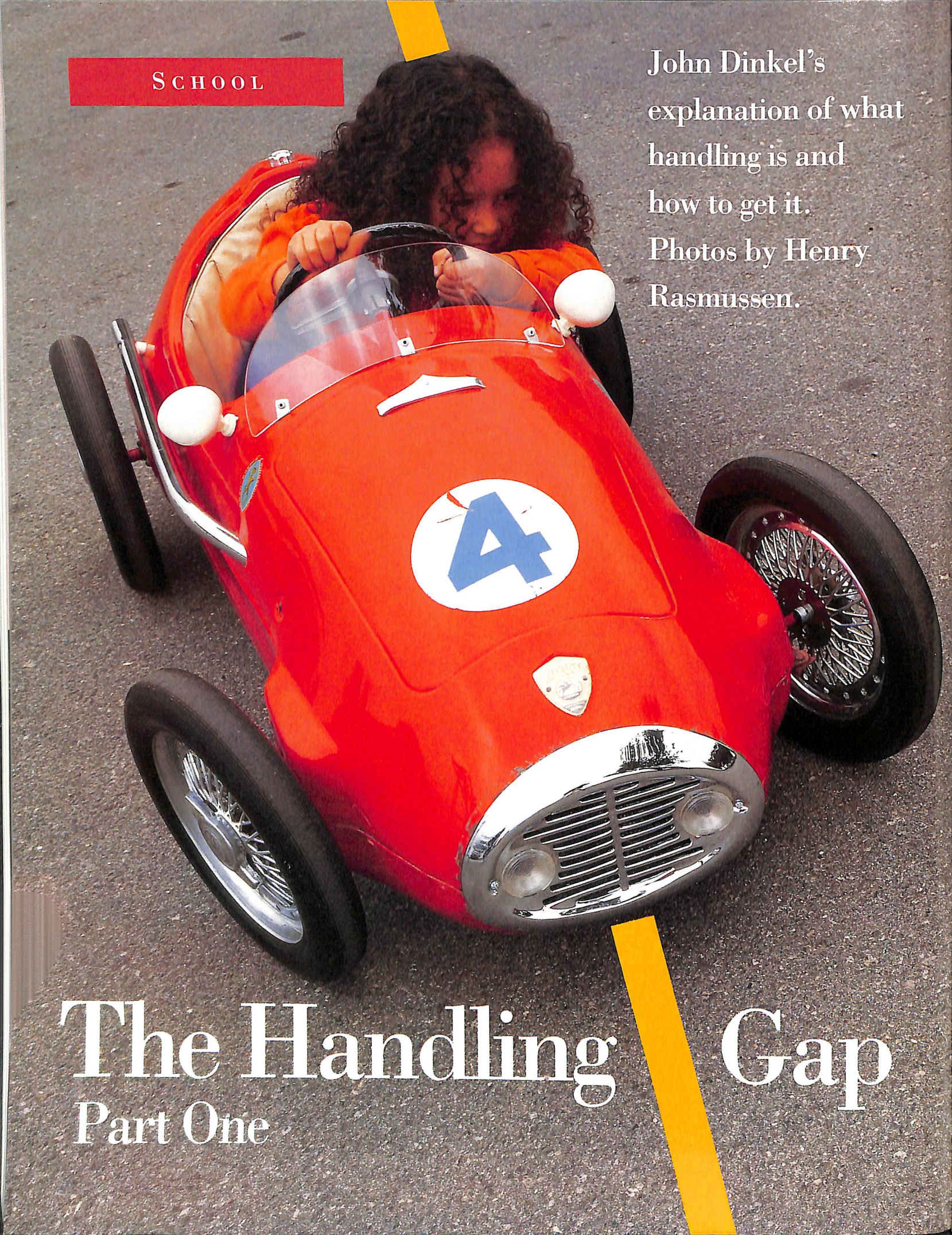


John Dinkel's explanation of what handling is and how to get it. Photos by Henry Rasmussen.

The Handling Gap

Part One

A little knowledge can be a bad thing, especially when it's accompanied by misconceptions and wrong information. This is particularly true with automotive handling, a subject cloaked in mystery: Everyone you talk to has a pet theory as to what makes a car handle, and compounding the problem is the fact that even supposedly knowledgeable people are often misinformed.

Basically, handling is **control**: control during acceleration, control during braking and control during cornering. Less obvious but also significant elements to handling are **road feel** and **ride.** Knowing where the wheels are, what they're doing and how they react to changes in the road surface is important, because these inputs allow the driver to sense how his or her car is reacting to a given situation.

We're not about to tell you how to design a suspension for your car—that job is best left to the designers, the engineers and their faithful companion the computer. What we do hope to convey is an understanding of what a suspension does, why it does it and how different types of hardware lead to different types of handling. From there, you should have a clearer understanding of what the usual car-magazine suspension terminology refers to and how to apply these lessons behind the wheel.

First let's clear up some of the misconceptions. Memorize the following—the explanations will come later:

- A front antiroll bar promotes understeer.
- A rear antiroll bar promotes oversteer.
- Installing stiffer springs at the front promotes understeer.
- Installing stiffer springs at the rear promotes oversteer.
- Stiffer is not necessarily better.
- Stiffer shocks are different from a stiffer suspension.

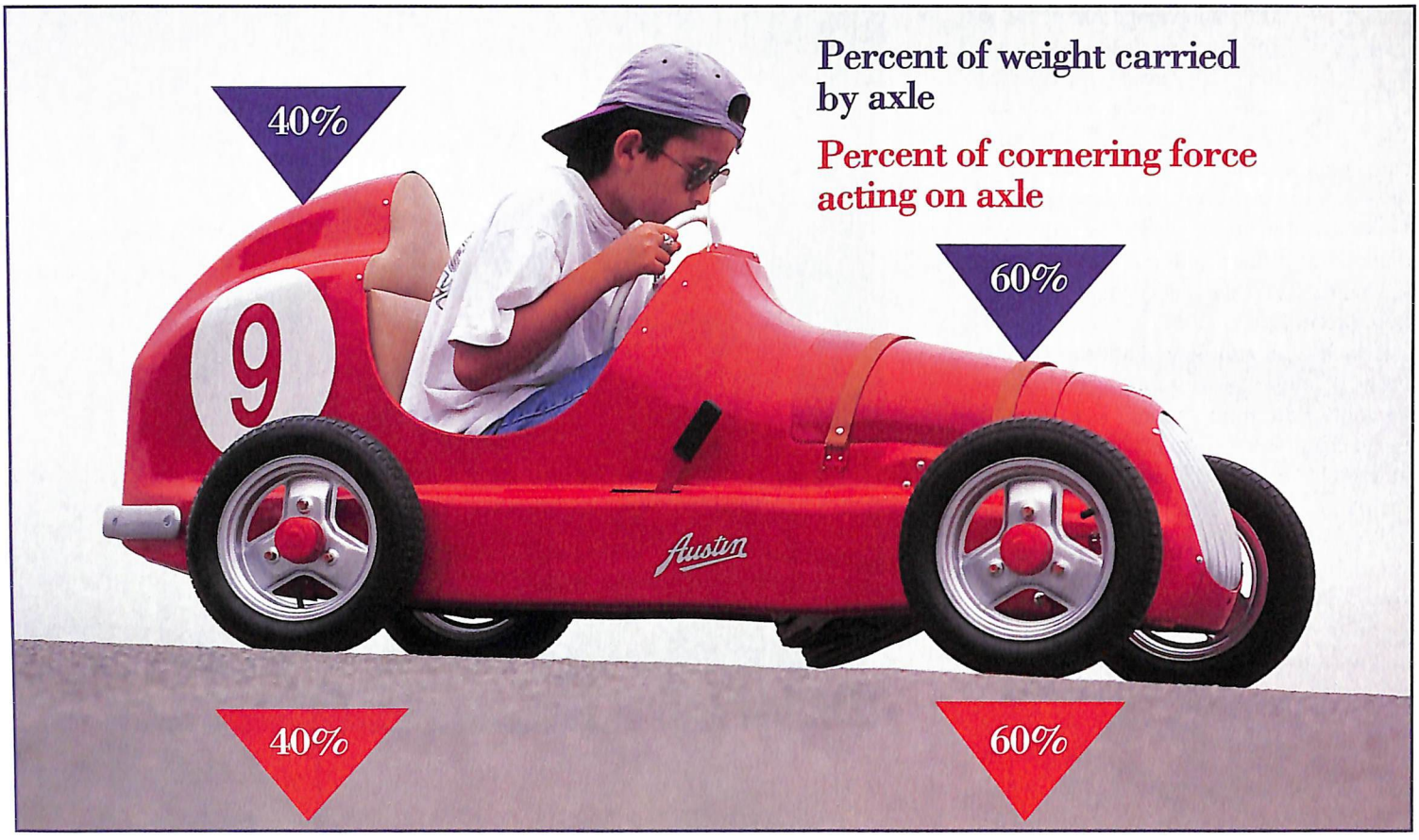
Oversteer

Understeer

Understeer and Oversteer

Okay, now what are **understeer** and **oversteer?** Consider the following example: You're driving a car around a constant-radius circle painted on the ground, and the faster you go, the more you find you must crank the wheel to stay on the line. Finally you reach a speed where no amount of additional steering will keep the car on the circle; the front tires lose their grip and the front end begins to slide. This is *understeer;* you wanted to keep turning, but the car's ability to rotate was *under* the amount you required.

Oversteer is the reverse condition. As you're traveling around the circle you find that the tail seems to be wagging the dog—the rear end keeps sliding off toward the outside of the turn. To correct, you ease off the steering wheel a bit (or give it less



Weight Distribution

lock, as they say). If you didn't do this, the rear end would come right around and you'd end up sliding off the circle backwards or sideways.

In this scenario, as your speed increases you remove more and more steering angle, eventually using **opposite lock**—turning the wheel in the direction opposite the turn—to continue straddling the line. Finally a speed is reached where no amount of opposite lock will hold the car; the rear slides out and you go spinning off the circle. The car's body rotated *over* the amount you actually needed; hence *oversteer.*

Racing drivers use more colorful expressions for these conditions: **pushing** or **plowing** means the car is understeering, while **hanging out** or **getting loose** means the car is oversteering.

Utilizing the Tendencies

Most cars are designed with some amount of understeer built into the suspension. Why? Because understeer is an inherently stable condition. When an understeering car is acted upon by a side force such as a crosswind, the car tends to go straight even though the wind is trying to push it offline. Many small disturbing forces are also automatically damped out by the steering behavior of a car set up this way.

An oversteering car, on the other hand, will feel twitchy in a crosswind, and the driver will be forced to make constant steering corrections to keep the car going straight. Also with an oversteering car, letting off the gas in a corner is likely to just make the situation worse; instead of going off nose-first, the rear end will whip around and the car will leave the road tail-first. A small improvement, true, but you'd rather not leave the road *at all.*

Leave oversteering cars to the pros. Mild oversteer can be corrected by reduced steering angle—or **easing off the lock**—but once the back end is really sliding, the forces involved have to be reversed by steering away from the corner you're trying to get around. Worse still, it's the changeover period—when the front regains control and the rear end snaps back the other way—that causes the over-correcting spin responsible for most skidding accidents. The steering on most production cars is too slow to hold a reverse skid, as are the average driver's physical reflexes.

A Steady State

The preceding explanations of oversteer and understeer are the classic definitions, and they assume the car has reached a **steady-state** condition—that it's running at a constant speed on a perfect circle with perfectly even pavement.

But in actual driving steady state cornering is rarely experienced—normal driving consists of a continuous series of steering maneuvers under widely varying conditions. The reaction of a car to these so-called **transient conditions** may be entirely different from those encountered during steady-state situations. A car that understeers on a constant-radius skidpad may exhibit transient oversteer when driven quickly through an S-shaped bend; in other words, at the moment of changing attitude and direction, the rear end may begin to come around even though the car is inherently prone to plowing straight ahead. The point here is to beware of blanket generalizations of handling behavior—when

someone says a car oversteers, it doesn't mean very much until you also know the qualifying conditions. When a car's **transient response** (or **transition behavior**) is discussed, it's a description of the behavior during directional changes, and therefore more likely to reflect your own experiences on the road than any behavior observed on the magazine's skidpad.

A Slippery Subject

An engineer looks at oversteer and understeer in terms of **cornering force** and **slip angles.** When the wheels of the car are turned for a corner, the direction the tread actually travels is not the same as the direction assumed by the wheels. In corners the tread runs at something of an angle to the exact direction of the wheel. This departure of the tire's direction of travel from the way the wheel is pointing is called the **slip angle.** Slip angle is really a misnomer. **Scrub** or **scuff angle** are probably more appropriate terms, as the tire isn't actually sliding sideways across the ground.

In the narrowest view, a tire's ability to grip the road is a factor of slip angle and the overall amount of cornering force being loaded on; that force increases in direct relation to the slip angle, until finally the tire breaks away.

At breakaway, the **lateral force** (the actual energy trying to push the tire sideways) has finally exceeded the **cornering force** (the theoretical ability to stick to the road) that the tire can offer. If breakaway occurs at the front end first, of course, you have understeer; if it happens at the rear, you'll get oversteer. An average driver can handle a car at slip angles to about five degrees, while skilled drivers can hang on to about 12 degrees. Anything beyond 12 degrees is getting into the realm of the racing driver.

The force that pulls outward on a car in a corner is called **centrifugal force** (often denoted as ***cf***). This force is divided between the front and rear of the car in exact proportion to the weight on each end: In other words, a car with 60/40 front-to-rear weight distribution (to simplify things we'll neglect dynamic weight transfer for the moment) would have 60% of the centrifugal force acting on the front wheels and 40% acting on the rears. The total cornering force developed at the front and rear must be equal to or greater than the centrifugal pull on each end of the car, or the result will be a slide.

Tire design has a great influence on the maximum slip angle that a tire can generate, but all things being equal, the lower the slip angle the tires run at for a given amount of centrifugal force the more cornering reserve the car has. For example, suppose the maximum slip angle that a particular tire can generate before breakaway is 10 degrees. Assume that 1000 pounds of centifugal force cause these tires on car A to run at a slip angle of 8 degrees, while the same tires on car B are only a 6 degrees. Now assume that an additional 400 pounds of *cf* increases the slip angles of both cars by 3 degrees—to 11 degrees for car A and 9 degrees for car B. Because the tires can only generate slip angles of 10 degrees before breakaway, car A would be out of control at this point; car B, on the other hand, would still be cornering in a stable manner. In fact, it would have 1 degree of cornering reserve before the tires reached the critical breakaway slip angle of 10 degrees.

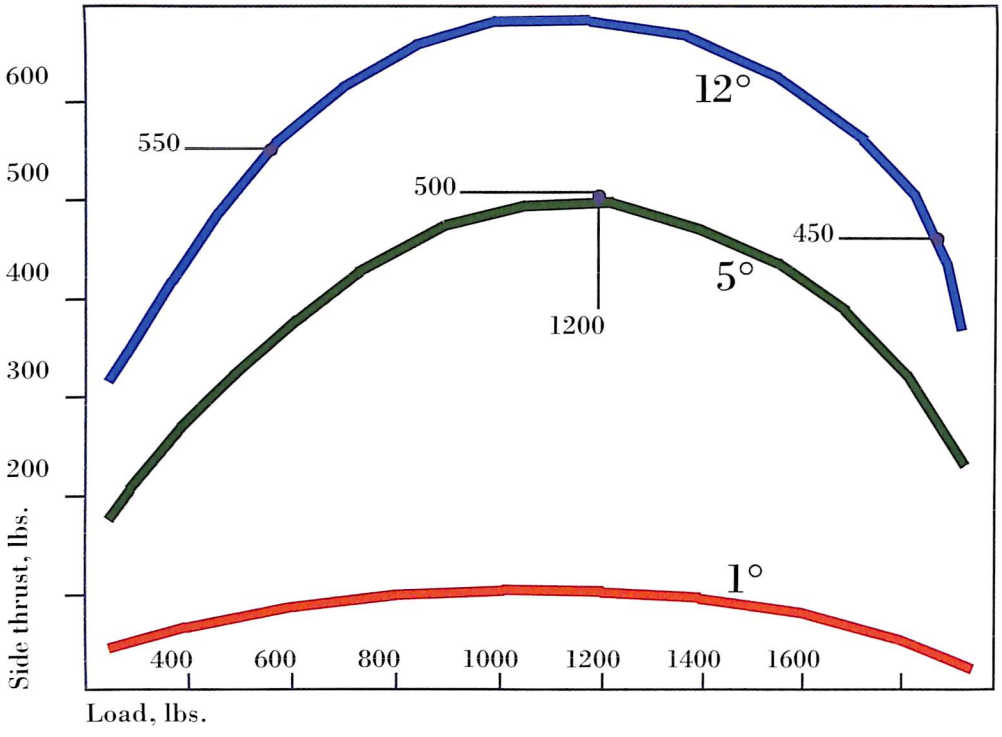
Weight Transfer

Lines of Force

The centrifugal force developed in a corner is of course proportional to the weight of the car itself, so everything else being equal, a light car will corner better and faster than a heavy car.

That's one of the reasons professional racing shops can take a 4000-pound car and chop off 1000 pounds before you can say "acid dip." Everything unnecessary comes off: Bumpers, windows, undercoating, stock exhaust, you name it. But unless you're willing to compromise comfort, convenience and in many cases legality with your

Slip Angle Generated



own street car, you are stuck with lots of weight. Fortunately, all is not lost: Those 3500-pound Nascar stockers probably weigh more than the car in your garage, and they're certainly no slouches

Okay, ready for a little technical material? Let's calculate the available cornering force versus the load on the tires at various slip angles: Assume that the front end of a car (we'll call it the Lump) is supporting 2400 pounds (or 1200 pounds per tire), and that its tires can develop 10 degrees of slip before control is lost.

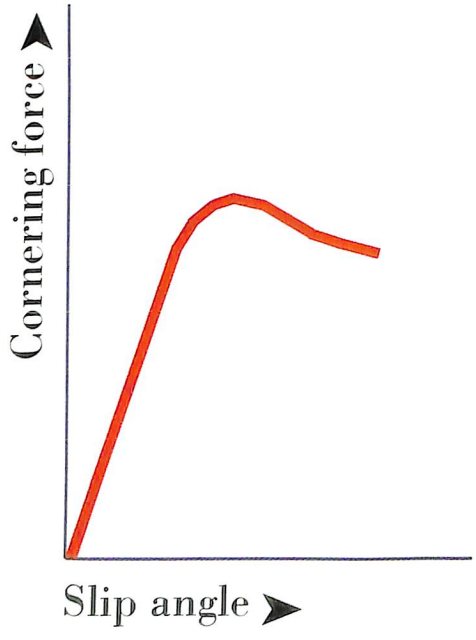
The Lump is being driven in such a manner that a centrifugal force of 1000 pounds is acting on the front of the car; the side force on each front tire is therefore 500 pounds. If we assume for the moment that we will not allow the Lump to transfer any weight to the outside front tire, the 1000 pounds of centrifugal force will be divided equally between both tires. Take a look at the chart above. For the given load (1200 pounds per tire) and side force (500 pounds per tire), we find that each tire is running at a slip angle of 5 degrees.

Now put the same car in the same corner at the same speed as before, but this time allow 600 pounds to transfer from the inside front wheel to the outside front wheel—just the way weight shifts from side to side during real cornering transitions. Now the inside front tire is only supporting 600 pounds and the outside front tire carries 1800 pounds.

The total centrifugal force these front tires have to resist is the same as before—1000 pounds. And we know that the slip angle of the less-laden tire is always going to be about the same as the slip angle of the other, more heavily laden tire, since the tires are essentially parallel to each other relative to the rest of the car. With this information we go to the figure again and determine how much of the cornering force of each tire contributes to the total of 1000 pounds.

For this example, we find that the inside front tire is contributing 550 pounds and the outside front is contributing 450 pounds of the cornering force, but to develop these forces the tires are now running at slip angles of 12 degrees. Since 10 degrees is the maximum before breakaway, the front end will be sliding.

Force vs. Slip



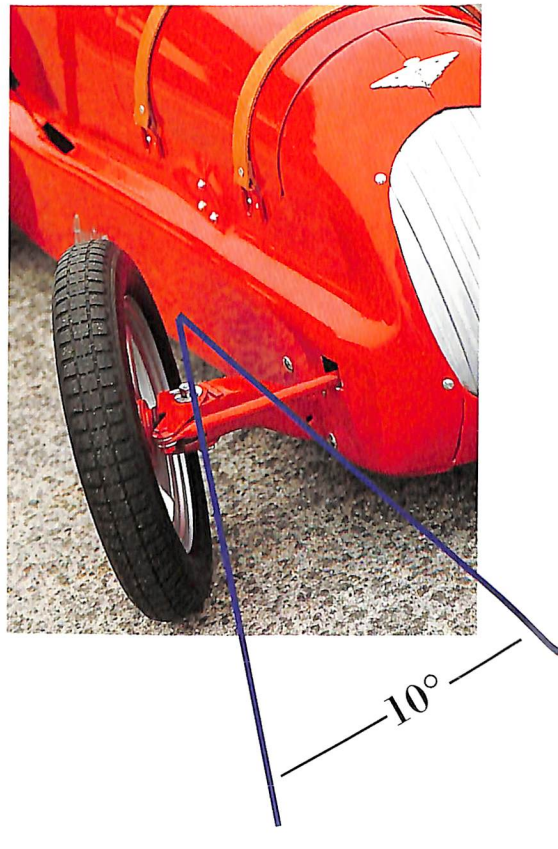
Transfer Ticket

To improve handling, side-to-side **weight transfer** must be reduced; therefore we must know what factors cause weight transfer, so we can systematically eliminate as much weight transfer as possible.

Our problem is complicated by the fact that we have to work with both the front and rear of the car: If we blindly eliminate weight transfer at the front end without concerning ourselves with the rear, we can finish worse off than when we started. Transfer must be balanced and controlled front-to-rear as well as side-to-side.

This is probably a good place to stop. Next month we'll conclude this primer on handling by discussing the effects that body roll, roll axis and front-to-rear weight transfer have on cornering. ○

Slip Angle



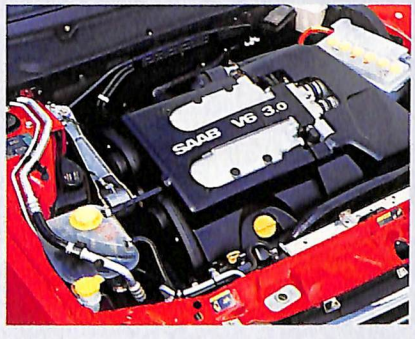
Quick Look

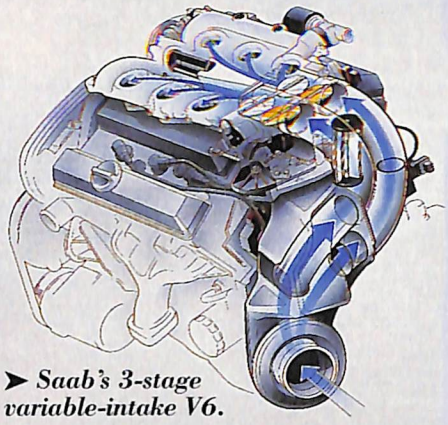
Saab 9000 CDE V6

➤ ***Deauville, France***—The French all drive around in dinky little Peugeots and Citroens at about a gazillion miles an hour, and given half a chance they'll dive to the outside of a big car like the Saab 9000 the way Jacques Cousteau squirts past hostile barracudas. There's something about the way the Saab looks that makes them assume it's both sluggish and unwieldy.

It isn't, so they get this wonderful *Mon Dieu!* look on their faces when something with more interior volume than the average French living room slingshots back past them two corners later. The trick to speed in this car is giving the 9000 CDE's automatic— mandatory with the new V6 in America— time to gather its thoughts, shift down a gear and spool up the powerplant. Then the car moves out in a stately, dignified sort of way, just like the well-heeled, well-coddled buyer of a vehicle in this class expects—with authority, but not necessarily brilliance.

There's none of the bang and zoom one predicts from Saab's turbocharged Fours, nor is there supposed to be. Even the firm's ever-forthright execs portray the Six as an easy-answer engine choice for shoppers uninterested in the alternative solutions that make other Saabs such a statement. The faithful continue to see the firm's turbocharged Fours as a more sophisticated solution to the performance/economy equation, but everyone acknowledges you've gotta give the buyers what they ask for. Today, many are asking for at least six cylinders, and as a newly wooed member of the GM corporate harem, that request hasn't been too hard for Saab to meet.





➤ ***Saab's 3-stage variable-intake V6.***

➤ Mechanically, this most mainstream of Saabs features basically the same GM-built Six offered on the new 900. This time the engine has been punched out from 2.5 to 3.0 liters and fit with a variable-length intake manifold, the latter ensuring a good spread of torque and a little something for the technoheads who care. Answering "absent" to the 6-cylinder roll call is Saab's own prowess in engine management, replaced in this instance with Bosch Motronic bits. Overall, this engine is an unobtrusive and invisible part of the package, despite its 4-valve/4-cam sophistication coughing up 210 horses @ 6100 rpm and 200 lbs.-ft. of torque @ 3300. The power is adequate, the performance competent, its behavior always satisfying without ever being sparkling.

The 9000 platform continues to age nicely, however, showing good rigidity and road manners over inferior surfaces and excellent stability at speed. As expected, the car's ability to plow through cold, wet weather and resist blustery crosswinds is also first-rate. Fast highway travel is perhaps this car's forte, with wind and road noise being expertly damped and stability at speed outstanding.

All in all, this 6-banger Saab makes a fine addition to the market even if the firm itself has more affection for its turbos. With prices near the $40,000 mark and blatant opulence nowhere in sight, it might seem that in going after this market Saab is splitting some pretty fine hairs indeed: The world certainly doesn't *need* another car like this. Still, while it lacks the luxury and smooth edges of the cheaper J30 or the power and poise of the costlier Seville STS, the 9000 CDE's strengths—interior space, safety and foul-weather prowess— make it a viable player all the same. —*George Stradlater*

SPECIFICATIONS

1995 Saab 9000 CDE V6

General
Vehicle type: front-engine, front-wheel-drive sedan
Structure: steel unibody
Market as tested: United States
MSRP: $38,995
Airbag: std., driver and passenger

Engine
Type: transversely-mounted V6, iron block and aluminum heads
Displacement (cc): 2962
Compression ratio: 10.8:1
Horsepower (bhp): 210 @ 6100
Torque (lbs. ft.): 200 @ 3300
Intake system: EFI (Bosch)
Valvetrain: two overhead cams per bank, four valves per cylinder
Transmission type: 4-speed automatic

Dimensions
Curb weight (lbs.): 3260
Wheelbase (in.): 105.2
Track, f/r (in.): 59.9/58.7
Length (in.): 187.4
Width (in.): 69.4

Suspension, brakes, steering
Suspension, front: MacPherson struts with coil springs and antiroll bar
Suspension, rear: beam axle with panhard rod and coil springs
Wheels (in.): 15x6
ABS: std.

1966-1994 Alfa Romeo Spider

➤ To hear our High and Exalted Leader prattle and complain you'd think the Alfa Romeo Spider was designed by Satan himself. In fact, these machines are well constructed and quite reliable once put in proper order—it's just that noodling amateur mechanics usually make things worse instead of better.

Alfa Spiders fall into three main categories: Roundtail, squaretail and the later cars with rubber spoilers and hefty front bumpers. The first year was 1966, the name Duetto and the initial displacement of the 2-valve, DOHC Four was 1570cc.

PHOTOS RASMUSSEN

In 1967 improved engine breathing and brakes arrived; a year later displacement rose to 1779cc and the name became 1750 Spider Veloce.

The firm took a miss from America in '68 due to emissions legislation, then returned in 1969 sporting a Spica fuel injection system specific to this country. In '71 the Spider's rounded tail got Kammed in the name of styling and luggage space. A year later displacement went up to a full two liters.

All of these cars came with 4-wheel disc brakes and 5-speed transmissions. In 1966 the former were made by Dunlop and have proven troublesome; the subsequent ATE brakes seem largely reliable. Alfa's 5-speed gearbox has developed a venerable reputation, but the synchros are fragile with 2nd weakest of all. Most drivers learn to double-clutch that change as second nature.

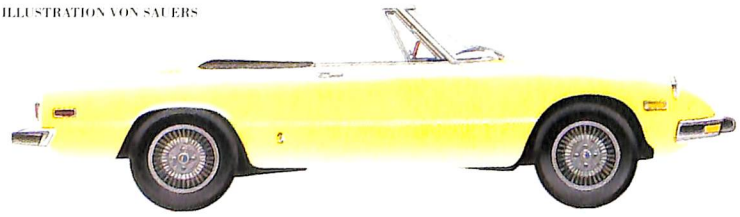
➤ A few words about the Spica cars. Once it's been debugged this system is nearly foolproof, but home tinkering is almost impossible, and new replacement bits are costly. If you can't pay the freight and can't find a good used injection pump, aftermarket carbs are a viable (but usually illegal) alternative. Enough said.

All the 1600, 1750 and 2000cc engines will leak a few drops of oil and most smoke a bit on acceleration. Up a to quart of oil every 1000 miles can be considered normal consumption: Excessive leaking and smoking mean costly engine work, often sucking up more than the car's total value. Be sure that previous owners have religiously used a 50/50 mix of water and antifreeze—pure water can lead to disaster through galvanic corrosion.

In general, the key to any Alfa Romeo is maintenance—the oil and filter need to be changed every few thousand miles, all factory checks and services must be carried out faithfully and above all the Spica auxiliary injection-pump filter should be changed with every other service. Do those things and these cars regularly run well over 100,000 miles between major overhauls, though headgaskets on the 2-liter cars tend to only last 50-75,000 miles. Spring for a professional (at about $500) to make sure the job is done right, and ask about permanent fixes. FYI, coupe and sedan engine parts will work.

Once set up properly, you'll find the Spider has fascinating (if archaic) handling, delightful steering and very strong brakes. If the messages at the helm are confused and sloppy, suspect new springs and shocks will be needed. Loose steering can usually be fixed just by cranking down the screw-adjustable 'box.

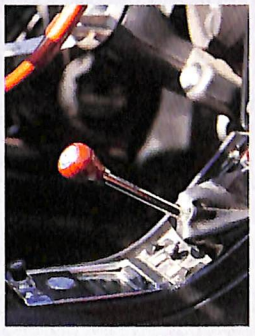
ILLUSTRATION VON SAUERS



➤ Very nice Duettos run anywhere from $6000-12,000. Good clean squaretails from before 1979 can be had for much less than half those figures: Solid runners come up occasionally at $1500 or less, and in general the later the car, the tighter and more reliable.

To me, the 1982 cars are the neatest—this was the first year for Bosch injection and the last year before the rubber-spoiler redesign. Restoration parts for any year are costly and engine kits prohibitive, so try to get a sanitary Alfa to begin with; low resale prices means restorations are rarely worth the bother.

The gorgeous Pininfarina-designed body doesn't have any hidden rust magnets of note, so just check all the usual spots. There's no reinforcement in the Spider's lovely nose, so dents and dings are almost impossible to remove. The easiest permanent solution is to weld in a whole new panel and have the nose repainted.



➤ Once up and running well, these cars provide something no other Italian or English equivalent seems able to offer: Reliable, fast and stylish transport at rock-bottom prices. In many ways this is the hot ticket in Little Red Convertibles—just make sure you don't buy one from an editor in Novato.

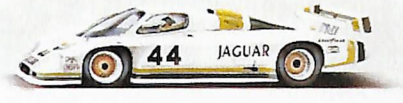
—Mark Terrapelli

"Group 44"

by Tom Bucher

Team owner Bob Tullius, teamed with Chip Robinson, pilots his XJR-7 (chassis #002) to victory at the IMSA Daytona Finale, 1986. Following #44 is #01 (XJR-7 chassis #001), driven by Brian Redman and Hurley Haywood. Drivers signing this print include not only the above, but also all of the team's regular drivers from 1982-1988.

Group 44 Inc



Bob Tullius | Chip Robinson | Brian Redman | Hurley Haywood | Doc Bundy | Bill Adam | John Morton | Pat Bedard

Group 44

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