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plus: READERS' CHOICE AWARD **WINNER!** **BEST CAR 2006**

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Wild Thing!

Bugatti Veyron 16.4: World's **Fastest** Production Car

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VOLUME 57, NO. 5

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Bugatti Veyron photo by Stephane Foulon; Shelby GT500 photo by Jim Fets

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On THE ROAD

By Thos L. Bryant, EDITOR-IN-CHIEF

GORDON MURRAY JOINS THE TEAM

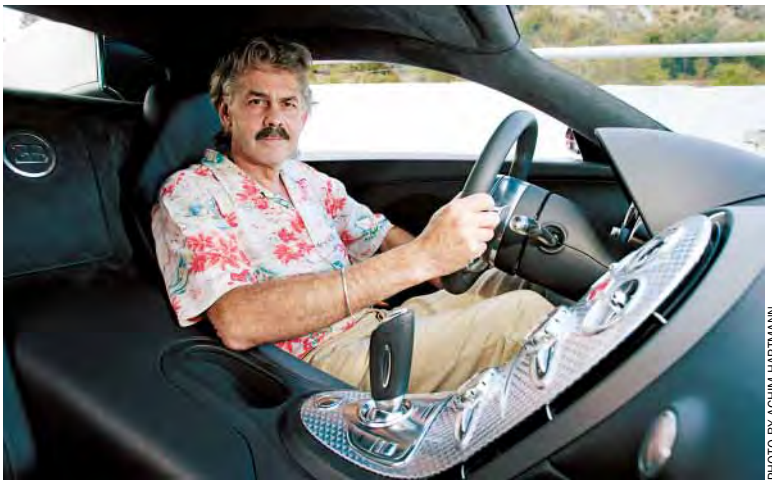


PHOTO BY ACHIM HARTMANN

WE AT *ROAD & TRACK* ARE tremendously excited to introduce you to our newest contributor, Gordon Murray. In any discussion of successful Formula 1 car design, Murray's acclaim is universal. Going back in time, Gordon startled the Grand Prix circus when his 1974 Brabham BT44 design dominated a few races, won the Austrian Grand Prix and took 1st and 2nd at Watkins Glen to end the season. Not bad for a 28-year-old South African who learned mechanics from his father and developed design skills through art courses in high school and technical drawing later on.

When Murray was chosen by then-Brabham team owner Bernie Ecclestone to be the head designer on the team in October 1972, he threw himself into the work with abandon, developing the beautiful BT42 in just three months. He also designed a prototype 3-liter sports car for Le Mans, which ran successfully for 21½ hours until Chris Craft spun off in the wet while running in 4th place.

Murray's success at Brabham continued with the BT45 F1 car, and he later stunned onlookers again with the Brabham-Alfa BT46 for the 1977 season. The car used surface-mounted heat exchangers instead of conventional radiators for water and oil cooling, built directly into the double-skinned monocoque body. He also added air jacks, à la Indy cars, digital monitoring of engine functions and an onboard electronic lap counter. But the car didn't work that well. The real innovation, however, came with the BT46B for 1978, which was a "fan" car that stuck to the track like glue, won its first race, and was then banned.

Gordon was probably the first to use carbon fiber in the structure of an F1 car, and was the designer of the Brabham-BMW that won the 1983 world championship.

He moved on to McLaren to continue designing F1 cars, where he worked closely with team manager Ron Dennis on the McLaren-Hondas that proved to be excellent cars for Alain Prost and Ayrton Senna.

In 1992, Murray came up with the Rocket, an astonishingly quick formula car for the street. It had a 143-bhp 4-cylinder engine mated to a Yamaha motorcycle 5-speed gearbox, and was, forgive the expression, a rocket to drive. It went into production at a company headed by the aforementioned Chris Craft.

And then Gordon got the chance to do another road car, the fabled McLaren F1. As our European Editor Paul Frère wrote in November 1994, "The McLaren F1 materializes the dream of a single man. Not just any man, but one of the most imaginative and successful [design] engineers that Formula 1 racing has known."

His latest automotive tour de force is the Mercedes-Benz SLR McLaren supercar, for which he did much of the development though not the styling.

I first met Gordon Murray at a BMW dinner for the Detroit Grand Prix many years ago. R&T's motorsports editor at the time, Joe Rusz, and I were invited to dine with Nelson Piquet and Murray, and we found it a fascinating evening. Murray is a charming man, with great wit, a passion for rock and roll music and some classic American cars (a 1957 Ford Thunderbird is in his garage). He also loves architecture and he and his wife, Stella, have spent many years remodeling and adding on to their home in England.

All of us at *Road & Track* are delighted to welcome Gordon Murray to our family as a Contributing Editor. His knowledge, talent and passion for all things automotive make him a unique and stimulating colleague, and I am certain you will enjoy his analyses of the technical aspects and design of the Bugatti Veyron in this issue.

PHOTOS BY GEOFFREY GODDARD, PHIPPS PHOTOGRAPHIC & JOHN LAMM

■ **The Brabham BT42 (above), the BT46 with the heat exchangers instead of conventional radiators, plus the brilliant but banned BT46B "fan" car.**

■ **While working at McLaren, Gordon designed the somewhat whimsical but exciting Rocket road car (left). In 1994, the McLaren F1 (above) became the world's fastest and most coveted supercar.**

Ampersand

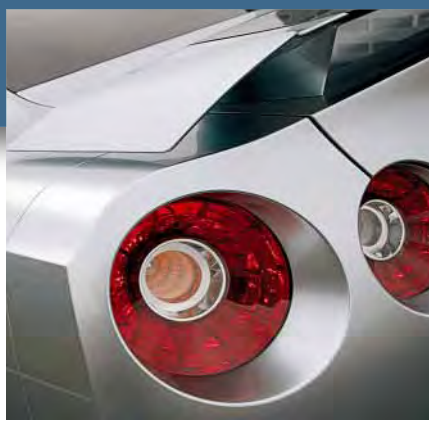
EDITED BY MIKE MONTICELLO

THE NEXT GREAT JAPANESE SPORTS CAR: NISSAN (INFINITI) GT-R

BENEATH THE GLIMMERing lights, amid the mass of people surrounding the center display area of the Nissan booth at the Tokyo Motor Show, the fourth generation of the modern-era Skyline GT-R was unveiled. What makes this unveiling different from the showing of the last concept GT-R in 2003 is that this is how the production model will actually look. Hiroshi Hasegawa, the chief designer of the car, informed us the GT-R Proto is a 90-percent representation of the finished product.

Information concerning the next GT-R is scant. What Nissan has officially said so far is this: The car will go on sale in late 2007 and it will be sold worldwide. That's it. Nothing about its performance, specifications or even price. Security at the

PHOTO BY JOHN LAMM



GT-R development facility at Nissan is so tight that most Nissan employees are denied access unless they have a special pass.

Here's what we've discovered about the next-gen GT-R as of now: The engine will be a turbocharged VQ V-6 that'll produce about 450 bhp. The suspension will be a multilink design both front and rear, although there are rumors of a MacPherson-strut setup up front. The biggest mystery surrounding this car now is whether it will be rear- or all-wheel drive. Strong rumors support both, but Nissan won't say either way. The car will most likely wear an Infiniti badge here in the States, but will be sold as a Nissan everywhere else in the world. The price is expected to be about $70,000.—*Sam Mitani*

PHOTO BY JOHN LAMM

5 Questions with Hiroshi Hasegawa

R&T: What did you want to convey with the new GT-R in terms of styling?
Hasegawa: The GT-R has a racing heritage, ever since it was first created under the Prince banner. I wanted to make the car look at home on both road and track.

R&T: The new GT-R looks much more like a pure sports car than ever before. Why?
Hasegawa: This is the first time the GT-R is not based on the Skyline sedan or coupe. [The Skyline had previously been a Japan-only model. The current Skyline is our Infiniti G35.] Therefore, I could start from scratch with the car's design, which gave me infinitely more freedom. What I wanted to do is take full advantage of this opportunity, yet not go overboard and make it an all-out sports car, but keep it a GT.

R&T: The front of the car is very aggressive. Are you concerned it may be too aggressive for some?
Hasegawa: Well, I feel the face of the car has to reflect what the car is about. It has to be a reflection of the performance potential of the car. And without giving away too much, the performance potential of the car is aggressive, so the face should be as well.

R&T: The front fenders are very attractive and really define the overall stance of the car. Will this make it to production?
Hasegawa: Yes, I wanted to blend the face of the car with the rest of the body in a sports-car-type way. By beginning from scratch, I was able to do this. If I had to base my design off the current G35, these fenders would not have been possible.

R&T: The roofline of the car is very unusual; can you comment on this?
Hasegawa: I wanted to create somewhat of a boxy look to the car. This may sound odd because everything is so swoopy now, but the GT-R has always had a somewhat boxy shape. It was important for me to keep that heritage. We also did a few things like black out the A-pillars to create a wraparound greenhouse, which I feel helps the general appearance of the car. The odd shape of the C-pillars was not strictly a style thing, but designed with aerodynamics in mind.

Though it will no longer be called a Skyline, the GT-R promises to live up to (or surpass) the legendary nameplate—expect 450 bhp from a turbo V-6. The sculpted front fenders will make production.

39TH TOKYO MOTOR SHOW

ALL GROWN UP

Known for its wacky concepts, loud music and outrageously attired models, this year the Tokyo Motor Show seemed *almost* a somber affair. The stands themselves were straightforward and the cars, particularly the small urban cars that more often than not appear cartoonish, actually looked quite reasonable in a world of continually rising fuel prices.

While the Nissan GT-R grabbed the headlines, there were plenty of other significant debuts, among them the next-generation Lexus LS in concept form, a new 4-place sports car by Mazda and a Giugiaro-penned Ferrari celebrating the designer's 50 years in the business. *—By Matt DeLorenzo and Dennis Simanaitis*

PHOTOS BY JOHN LAMM

AUDI TT SHOOTING BRAKE

▶ Audi showed the look of the next-generation TT with this thinly disguised concept. The new TT, which will be offered in traditional coupe/roadster and this long-roof hatchback, is much more angular than the current model. With bolder character lines and a larger grille with vertical slats, the TT sports slit-like headlamps and a face derived from the current A4 DTM racers and the RSQ show car. The updated interior dispenses with the bulky console-mounted grab handles and features a new touch-screen navigation system. Conspicuous by its absence is Audi's MMI (Multi-Media Interface). Underneath, the Shooting Brake is fairly conventional Audi, from its 250-bhp 3.2-liter V-6 powerplant to its Quattro all-wheel-drive system.

VOLKSWAGEN ECORACER

▶ Using a fuel-efficient 1.5-liter turbodiesel, the VW EcoRacer promises 0–100 km/h (0–62 mph) acceleration of 6.3 seconds, a top speed of 180 mph and fuel economy of 60-plus mpg. The EcoRacer is fitted with a removable roof that converts it from a street car to a track car in seconds. With a body made of carbon-fiber-reinforced plastic, the EcoRacer weighs just over 1700 lb. There are no plans for production.

GIUGIARO GG 50

▶ Marking his 50th year designing cars, Giorgetto Giugiaro conceived this concept—the GG 50—based on the Ferrari 612 Scaglietti. Shorter in overall length than the 612, the GG 50 has a bold, rectangular grille flanked by vertical headlamps and aggressively flared wheel arches. The rear has been redesigned and converted into a hatchback. The fuel tank was repositioned beneath the floor, increasing the vehicle's cargo space by allowing the rear seats to fold flat. The interior has been completely redesigned, incorporating new leather treatments, beechwood accents and sport seats with larger bolsters. To ease entry to the back seat, the rear quarter windows automatically retract when the door is opened and the front seatback is tilted forward.

HONDA FCX CONCEPT

▶ Innovative packaging of its fuel-cell hardware makes the Honda FCX Concept one of the most significant cars of the show. A "V Flow" layout features vertical gas flow through its fuel-cell stack. This is key to the FCX's water management, a crucial aspect of fuel-cell operation. Honda calls its dual hydrogen tanks a next-generation design containing an absorption material essentially doubling capacity to a calculated range of 350 miles. A 107-hp motor drives the front wheels; each rear wheel contains a 33-hp motor of its own. How to fuel your FCX Concept? Honda's Home Energy Station ties into your home's natural gas line.

LEXUS LF-Sh

▶ Accompanied by few specifications, Lexus presented a concept version of the successor to its LS full-size sedan. Much more expressive than the current car, the new LS moves beyond being a Mercedes clone with a clean, sculpted look that features a new trademark C-pillar similar to that found in its RX SUV-series. Although mum on the powerplant, word was that the LS would be offered in a hybrid version using a system similar to that found in the GS 450h.

HONDA SPORTS 4 CONCEPT

▶ Individual bucket seats all around enhance passenger participation in the Honda Sports 4 Concept's driving experience. What's more, each of the four positions gets its own personal sky roof, electrically controlled to admit as much—or as little—light as you want. Honda's SH-AWD (super-handling all-wheel drive) offers traction and stability. Perhaps discounting the over-the-top grillework, the Sports 4's taut surfaces and sharp character lines are closely indicative of coming Honda products.

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Yes, I bit on their price

Marc Palmer bought a Passport 8500 and handed down his 1998 V1 to his wife, who was following him on I-40. "I look in my mirror and she had dropped way back," he said. Then his Passport 8500 went off. Too late!

As he was being written up, his wife phoned to say V1 had been warning for seven or eight seconds. "I'd say close to a quarter mile."

"I'm looking forward to my new V1," says Mr. Palmer, after returning his Passport.

Dumped his Passport... for $50

James Wegielewski was driving in a pack with friends on I-78 when his V1 warned of K band. "I radioed the other cars," he said. An M3 ahead, relying on Passport, radioed back he "didn't have anything," and pressed on.

"Right at the top of the hill I saw a frantic dive for the slow lane, with heavy braking" by the M3. Luckily for him, a car ahead got nailed.

"His exact words were, 'I saw the light rack not even a second after my detector went off. I can't believe how early you got a warning.'"

The Passport was sold for $50 that very day, and replaced by a V1.

His Passport is going on eBay®

Justin Kreimer, with both a V1 and a Passport 8500 in his windshield, was southbound on I-85, heading uphill. "The V1 chirps a light warning on Ka band; says 'ahead,'" he remembers, "8500 says nothing. I think for a second about *radartest.com's* test. I decide not to trust it."

"As I get closer to the top, 8500 finally starts to chirp…and there's an enforcer's Camaro hiding in the bushes. V1 warned me a full 3-4 seconds before 8500."

"V1 is becoming a permanent fixture in my vehicle."

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Car and Driver — Overall Ratings	
Total Score for Test Year **2002**	
Valentine One	97
Escort Passport® 8500	73
BEL® 980	61
Cobra™ XR-1050	43
Whistler® 1780	35
Uniden LRD 987	34

FIRST PLACE

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"The Passport offers less range than the Valentine and, like all the non-Valentine units, lacks the useful directional arrows," *Car and Driver* went on to say. Final ranking: 97 points for V1, 73 for second-place Passport 8500.

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ALL GROWN UP

MAZDA SENKU

▶ Senku means "pioneer" in Japanese, a hint that this concept is showing the direction of future Mazda styling. Positioned as a possible replacement for the current RX-8, this 4-passenger sports car features a very clean exterior shape angled so that the car appears to be moving even when standing still. The direct-injection rotary engine is coupled to a hybrid electric motor positioned in front of the cabin (but nearly midships, given its long wheelbase), endowing the Senku with an ideal 50/50 weight distribution.

TOYOTA FINE-X

▶ This two-box people-mover features large gullwing doors to provide B-pillarless access to the front and rear seats. In addition, the Fine-X has wheels that turn inward front and rear, similar to those found on the Jeep Hurricane concept. Not only can the car parallel park with ease, it can turn around in its own length when both front and rear wheels are turned sideways.

TOYOTA bB CONCEPT

▶ Showing a possible design direction for the next-generation Scion xB, the bB concept has a smaller greenhouse and a more muscular body that is less boxy than the current model's. Other touches include a more aggressive grille opening, an integrated rear wing and a larger rear bumper.

SUZUKI PX

▶ This large box on wheels looks like a family hauler, but the three rows of Recaro seats give away its sporting intentions. The PX also has an innovative second-seat stowage system that opens up the interior to large party-room proportions.

CHRYSLER AKINO

▶ The Akino concept is a 5-seat one-box car named for its designer, Akino Tsuchiya (she was responsible for the Dodge Razor's exterior shape), who was born in Japan and works out of the DaimlerChrysler Pacifica Advanced Design Center in Carlsbad, California. Tsuchiya says the purpose was to build a space-efficient one-box car that "achieved the silhouette of a box without literally resembling a box." The Akino's interior features bamboo flooring, a throw rug, mood lighting and pillows. The rear glass is a specially coated texture to give passengers privacy.

SUBARU B5TPH

▶ This Subaru with the alphabet soup name (B-class car, 5-passenger, Turbo Parallel Hybrid) combines a turbocharged 256-bhp flat-4 with a 14-bhp electric hybrid system and all-wheel drive. The 3-door hatch takes a more minimalist approach to Subaru's new face, using a much smaller grille than the recently introduced Tribeca. The hatchback area is also unusual in that it hinges just aft of the B-pillar to make loading and unloading a breeze. The biggest development in this hybrid's package is the use of manganese lithium ion batteries, potentially one of the next generation of onboard energy-storage technologies.

New Miura!

DIGITAL ILLUSTRATION BY LARSON

Lamborghini is readying a new mid-engine exotic based on Audi's upcoming R9 supercar (Le Mans Quattro concept) that not only borrows the previous Miura's nameplate, but also adopts many of its 1960s'-era styling cues. This artist's rendering shows what the new Miura could look like when it is launched in late 2006. Inside sources tell us the limited-run (450 cars) Miura is Lamborghini's "answer to the Ferrari Enzo." It will be built alongside the R9, both cars using an evolution of the Gallardo's space-frame chassis.

But the Miura will differentiate itself from the R9 with a version of the Murciélago's V-12, bored out to 6.5 liters and producing 700 bhp and 554 lb.-ft. of torque. The Miura will use a paddle-shift transmission with a rear-biased Quattro all-wheel-drive system and will come standard with carbon-ceramic brakes. Although sharing its platform with the R9, the new Miura will be lower, wider and shorter than its German counterpart. The Miura's simple interior will reflect its retro theme, doing without many of today's electronic gizmos.—*MM*

FORD GT FLIPS ITS LID

A DEFINITE HEAD-TURNER at the Specialty Equipment Market Association (SEMA) confab in Las Vegas was this open-top Ford GT called the GTX1 (we'll have more in-depth coverage of SEMA next issue). Converted by Genaddi Design Group of Green Bay, Wisconsin, the GTX1 turns the tops of the stock doors into removable roof panels that store behind the seats. The center section can be left in place for a T-top effect or removed completely—along with the backlight—for true open-air motoring. With the tops separated from the doors, the GTX1 becomes much easier to park, requiring less door clearance to get in and out of the vehicle. The GTX1 will be offered as an aftermarket conversion through Ford dealers beginning in the second quarter of next year, adding about $38,000 to the GT's price.—*MDL*

VENOMOUS VIPER COUPE

HOT ON THE HEELS OF the convertible version of John Hennessey's Venom 1000 Viper—which won R&T's Standing Mile shootout in the September 2005 issue—comes the introduction of the coupe. Only 24 of these 1000-bhp twin-turbo V-10 monsters will be built, highlights of which include a super-low front air dam/bumper assembly, 19 x 10-in. front and 20 x 13-in. rear wheels with Michelin Pilot Sport 2 tires, KW adjustable suspension, a Quaife differential and 5-point racing harnesses. The Venom 1000 convertible took just 25.6 seconds to accomplish the standing mile, at a speed of 210.2 mph; expect better still from the more aerodynamic coupe.—*MM*

Volkswagen Hatches a 5-Door Phaeton

DIGITAL ILLUSTRATION BY MOTOR FORECAST

Listed under the "believe it or not" category, the second generation of VW's dismally selling Phaeton ultra-luxury sedan will be a 5-door hatch. Completely out of the question, you say? Maybe not. VW has realized it simply can't compete head-to-head with Mercedes-Benz, BMW, Jaguar (and even the family Audi A8 L) with basically the same product. So the next Phaeton will adopt a large coupelike angular shape similar to the Lexus GS series; but as you can see in this artist's rendering, it will do without a traditional trunk and become one of the most expensive 5-door hatches in the world. For further proof that this isn't so strange, remember that the original Phaeton concept—the D1—was itself not a traditional 3-box car. The second-gen Phaeton is due to hit the market in 2008.—*MM*

OVERHEARD:

▶Zeta lives! **General Motors'** much talked-about rear-drive Zeta program for North America has been revived. However, this architecture has been overhauled to combine elements of the Australian-developed rear-drive package that will be used for the next Pontiac GTO and bits from Cadillac's Sigma platform. The plan calls for this new platform to be used for a Buick flagship, the next Chevy Impala and Monte Carlo—and a resurrected Camaro.

▶"Let me set the record straight: The Q7 does not share a platform with anything."—*Johan de Nysschen, Audi of America executive vice president, explaining that Audi's new Q7 SUV is not just a derivation of the Volkswagen Touareg and Porsche Cayenne.*

▶"You can't design a car from a computer. You have to feel it, touch it, caress it; you have to love it. It's like a human body. Then…it's good."—*Walter de'Silva, head of Audi brand group design.*

▶"I think the popularity of SUVs has prepared U.S. buyers to take another look at hatchbacks."—*Chrysler Design VP Trevor Creed on the Dodge Caliber and Jeep Patriot and Compass.*

▶"A lot of friends have said to me `How can you go from Ferrari to Fiat?' But to be honest, I'm having a lot of fun. The next Cinquecento is going to be stunning, just like the show car. My biggest challenge, though, is reviving Lancia."—*former Mini and Ferrari design chief Frank Stephenson.*

NEW CIVIC Si GOES RACING

HONDA ISN'T WASTING any time putting the new Civic Si through its paces. Built to compete in the grueling 25 Hours of Thunderhill endurance race in Northern California, a pair of Honda R&D-built Si race cars will hit the track at the same time the production Si arrives in showrooms.

Both cars were modified for competition by stripping the interior, adding a rollcage and then fitting the chassis with an H&R racing suspension, lightweight 17-in. Volk wheels and Michelin Pilot Sport Cup racing tires.

Engine modifications have been restricted to a race-tuned ECU along with a freer-flowing AEM intake and DC Sports exhaust system. I'll be sharing driving duties with members of last year's class-winning Acura TL race team.

—Kim Wolfkill

Solstice Turbo For Real

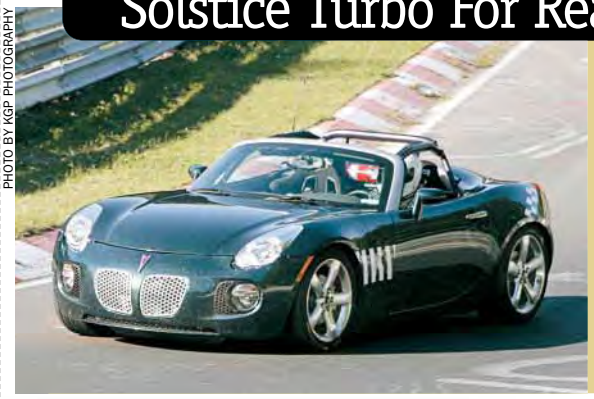


PHOTO BY KGP PHOTOGRAPHY

▶ Despite their fondest hopes, Pontiac's all-new 2-seat roadster has been slightly outclassed by Mazda's new MX-5 Miata. To counter the lighter Mazda's performance advantage, Pontiac is hard at work on a turbo version of the Solstice (as seen here on the Nürburgring) that should develop 240 bhp from its Ecotec four. Exterior changes include a lower front air dam with an extra air intake slit at the bottom as well as intakes inward of the lower lights. Dual exhausts hint at the power within, while a small lip spoiler on the trunk helps with high-speed stability. Pontiac is hoping to have the Solstice Turbo ready for the 2007 model year.—*MM*

This Month in…

As the cliché goes, all good things must come to an end, and so it goes with *Road & Track Road Gear*. The December/January issue is the final newsstand edition; after that, it combines with *SPEED* to become an online publication. Check out *SPEED/Road Gear* at roadandtrack.com. Here are the highlights of the December/January issue on sale now:

▶ With the holiday season bearing down upon us, we expanded the regular Car Toys column into a 10-page special feature, offering a smorgasbord of 30 products; in other words, something for everyone's mobile electronics wish list, whether you've been naughty or nice.

▶ Desired Customs in Niagara Falls, Ontario, Canada, souped up a Saturn Ion Quad Coupe with a fiberglass subwoofer box that houses six subs, an amplifier rack in the trunk and a truly cosmic paint job.

▶ Pamela Anderson has always had a thing for Rovers—"My dad drove a Land Rover when I was little," she says—and her updated 2004 Range Rover has been stacked with a slamming stereo system. She was more than gracious to show off her white stallion to Editor-in-Chief Mike Mettler and share with him what she listens to on her iPod when she's behind the wheel.

▶ The fantastic foursome evaluated with *Road Gear's* rigorous in-car and in-lab test standards are: JL Audio's CleanSweep, a processor that interacts directly with your factory stereo; an MA Audio monster 15-in. subwoofer that's perfect for ground-pounding on both the street and in the competition lanes; a JBL subwoofer amplifier that amplifies a sub signal seamlessly; and Eclipse's way-cool multitasking head unit that handles navigation, audio and video—and comes with a built-in hard drive.

Your TURN

NEW STAR OF THE FAMILY?

PORSCHE CAYMAN

I can't eat, I can't sleep. I have never wanted anything more in my life than a Porsche Cayman (November cover story). I have looked at Boxsters for years with a ho-hum feeling. The Cayman has that look I have been waiting for: powerful and unique. For me, it is still out of reach as dreams always seem to be, and I hope Porsche comes out with a regular Cayman (no S), which might bring the price down a bit. Otherwise, I will have to wait a few years to get a used one. Either way, I will have one someday. **Steve Christy**
LANCASTER, PENNSYLVANIA

As a heads-up to other potential owners of the Cayman thinking about the untapped potential: The line forms right behind me at 19-21 Mindelheimer Str., Pfaffenhausen, Germany. **Joseph Carastro IV**
GOLETA, CALIFORNIA

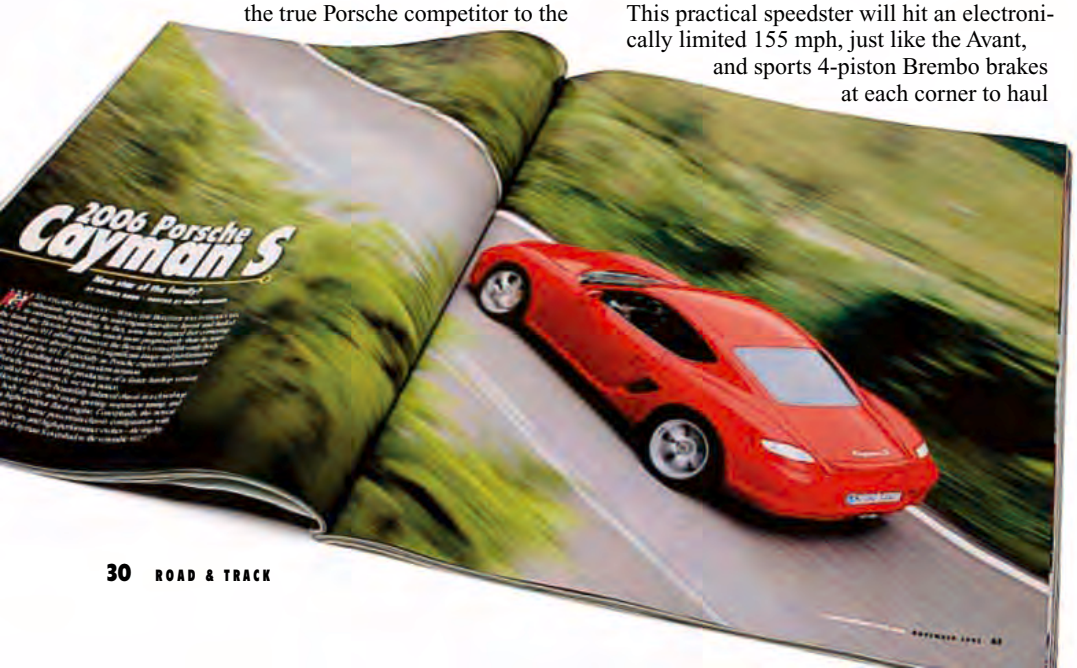
Ruf Automobile GmbH is located in Pfaffenhausen.—Ed.

I have been curious as to how the new Aston Martin V8 Vantage (November road test) would compare with its competitors, especially Porsche. I was glad to see the comparison box with the Maserati and Porsche 911 Carrera S, but what I hadn't realized (until flipping back a few pages) was that the true Porsche competitor to the Aston is not the 911, but the Cayman! Each has two seats, near-identical 0–60 times and comparable braking specs. Both have plenty of cachet, and yet Porsche does it for almost half the price.

Who would have thought a Porsche would be such a bargain? **Barnett Adler**
PROVINCETOWN, MASSACHUSETTS

If I see another car magazine with the Cayman S on the cover, I'll flip. This new Porsche is significant, but how many times can one read about the same car?

Besides, I'd rather have my manual Mercedes-Benz SLK350. It may not handle as prodigiously as the Cayman S, but it is now a real sports car, costs about $11,000 less, has a trunk and, best of all, it is a hardtop convertible. I can have only one 2-seater in my family and I want it to be a roadster that offers topless motoring. **Joe Carballosa**
DELRAY BEACH, FLORIDA



BATTLEWAGONS

Enjoyed the "Battlewagons" comparison test (November issue), but you forgot something: It's a near-luxury European wagon with 300 bhp, all-wheel drive, a 6-speed manual transmission and runs acceleration numbers within 1–2 tenths of the Audi S4 Avant for both 0–60 and the quarter mile. This practical speedster will hit an electronically limited 155 mph, just like the Avant, and sports 4-piston Brembo brakes at each corner to haul it to fade-free stops. What is this mystery wagon? The Volvo V70R. **Mark Gottschalk**
HUNTINGTON BEACH, CALIFORNIA

Given the range of vehicles you included, I'd say you forgot one: the Subaru Legacy GT wagon. For about $30K, it will do 0–60 in the mid-5s, handle smartly, cope with weather as well or better than the Audi, while getting significantly better fuel economy than any of the others. And you still have $10K toward your Cayman… **Jeff Lowell**
PROSPECT, CONNECTICUT

Please, *Road & Track,* don't let our secret out! As the owner of a Saab 9-5 Aero Wagon, I have been happily driving circles around SUVs and minivans for years. When I drive my son to college, I stay off the Interstates and take the back roads. Having read "Battlewagons," I now would like to trade up to the Mercedes-Benz E55 AMG wagon—but tuition and fuel costs will prevent that any time soon. Great article! **Michael A. Kehl**
ALLENTOWN, PENNSYLVANIA

I am one of those sickos out there who really likes wagons, particularly performance wagons such as you tested. As an owner of a BMW 325i sport wagon, I can appreciate the combination of utility and sports-car performance these vehicles offer. Which leaves me asking why BMW doesn't offer a competitor to these "Battlewagons." Imagine an M3 wagon with a 6-speed and 333 bhp on tap? Or a 500-bhp M5 wagon? **Niels Nicolaisen**
PORT ORCHARD, WASHINGTON

THE CHALLENGE OF CHANGE

How could Tim Tuttle write "The Challenge of Change" (November) without mentioning Mario Andretti? Daytona 500 winner, Indianapolis 500 winner, Formula 1 World Champion…

And guys like Dan Gurney and A.J. Foyt, who made a practice of running everything and winning everything. It's nothing new, and I hope the concept of a driver is a driver is a driver is coming back. **Tom Thornell**
LOCKHART, TEXAS

A.J. Foyt, Tony Stewart and Robby Gordon deserve mention in any discussion of versatile drivers. Besides being the most successful Indy-car driver ever, with 67 wins, A.J. won in USAC and NASCAR stockers, including the Daytona 500, and was one of the all-time greats on dirt in sprints and midgets. His sports-car successes alone would make a career, with wins at Le Mans, Sebring and Daytona.

In recent times, Tony Stewart has gone from dirt-track champ to Indy-car champ to NASCAR champ. Robby Gordon, although of lesser fame, is perhaps the most versatile of all. He has won in stadium trucks, desert trucks, sports cars, Indy cars, stock cars and even won a pair of Dakar rally stages.

Harry Hess
DEARBORN, MICHIGAN

I was surprised not to see Valentino Rossi's name mentioned. After winning five consecutive MotoGP championships and with just a one-year contract remaining, Rossi is expected to make the jump to Formula 1, with Ferrari being the best bet to land him.

Bob Prisco
CHANDLER, ARIZONA

PHOTO BY GARY NORDMARK

THE PICKLE LAKE CHALLENGE

When I read Peter Egan's "A Jaguar in Moose Country" (May 2005), I was captivated—and determined to follow his tracks, substituting a Packard for the Jaguar. So just before Labor Day, Sandra and I left Red Wing, Minnesota, in our 1936 Packard Model 120 Business Coupe and headed for Pickle Lake. Our Packard is powered by its original straight-8 engine, assisted, however, by a modern Paxton supercharger.

Lots of tools and spare parts were packed in the trunk. No Packard dealers on this route. Our first night was in International Falls, then we traveled to Sac Bay Lodge, which Peter mentioned. On day three we drove the 140 miles to Pickle Lake, took our pictures and then drove back to Silver Dollar for its annual community celebration. What great fun. We headed home via Thunder Bay, along Lake Superior's North Shore to Duluth and on to Red Wing.

It was a great 1520-mile trip. Remember: Keep driving them; that's what they were made for.

Gary Nordmark
RED WING, MINNESOTA

FAST AND RELIABLE?

Kim Wolfkill's article, "How Would You Like to Set a World Record?" in the November issue was most impressive. However, some 99 percent of the test miles occurred at constant speed, not a real-world scenario for passenger cars. Obviously, Mercedes-Benz and diesel engines are both known for durability. But is there good information on diesel Mercedes subjected to real-world repeated "spirited" acceleration and high-speed travel over extended time periods?

Ed Klein
CENTER MORICHES, NEW YORK

See below.—Ed.

I purchased my Mercedes-Benz CDI in May 2004, and had actually put a deposit on it months earlier being anxious to trade in my 1996 300D for the newest model.

It is truly a wolf in sheep's clothing. Aside from getting 30-plus mpg around town, it returns 37-plus at highway speeds, not to mention that when passing at speed on an Interstate, it will go from 70 to 90 before you know it. It's going to be difficult to explain to a trooper, unless he's a car nut like me.

The car has been bulletproof so far and the 14-month service schedule works out well for my mileage use. Maybe we will see those other great diesel engines Mercedes sells in Europe one of these days.

John A. Collier
BASKING RIDGE, NEW JERSEY

MR. LOSEE'S FERRARI

Kudos to Richard Losee to have a "chop job" done on his Ferrari Enzo (November issue). After reading his article, I had to take a closer look at my own Enzo with a thought toward making the same conversion.

Although Ferrari was willing to send Mr. Losee a second set of doors, I don't think Mattel would be so inclined to do the same for my Enzo. I would probably have to purchase a complete second car, not altogether an impossibility. And I do know a master modeler who could complete the necessary bodywork on the 1:18-scale doors.

On a serious note, I have great admiration for Mr. Losee for his willingness to even consider, let alone perform, such a modification on an Enzo. I would love to know what Ferrari and Pininfarina think of his T-top Enzo.

Neil Tusing
RIVERSIDE, NEW JERSEY

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PEOPLE, Places & THINGS

By David W. Black

PHIL FRANK

AVIAN RULE: James Thurber might have written that at last the birds were in charge. According to *Las Últimas Noticias,* a robber gang ransacked a house in El Salvador, and even stole Paquita, the family parrot. Police stopped the suspects' car for a routine check, and the parrot suddenly screeched "Robbery! Robbery!" A quick inspection identified the scoundrels and made Paquita a national celebrity.

MODULE MADNESS: The convoluted electrical systems in today's cars contain about 70 small computers, says the *Los Angeles Times,* and their software programs employ more than 35 million lines of code. They have to operate under brutal conditions of heat, fumes and vibration, so their glitches are constantly being identified, analyzed and corrected by automakers at a total expense of $2 billion to $3 billion a year.

DEDICATION: Thomas Stefanelli isn't your ordinary pizza-delivery guy. He was on a run in Tampa, Florida, when a masked robber stopped him and demanded all his money. Stefanelli refused and shots were fired, one hitting him in the leg before the gunman fled. Stefanelli resolutely completed his remaining four pizza deliveries before checking into the hospital. He's doing fine, and police have identified his attacker.

SPECIAL HARVEST: It's kind of a sweet-and-sour story—and yummy for good Hungarian drivers. The fruit-growing area of Szabolcs-Szatmar-Bereg has its children riding along with traffic policemen for a month, to reward good drivers with an apple and a winning smile. Bad drivers, however, will receive a lemon, a sad look—and the psychologically weighty realization that they have disappointed a child.

HARD SELL: The Harvard Center for Risk Analysis estimates that 2600 deaths and 330,000 injuries a year are caused by drivers using cellphones, and urges that they be reserved for emergencies only. Car-safety agencies also recommend: 1) Programming-in recurring numbers for no-look dialing, 2) Memorizing the keypad, 3) Remaining calm while talking, 4) Letting your voice mail accumulate all messages while traveling.

THOSE KIDS: The Dutch worker drove home to find a strange car in the driveway, with two children playing in the back seat. He asked, "Are your parents inside?" and they cheerily responded, "Yes! They're inside robbing your house!" The homeowner rushed in, the robbers rushed out empty-handed, burned out of the driveway, and so far are still missing.

FRAGRANT FRIEND: A routine driver sweep in Munich, Germany, bagged a 24-year-old who registered well above the drunk-driving limit. Downtown, however, he tested perfectly sober. It turned out he had just enjoyed a Fisherman's Friend, the respected and

PHOTO BY MARC URBANO

■ **Need an escape after being stuck in traffic behind that seemingly never-ending stream of large sport utes? Might we suggest *Road & Track's Guide to Sports & GT Cars 2006*, a new 112-page magazine dedicated exclusively to those high-performance cars that make you yearn for twisting canyon roads and late-night blasts down the *Autobahn*. Inside, you'll find numerous road tests and features on cars that matter, everything from the Bugatti Veyron and Corvette Z06 to the Honda Civic Si and Pontiac Solstice. Throw in some great comparison tests (Ferrari F430 vs. Ford GT, Corvette Z06 vs. Viper Coupe, Mitsu Evo MR vs. Subaru WRX STi) and you'll see why we guarantee this magazine to be therapeutic. On sale at newsstands December 20.**

internationally reputable cough drop, whose mentholated oils apparently affect handheld breath analyzers in the same way as alcohol. Sweeps police are being reeducated.

ROUND TRIP: A successful bank robber in Christchurch, New Zealand, was running long on discretionary income, so he put down about $44,000 on a nice sports car. He was less successful as a driver. He was soon caught speeding, identified as a wanted criminal, and imprisoned.

SWEET HOME: An unnamed oil sheik has taken delivery of the world's largest and most opulent camping van, christened the Desert Challenger. The handmade vehicle cost more than $1.75 million and took Action Mobil of Austria 1½ years to build. The rig can be self-sufficient out on the desert for several weeks, with 4000 liters of water, plus 2500 liters of fuel for its 13-liter diesel engine. Surveillance cameras provide constant perimeter scanning. Exquisite planning and materials were used throughout, involving expertise and craftsmen from auto, aircraft and yacht-building specialists.

PECULIAR PITCH: In a convoluted bit of reverse-marketing reported by *International Express,* the two Mustangs driven by Steve McQueen in his 1968 movie *Bullitt* were advertised—and sold—as "[having been] used by careful elderly ladies." The sales price was not revealed.

MONEYMAKER: There's a traffic camera focused on a no-left-turn bus lane in Hampstead Borough, London, and due to a peculiar, traffic-compressing intersection, it brings in more than £1 million per year. Authorities refuse to change either the camera or the traffic lanes, saying the proceeds pay for road repairs. Victims are furious, one woman calling the whole quasi-legal setup a real cash thief and "a money spinner."

JUST SING ALONG: Dialing cellphones, shouting at rackety children and manipulating sloppy fast-food will dangerously weaken any driver's skills. However, recent research by Privilege Insurance Company indicates that a lilting, heartfelt duet with a Sinatra oldie is sure to enhance your attentiveness and driving safety. Raucous rock, rap and cacophonous composers provide less welcome duets, but the poll says singing along with a cherished balladeer is psychologically beneficial.

FUZZY FLIGHT: Sheriff's deputies responded quickly to a reported morning robbery of a North Pownal, Maine, store, but were sidetracked by an unusual sight: two teenagers tooling down State Route 231 in a golf cart with two cases of beer on the seat. The case was quickly closed.

SOURCES: Technical advice for both weekend mechanics and baffled owners is all over the Internet. A few examples: www.familycar.com/carcare.htm is a very general, direct site, as is www.motorist.org/e1.htm. Service bulletins, tips and marketing are at www.theautochannel.com/mania/repair.

Classics Rock

■ **Mercedes-Benz is as serious about taking care of its classic cars (read 20 years old or older) as it is in selling new ones, as evidenced by the November opening of the new Classic Center in Irvine, California. It not only preserves the heritage of the brand, but it also is good business.**

The Classic Center, headed by Michael Kunz, provides parts and service including full restoration to the more than 350,000 such classics on the road in the United States. In addition, the Classic Center will sell cars both on consignment from owners and dealers as well as other cars that it will purchase and restore.

"With the Classic Center, Mercedes-Benz has essentially created the business model for direct factory support of the classic automobile enthusiast and owner," Kunz explains. Services offered will include roadside support at major tours as well as Mercedes' sponsored gatherings, and the Center will display at any given time about 30 or so cars from the company's car collection—models owned by the U.S. unit of Mercedes as well as cars from the museum in Stuttgart. In fact, the U.S. Classic Center is modeled on Mercedes-Benz's center for factory restoration in Fellbach, Germany, which has been in operation since 1993. For more information on the Classic Center, log onto www.mbusa.com/classic.—*Matt DeLorenzo*

PHIL FRANK

SCENT MATTERS: Great Britain's *Western Mail* reports that an odor analysis by the RAC Foundation has identified smells that affect driving behavior. Dangerous smells include chamomile and lavender, which can cause over-relaxation; fresh bread, which can generate hunger and hyperactivity; and leather, which can recall youthful thrills to elders and encourage risk-taking. Peppermint and cinnamon are considered beneficial, improving most drivers' levels of concentration.

Cool Car Stuff What's Your Sign?

▶ How about an authentic blue-and-white *Autobahn* traffic sign displayed on your game room wall? Or a full-size black-and-white road sign showing that your garage recognizes no speed limits? Or maybe even a graphic warning that German tanks may demand the roadway at any time?

These and other European road signs are being offered by Roundabout Signs LLC, all exact in form, design and color. They are produced by their original manufacturers, and each carries formal documentation showing its country of origin. Special adhesive strips are included for mounting.

Prices begin at about $125 plus shipping. Full details are available via phone at (888) 527-1704 or at www.roundaboutsigns.com.

—David W. Black

SMASHING IDEA: The German state of North Rhine-Westphalia is considering a shocking highway turnabout—actually permitting *Autobahn* drivers to make U-turns directly into oncoming traffic. The plan is to reduce the heavy traffic jams that follow major accidents. The U-turns would be permitted only under police guidance and full highway control.

STAR TURN: It was all about a campaign promoting Japanese road safety, says the *Mainichi Daily News,* and Pluto the parading poodle was clearly at the top of his game. Officials duded him up in a "Traffic Safety" sash and publicized Pluto doing his famous two-legged trot for 20 meters across a primary intersection. Then they gave him an award and took him down to the police station for a big thank-you from the chief, plus some dog food. Pluto, of course, insisted on strolling into the station house on his own two legs.

THIEF WITHOUT HONOR: The *Los Angeles Times* describes this rolling drama: A getaway car carrying three burglary suspects was being pursued by police on the crowded San Diego Freeway. They neared an offramp, and suddenly the driver slowed down, leapt out and ran down the embankment, leaving his two cohorts adrift on the freeway. Police got in front of the car and stopped it before anyone was injured. They found stolen goods, made their arrests, and soon located the fickle pilot.

25 Years Ago

PHOTO BY RICHARD M. BARON

▶ After Ettore Bugatti's death in 1947, his company survived, mainly by making airplane parts. There was an attempt in 1956 to return to Formula 1 with the Type 251 (March 1988 Salon by Doug Nye), but in 1963 Hispano-Suiza bought the company and ceased automobile manufacturing.

In 1987 Romano Artioli acquired the Bugatti name, and in 1989 work began on the EB110 (above), a V-12 so named and set for launch in 1991 as a tribute to Ettore Bugatti's 110th birthday. Griffith Borgeson visited the new Bugatti factory (built in 1990 in Campogalliano), and in the January 1992 issue we published a driving impression of this new exotic. The July 1994 road test confirmed that this was, indeed, a hyper-exotic: a 4.4-second 0–60 time and an estimated top speed of 207 mph.

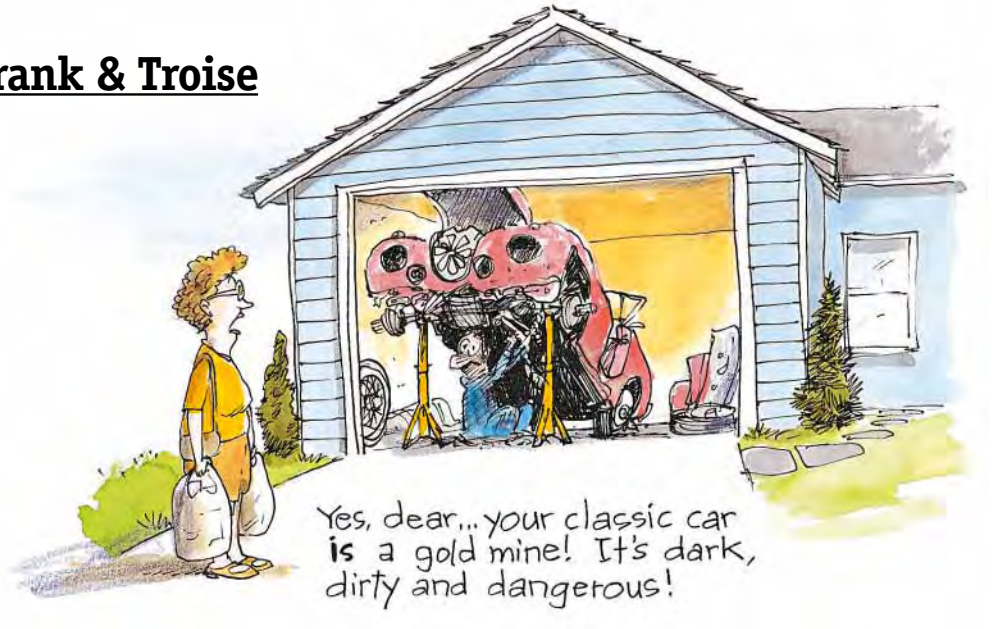
Unfortunately, in 1995, after production of 95 EB110 and 31 EB110S models, production ceased, and in 1998 the factory was sold to a textile firm. The Volkswagen Group bought the name that same year and continued creating various show cars that have led to the production Veyron 16.4 featured in this month's cover story.

In the February 1967 issue we tested the original Shelby GT 500. How do you think it might stack up against the new Shelby GT500? With 450-plus bhp on tap, this is the most powerful factory-built Mustang to date *and* you or I might be able to afford one…*—Jerilyn Jeffery*

2005 ROAD & TRACK Index

▶ A complete listing of all articles and illustrations that have appeared in *Road & Track* over the past year is now available. This 2005 *Road & Track* index is easily downloaded from our website (www.roadandtrack.com). Or send a stamped, self-addressed business-size envelope (No. 10 or larger) to R&T Index, 1499 Monrovia Ave., Newport Beach, Calif. 92663.

Frank & Troise



Side GLANCES

By Peter Egan, EDITOR-AT-LARGE

EXTINGUISHING THE MIDNIGHT OIL

ONE OF OUR SECRET PLEASURES HERE IN the upper Midwest is the work of a singer and songwriter from Iowa City, Iowa, named Greg Brown. He comes through on tour once in a while—each overnight stop carefully chosen for its proximity to a good trout stream—and we usually see him when we can.

A few years ago we caught up with Brown in Fort Atkinson, Wisconsin, at a bar and restaurant called The Café Carp. He pulled up in what novelist James Lee Burke would call "a mid-'70s gas hog" and changed out of his hip boots on the street in front of the café. Extracting his guitar case from a trunk full of fishing gear, he strode into the place and sat down to play his soulful and poetic mix of tunes, wearing a slightly torn sleeveless T-shirt and an old felt hat, looking a bit wild and windblown, like someone who had just skydived into a briar patch.

The whole scene reminded me of the last Rolling Stones concert we went to, only without all the semis and security guards.

Brown has written a lot of great songs, but one of my favorites is called "Who Woulda Thunk It," and it's about getting older and losing your enthusiasm for excess and suffering. I won't print out the whole lyric sheet, but the essence of it might be contained in a couple of verses, here abridged (with apologies to Brown) for your convenience:

We used to say "I could walk all night,"
And we could and we did…
Now we say "I could walk all night,"
But it's not true
We can't walk all night, no,
Because we don't want to.

Another verse says,

JON LEZINSKY

We used to say "I could eat a horse,"
And we could and we did…
Now we say "I could eat a horse,"
It's not true
We can't eat a horse, no,
Because we don't want to.

The chorus after each verse is:
Hey, hey,
Hey, hey,
Who woulda thunk it?
Who woulda thunk it?

It's one of those songs that enters your repertoire of useful phrases and stays with you. Barb and I have used it a lot, in shorthand form, over the years. And, strangely enough, it's shown up three times in just the past month or so.

On our recent road trip through Quebec and New England, I suggested to Barb that we stop for the night in a particularly bleak and seedy-looking motel along the highway, mainly because I was tired of driving and it was getting late. Also, I am cheap and hate to spend a lot of money on those lost portions of my life when I'm comatose.

Barb looked at this shabby little place from the parking lot and said, "We used to stay there, and we could stay there, but now we don't want to."

So I drove on another 25 miles and we found a place with better neon and the promise of fewer cigarette burns on the nightstand.

Right after that trip, the Greg Brown lyrics struck again while we were driving Up North for the weekend, and I suddenly swerved off the road to look at an MGB that was sitting by the roadside with a FOR SALE sign in the window.

The car wasn't rusty and the price was quite reasonable, but the interior, top, rubber trim and tires were all shot. The owner came out and opened the hood for me, and the engine compartment was an oily mess, with ratty wiring and a greenish-white radiator. It smelled like hot oil and coolant. He started the engine and it practically ran on almost three cylinders.

Not enough, really.

"Needs second gear," he said, "but otherwise the car works great."

I thanked him and returned to our waiting Mini.

"What do you think?" Barb asked as I accelerated down the road.

"Twenty years ago I would have dragged that car home and spent the next two years restoring it," I said, looking at her just a little sadly. "And now I could fix it up, but I don't want to."

She nodded and hid her sigh of relief behind a polite little cough, sort of like Doc Holliday during his time in Tombstone. She didn't want me to, either.

And, alas, this same expression of preemptive surrender and avoidance came yet a third time just a couple of weeks ago. The subject, once again, was an old car needing restoration.

The car, in this case, was my 1971 Lola T-204 vintage Formula Ford, which I've been restoring, slowly and methodically, for about three years. This car is kind of like that huge statue of Crazy Horse in the Black Hills—always nearing completion, but never quite done. My friends have begun giving me a fair amount of guff about this and are encouraging me to finish the project sometime before the next Ice Age brings an end to auto racing as we know it, or the Chinese burn off the last gallon of oil making plastic spatulas for Wal-Mart.

After I got the engine and Hewland gearbox successfully installed a few weeks ago, my friend Pat Donnelly looked at the project and said, "You know, if you would just get busy and maybe pull a few all-nighters, you could have this thing done in time to race the BRIC [Brian Redman International Challenge vintage races] at Elkhart Lake."

I glanced over at the Blues calendar on my garage wall, which showed a photo of Sonny Boy Williamson playing harmonica above the month of July.

"By golly, you're right," I said. "I *could* do it!"

So I started working feverishly on the car and ordering so many parts from so many sources that the UPS truck looked like a tuning fork going up and down our driveway. I didn't pull any all-nighters, but I did put in a lot of late-nighters, drinking iced coffee and caffeine-laced diet soft drinks into the wee hours of several mornings.

It was just like the old days when I was 23 and racing my Bugeye Sprite. I'd work until near exhaustion and then shower and go to bed, but lie there twitching like a high-voltage wire and thinking about what had to be done next, making mental lists and muttering to myself like a wino remembering the days when he used to be a big shot at Enron. I was on a crazy roll.

Things were moving.

But then, about a week and a half before the races, a few snags appeared.

First, the foam in my 30-year-old fuel cell turned to gasoline-flavored Jell-O when I added fuel to the tank, so I had to order a new one. And then I had starter trouble.

A Lucas starter came in an old box of parts with the car, but I refuse, from long and bitter experience, to put a Lucas starter in any race car. Especially a Lola 204, where the entire engine and transaxle have to be extracted to sneak a faulty starter past the frame tubes. So I ordered an expensive, reengineered, updated starter made from modern Japanese parts.

But when it arrived, it didn't fit. It hit the shift linkage and the frame.

So I sent it back and ordered a different, supposedly more compact, modern starter from a different source.

It arrived four days later and that night I took it out to the garage. Time and hours and minutes were running out.

I wrestled this starter down through the frame, and realized, to my growing horror, that this one wasn't going to fit, either. It was about a quarter inch too long. No go.

I sat down to catch my breath, glancing at the clock. Almost midnight. To have any hope of making the race, I'd have to put the old, cursed Lucas starter in. And to do that, I'd have to pull the engine and transaxle back out of the car, undoing all my recent work.

I'd have to burn the midnight oil. Pull an all-nighter. A bunch of them, actually.

Back when I was 23 and working on that H-Production Bugeye Sprite, I would have done it, too. All of us who raced did in those days. Nighttime had no meaning, except as an extension of the day, a time when things got done. We'd start out bright and energetic in the evening and work until the sun came up, slowly losing our energy and zeal until we were wandering around like zombies, stumped by the simplest decisions. Go home feeling sick, dazed, dirty and stale, sleep for a couple of hours and then get up for the regular work day.

But that was then.

And now was now.

I got a Diet Coke out of my small Japanese workshop refrigerator, and sat back to look at my car. I started to pull the tab on the Coke can, but thought the better of it and put it back in the refrigerator. I got out a beer instead.

A dark, heavy *doppelbock.* Ambien of the gods.

"I used to work all night," I mumbled to myself, "and I could work all night. But now I don't want to."

I finished the beer, turned out the lights and went to bed. I'd be carless at Elkhart.

Hey, hey, who woulda thunk it?

"I'd work until near exhaustion and then shower and go to bed, but lie there **twitching like a high-voltage wire** and thinking about what had to be done next…"

First DRIVE

BUICK

Lucerne

Reinventing a classic

BY MATT DELORENZO

BACK IN THE DAY, BUICK was the quintessential American step-up luxury car—a stylish, large sedan, usually with V-8 power, that appealed to the professional class, usually doctors and lawyers. The 2006 Lucerne is a serious attempt to recapture some of that magic and transform Buick from a dowdy domestic into a luxury liner that can go toe-to-toe with the likes of Lexus.

The Lucerne is an all-new entry for Buick replacing both the LeSabre and Park Avenue, but uses some familiar architecture beneath the skin—the tried-and-true mechanicals that underpin the front-drive Cadillac DTS. In the process, Buick has returned the V-8 to its car lineup, the first application since the Roadmaster's demise in 1996.

From a design perspective, the Lucerne is much more expressive than the DTS and the Buicks it replaces. The shape features a steeply raked rear window, a more aggressively shaped grille and large headlamps, clean flanks and dressy body jewelry that includes chromed door pulls and the venerable portholes—four on each side to denote the presence of the 275-bhp 4.6-liter Northstar V-8, three for the 197-bhp 3.8-liter pushrod V-6. While more expressive, additional work is in order to make the Buick face more distinctive. The grille and headlamps are larger, but the look is too soft and rounded to make a strong impression. Likewise, the rear of the car is almost too clean and mimics the rear of the Volkswagen Passat/Phaeton. Even the larger Buick tri-shield logo looks oddly VW-ish from a distance. Perhaps it's time to bring back cloisonné badging.

Inside, Buick has learned lessons from that German automaker. The materials are top-notch, the design is clean and elegant and represents a huge step forward for GM in cabin appointments. Small items, like passenger grab handles and coat hooks, feature damped hinging. The seats are large and comfortable; however, a bit more lateral support is needed to match the car's athletic dynamics. The instruments are clear and simple and the controls are straightforward and easy to use. There is a distinct lack of clutter, which makes for a peaceful driving environment, something that is a breath of fresh air in a world gone mad with gimmicks.

The Lucerne comes in three trim levels: The base CX and CXL models are offered with a V-6, while the Northstar is optional in the mid-level CXL and standard in the CXS. All engines are mated to 4-speed automatic transmissions driving the front wheels.

Besides marking the return of the V-8 to Buick cars, the CXS is the first application of magnetic ride technology for the division. These magnetically charged shocks change the viscosity of their fluid in milliseconds, allowing for a compliant ride with virtually no body lean. The CXS has a supple ride and yet minimal roll to provide a solid base for flat cornering. The only disadvantage is tire slap over irregular surfaces. It's surreal—you hear the rubber pounding the pavement and yet none of the impacts are transmitted to the cabin.

Almost as eye-opening as magnetic ride is the traditional suspension setup in the V-8 version of the CXL. Buicks in the past have been lambasted for floaty rides, but there is none of that in this new model. Although there is a bit more lean in the CXL, the motions are well-controlled, the steering is balanced and provides the right kind of feedback that encourages you to push the Lucerne hard. There's no flop, squat or pitching to be found in this suspension.

An added bonus is the "quiet tuning" of the body. Engineers have put tremendous efforts into controlling noise/vibration/harshness through the use of Quiet Steel, laminated glass and foam insulation to reduce cabin noise to Lexus levels.

While taking aim at the luxury segment, Buick has kept a tight rein on pricing. The base CX V-6 starts at $26,990, the V-8 CXL stickers at $30,990, and the CXS is priced at $35,990. The Lucerne's solid body, big passenger compartment and able road manners might just be the prescription Buick needs to lure doctors back from luxury imports.

■ **Clean understated elegance pervades the Lucerne's interior. Flat seats could use more bolstering.**

PHOTOS BY JIM FETS

First DRIVE

HYUNDAI Azera

Room for five, with eight airbags and a top speed of 146 mph

BY ANDREW BORNHOP

PHOTOS BY BRIAN BLADES

■ **Coming or going, the new Azera is a reasonably handsome car with excellent power and surprising refinement.**

YES, WE KNOW, WE'RE beginning to sound like a broken record, but it's true: Hyundai—and other Korean manufacturers, for that matter—is continuing to build better cars each year, to the point that most of its models are competitive with their Japanese counterparts, especially when factoring in MSRPs of typically thousands less.

Of late, the new Sonata has led the charge, going after Honda Accord and Toyota Camry buyers with handsome styling (some say it's a flagrant Accord copy), good suspension tuning, excellent build quality and a reassuring 10-year powertrain warranty. Now, the new Azera steps into the limelight, a handsome larger sedan that has scads of interior room, neat LED taillights and projector-beam headlamps firmly affixed on the Toyota Avalon and Nissan Maxima.

In fact, Hyundai says it tuned the Azera's suspension to fall somewhere between those two competitors in firmness—softer and more plush than the Nissan but firmer and a tad sportier than the Toyota. After a week spent in the Azera, we'd say Hyundai has hit its target. The Azera rides very well, the double A-arm front/multilink rear suspension clearly tuned with comfort in mind but nary a hint of float.

Yes, this 3630-lb. front-driver does like to understeer at the limit, but you have to be driving pretty hard—well into ticket territory—to get the 235/55VR-17 tires even squealing or to have the standard ESP yaw control kick in. The hydraulically assisted rack-and-pinion steering has a natural effort, and although the chassis—a widened and stretched version of the Sonata's—is significantly stiffer than the outgoing XG350's, one of our editors did notice the slightest bit of shake through the tilt/telescope steering wheel when driving over rough pavement.

Perhaps the best characteristic of the 5-seat Azera—apart from the generous interior room, front and rear—is its engine. An all-new Lambda V-6 that meets ULEV emissions standards, the aluminum 3.8-liter produces 263 bhp at 6000 rpm and 255 lb.-ft. of torque at 4500 rpm.

Smooth and well muted, this transverse-mounted dohc 24-valve V-6, aided by variable valve timing, a variable-length intake tract and chain-driven overhead camshafts, makes the Azera quite quick, able to spin its front wheels on take-off and propel the car to 60 mph in 6.5 seconds, says Hyundai. Top speed is a lofty 146 mph. The only gearbox, an all-new 5-speed automatic, shifts smoothly on its own, or can be told to do so by nudging the Shiftronic gear lever fore and aft.

As you'd expect of a premium sedan, the Azera is opulent inside, fitted with easy-to-understand controls and a handsome wood- or metal-trimmed dash that sweeps back neatly into the door panels. Expected amenities include automatic climate control, 4-wheel disc brakes with ABS, power front seats, cruise control and a good stereo fitted with a CD/MP3 player. Unexpected (but welcome) standard Azera hardware includes yaw control, eight airbags (with side curtain protection), active front headrests and 60/40-split folding rear seats.

Moving up to the Limited flagship model brings 17-in. wheels, leather seats with contrasting stitching, heated front seats, electroluminescent gauges, a wood-trimmed steering wheel and a power rear sunshade. Options include power-adjustable pedals, a power-adjustable tilt/telescope steering wheel, rain-sensing wipers and a 10-speaker Infinity stereo with a subwoofer and a 6-disc in-dash CD player.

And now, pricing: Although final prices had not been announced at press time, the Azera SE, which went on sale in December, starts at around $25,000. The Azera Limited, about $27,000. Toss in as many options as possible, and a fully loaded Limited, with what Hyundai is calling the Ultimate package, will set you back about $30,000. That's a lot of car for the money, precisely why Hyundai is selling more and more cars each year.

First DRIVE

SAAB 9-5

Dramatic restyle for this Swedish highway hauler

BY SHAUN BAILEY

IT'S IRONIC THAT A VOLVO powers the fastest Saab on the planet. And it's a doozy of a powerplant—power enough to pass traffic at speeds registered in mach numbers. Of course, I'm talking about the newest Saab jet fighter, the Gripen, whose GE turbine is supplied by Volvo. Because you can't buy a Gripen unless you represent a country, you will have to settle for the next best thing, a Saab automobile.

Svenska Aeroplan AB, whose acronym is Saab, started life as an airplane manufacturer in the late 1930s. It branched out to build automobiles shortly after but kept the name. Today the auto and aircraft companies are separate and General Motors has had a controlling share of the auto stock since 1990.

There are four models available, the 9-2X, 9-3, 9-5 and new 9-7X. As of October 5, 2005, the alliance with Fuji Heavy industries to build the 9-2X ended. Now more than ever, Saab is hoping the refresh of its large sedan, the 9-5, will boost sales. We're not so sure it will.

Briefly, the exterior styling changes—though dramatic—still have not made the 9-5 as attractive as its smaller 9-3 sibling. The headlights are recessed and have quirky horizontal eyelashes. In contrast, the 9-3 has flush headlights and a three-part grille that is distinctly Saab.

Although this is the same chassis as the previous Saab 9-5, there are 1367 new or modified parts. Much of the change was focused on improving driving dynamics. There is a good history of front-wheel-drive torque steer coming from Saab, but aside from the typical fwd numbness in the steering wheel, this 9-5 is smooth and responsive. Not once did it try to change lanes, or jerk the wheel when the turbo spooled.

Driving on back roads in Sweden, which are particularly smooth, the 9-5 carved around bends with mild understeer. Body roll was appropriate for the size of the car and not excessive. On the highway the 9-5 was in its element, cruising easily at 80 mph and spooling its turbo quickly for passing at highway speeds.

An optional sport package that gives a slightly stiffer and more planted ride was the most enjoyable model to drive. Combined with the bolstered seats and slick 5-speed manual transmission, the 9-5 makes for a decent back-road hauler. A 9-5 loaded with camping gear, kids and ice-chest would still have a hard time obeying suggested cornering speeds.

The only engine coming to the U.S. in the 9-5 is the turbocharged 2.3-liter dohc 16-valve inline-4. Improved intake tuning has upped the power to 260 bhp and it feels like it. Acceleration times are estimated to be sub 7 seconds to 60 mph. Add the automatic gearbox or the wagon to the equation, and lose about a half second.

The wagon is not just a wagon; it's the SportCombi. There is only one trim level now, and standard equipment includes heated leather seats, a moonroof, stability control, Harman-Kardon audio with a 6-disc in-dash changer and XM satellite radio capability, heated rear seats and driver's seat memory.

Important options are a navigation system for $2750, the 5-speed automatic with shift paddles for $1350 and a sport package that for a reasonable $1095 adds sport seats, lowering springs and tinted chrome interior trim.

At a starting price of $34,100, the Saab 9-5 sedan is a good deal less expensive than its European competitors. The SportCombi costs an even grand more, but comes with a bit more storage space. That's a small price to pay for the joy of passing SUVs and minivans. Just don't expect to keep up with any Volvo-powered Saabs.

Driver-oriented controls are well placed, but shared with other GM products. Shift paddles are just visible behind the steering wheel spokes. Key is still next to the parking brake.

America wins Best Car again, while Italian exotics continue to capture our dreams

BY PATRICK HONG • PHOTOS BY MARC URBANO

LET'S HEAR A NICE ROUND OF APPLAUSE FOR CHEVROLET. For two years in a row, our readers have declared the Corvette as the winner of the *Road & Track* Readers' Choice Award: Best Car. Last year it was the completely redesigned C6 that received the honor. This year, the high-performance 505-bhp Z06 gets the crown. In fact, since the first day of voting, the Z06 led the remaining 11 Best Car finalists and never looked back. America's favorite sports car garnered nearly three times as many votes as its closest competitor. Congrats to Chevrolet for building yet again an exciting, world-class sports car.

To qualify for the *Road & Track* Readers' Choice Award: Best Car 2006, each candidate had to meet the following criteria: having above-average performance and handling, pleasing design and being both space- and fuel-efficient. In addition, each car must carry a model-year 2006 designation, be all-new or have significant upgrades and have a manufacturer's suggested retail price (MSRP) of less than $100,000. This year, the *Road & Track* staff selected a group of eligible cars and gave the list to our *Road & Track* Online Reader Panel (www.hfmsurveys.com/roadandtrack) to choose the finalists. Then, in our October 2005 issue, we announced the 12 finalists and our entire enthusiast readership was able to cast ballots through a postage-paid response card, toll-free telephone number or via our website. The polls were open from August 26 to September 30.

The Chevrolet Corvette is an American sports-car icon. But with the latest iteration of the Z06, the Corvette's performance and refinement have been elevated, making it a true competitor against the world's best. Just look at its numbers: 505 bhp and 470 lb.-ft. of torque, 0–60 mph in 3.9 seconds and the quarter mile accomplished in 12.2 sec., 0.99g around our 200-ft.-diameter skidpad and 69.6 mph through our 700-ft. slalom. And that's not all. Its massive brakes stop the car from 60 and 80 mph in a short 109 ft. and 197 ft., respectively. And guess what, all this performance comes at an MSRP of just $65,000 *and* manages to avoid the gas-guzzler tax.

"Beauty and pure brute performance all rolled into a sweet affordable car; performance that runs with the big boys."

—Babatunde Williams, Huntsville, Alabama

"Power, style, value, what more could you want? The Z06 delivers it all."

—Robert Evans, Sterling, Illinois

"Is an explanation really necessary?"

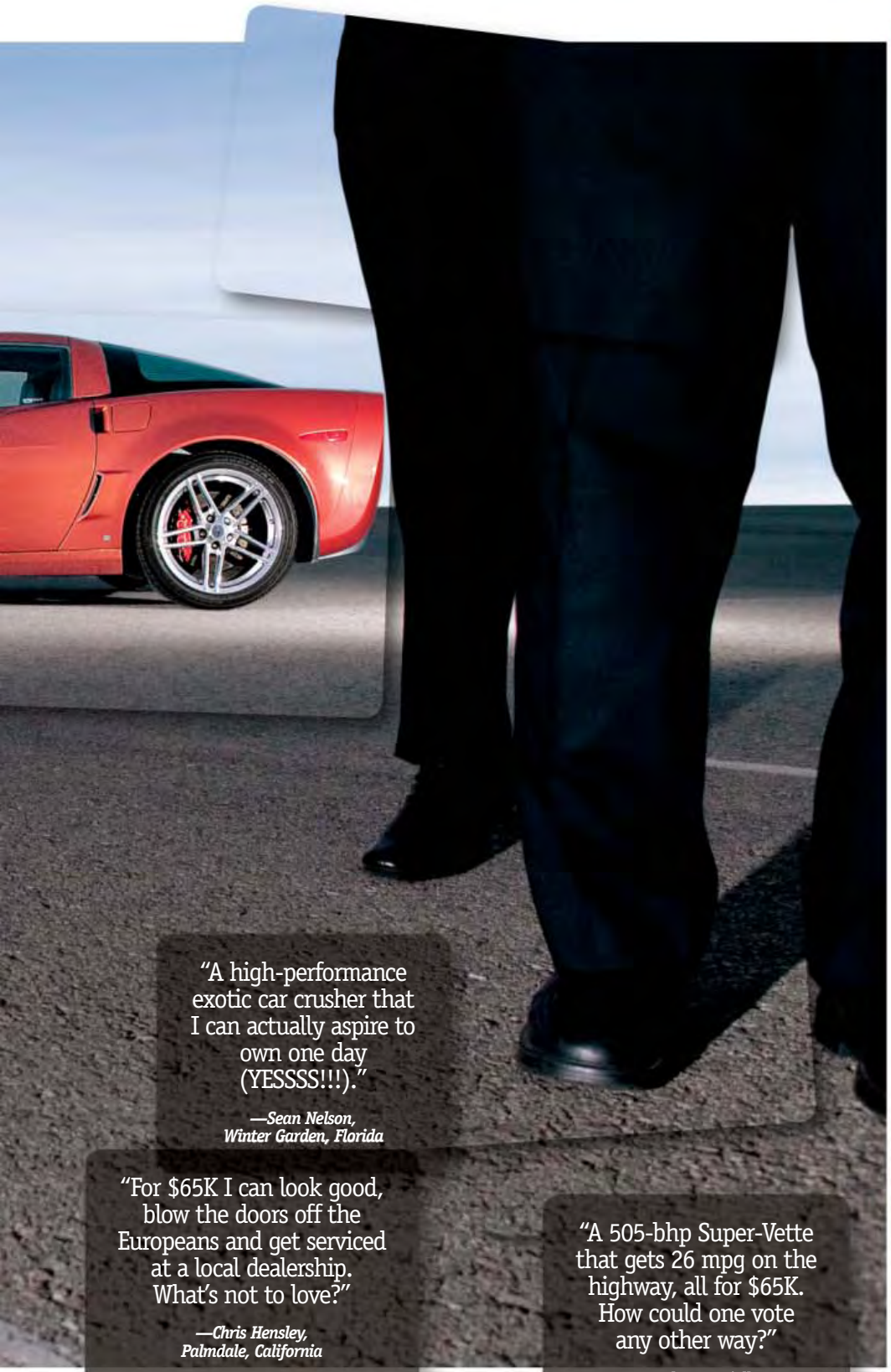
—Chris Abele, Smyrna, Georgia

"World-class supercar performance, not world-class supercar price!"

—Guillermo Sierra, Hereford, Texas

"The most awesome Vette ever produced. What else can you say except 'When will mine be built?'"

—Jeff Cox, Phoenix, Arizona



"A high-performance exotic car crusher that I can actually aspire to own one day (YESSSS!!!)."

—Sean Nelson, Winter Garden, Florida

"For $65K I can look good, blow the doors off the Europeans and get serviced at a local dealership. What's not to love?"

—Chris Hensley, Palmdale, California

"A 505-bhp Super-Vette that gets 26 mpg on the highway, all for $65K. How could one vote any other way?"

—Andrew Coviello, Lansing, Michigan

"Finally, a Vette that can not only run with the world's best sports cars, but beat them."

—William Montana, Greenwich, Connecticut

"Can anyone else give us a supercar for under 70K?"

—Mark Meents, Colorado Springs, Colorado

At first glance, it's difficult to distinguish the base Corvette from the Z06. But take a closer look. You'll notice the car's wider and more aggressive stance. Also, much attention has been paid to the Z06's aerodynamics: Details such as a splitter underneath the front fascia, recontoured front fenders with larger side ducts, a small scoop on the hood and rear-brake cooling ducts all contribute to the car's impressive 0.34 drag coefficient and its high-speed stability. Hidden underneath the hood is the endurance-racing-inspired 7.0-liter powerplant residing in an aluminum and magnesium frame. The body panels on the Z06 are made of composite and carbon fiber, all to help achieve a curb weight of 3150 lb.

Climb aboard the Z06. Turn on the engine and tromp on the throttle. The resounding rumble will take your breath away. It sounds powerful and it delivers. On the street, the high-performance Corvette cruises effortlessly, thanks to its abundant low-end torque and confidence-inspiring traction. On the racetrack, the car wants to be pushed hard and it rewards with sheer speed and grip. It's no wonder that the Z06 forged ahead of the other Readers' Choice Award finalists to be Best Car 2006. Check out www.roadandtrack.com to see where other Best Car 2006 finalists finished in the voting.

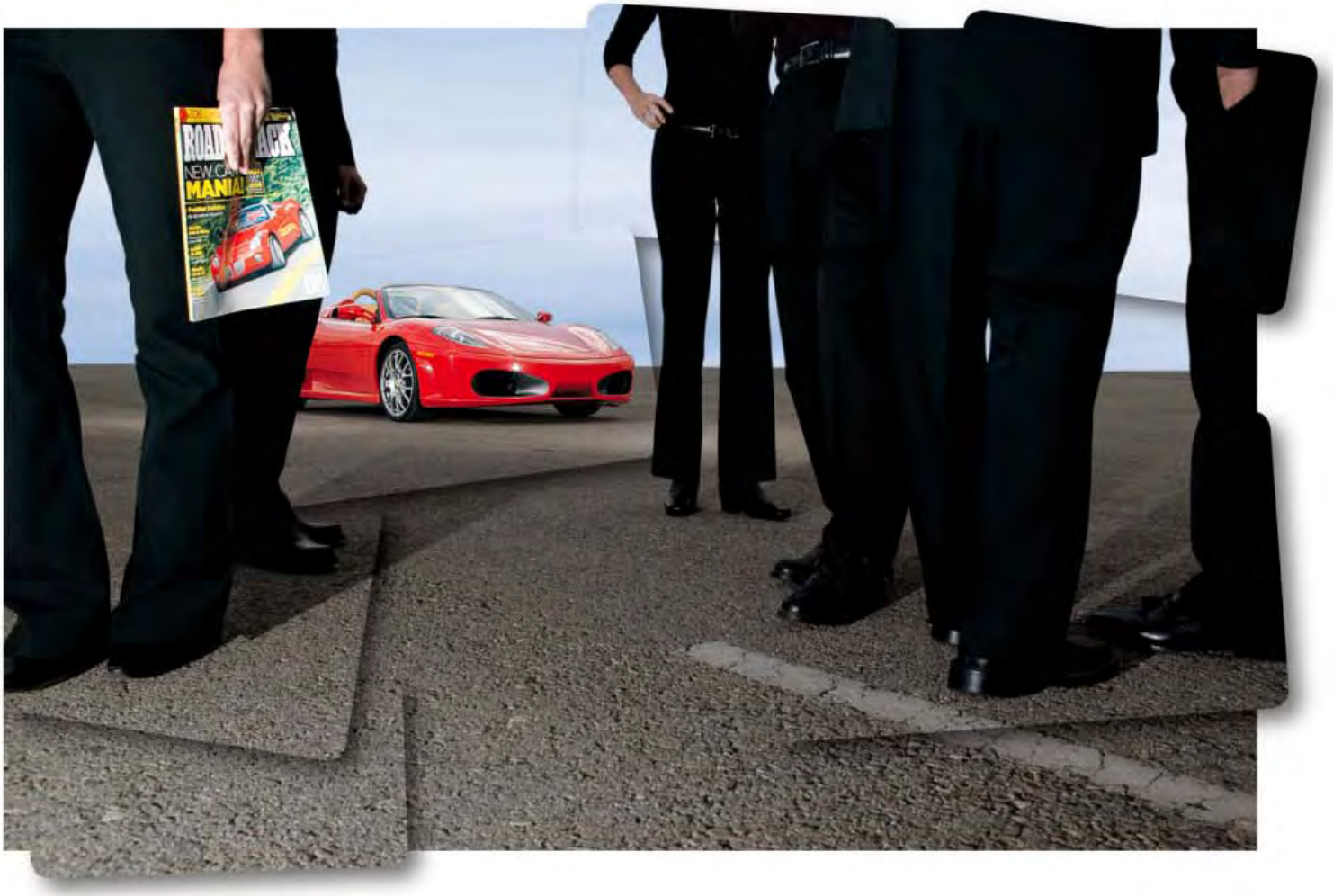
Thanks, Chevrolet, for making the Z06 fun, exciting and affordable for enthusiasts around the world. Keep up the good work!

2006 CHEVROLET CORVETTE Z06 SPECIFICATIONS

List price	$65,000
Curb weight	3150 lb
Layout	front engine/rear drive
Transmission	6-speed manual
Engine	ohv 16V V-8
Displacement	7011 cc
Horsepower (SAE)	505 bhp at 6300 rpm
Torque	470 lb-ft at 4800 rpm
Brake system, f/r	14.0-in. drilled & vented discs/ 13.4-in. drilled & vented discs, ABS
Wheels	18 x 9½ f, 19 x 12 r
Tires	Goodyear Eagle F1 Supercar EMT; P275/35ZR-18 f, P325/30ZR-19 r
Steering type	rack & pinion
Suspension, f/r	upper & lower A-arms, transverse leaf spring, tube shocks, anti-roll bar/upper & lower A-arms, transverse leaf spring, tube shocks, anti-roll bar
0–60 mph	3.9 sec
0–1320 ft (¼ mile)	12.2 sec @ 120.7 mph
Braking from 60 mph	109 ft
Braking from 80 mph	197 ft
Lateral accel (200-ft skidpad)	0.99g
Speed through 700-ft slalom	69.6 mph
EPA city/highway	16/26 mpg

For more information, see Comparison Test in December 2005 issue and www.roadandtrack.com

For video action see www.roadandtrack.com



ROAD & TRACK Readers' Choice Award:

DREAM CAR 2006

IT'S HARD TO BEAT THE MYSTIQUE OF THE prancing horse from Maranello. Against other finalists in this Dream Car category, including the mighty 987-bhp Bugatti Veyron, the sleek Aston Martin Vantage and the outstanding Bentley Continental Flying Spur, the Ferrari F430 Spider galloped to the finish line and won the *Road & Track* Readers' Choice Award: Dream Car 2006.

The qualifications for Dream Car 2006 were the same as Best Car 2006, with the exception that the manufacturer's suggested retail price (MSRP) of $100,000 is the baseline, not the cap. So the sky is the limit. That means most of us get to dream a little about what car we would love to have parked in our driveway—if we had the means.

Taking nearly 40 percent of our readers' votes, the F430 Spider clearly captured the imagination of our readers, along with the runner-up Bugatti. Never mind that the Veyron boasts 987 bhp, 922 lb.-ft. of torque and a top speed over 250 mph, the Ferrari Spider wins thanks to its sexy looks, alluring Formula 1-inspired engine note and a phenomenal driving experience.

Armed with a potent 483-bhp V-8 engine and all-around double-wishbone suspension, the Spider is incredibly exciting to drive. Weighing in just 154 lb. heavier than the coupe, the open-top F430 is just a few ticks off in acceleration compared with its berlinetta sibling. Zero to 60 mph is accomplished in 4.0 sec., and the quarter mile is covered in 12.3 sec. at 116.9 mph. On handling, the Spider is by no means a slouch. Through our 700-ft. slalom tests, it recorded an impressive average speed of 70.9 mph.

Got a long weekend coming up? Find a winding road along the coast or a twisty path through the mountains on the way to your destination. There is no better ride than the Ferrari F430 Spider.

2006 FERRARI F430 SPIDER SPECIFICATIONS	
List price	est $195,000
Curb weight	3545 lb
Layout	mid engine/rear drive
Transmission	6-speed paddle-shift manual
Engine	dohc 32V V-8
Displacement	4308 cc
Horsepower (SAE)	483 bhp at 8500 rpm
Torque	343 lb-ft at 5250 rpm
Brake system, f & r	13.0-in. drilled & vented discs, ABS
Wheels	19 x 7½ f, 19 x 10 r
Tires	Pirelli P Zero Rosso; 225/35ZR-19 f, 285/35ZR-19 r
Steering type	rack & pinion
Suspension, f/r	unequal upper & lower A-arms, coil springs, elect. adj tube shocks, anti-roll bar/unequal upper & lower A-arms, coil springs, elect. adj tube shocks, anti-roll bar
0–60 mph	4.0 sec
0–1320 ft (¼ mile)	12.3 sec @ 116.9 mph
Braking from 60 mph	107 ft
Braking from 80 mph	191 ft
Lateral accel (200-ft skidpad)	0.90g
Speed through 700-ft slalom	70.9 mph
EPA city/highway	13/17 mpg

For more information, see Road Test Update in September 2005 issue and www.roadandtrack.com

2007 FORD Shelby GT500 CONVERTIBLE

Serious fun

BY MATT DELORENZO • PHOTOS BY JIM FETS

THE LOOK OF THE SHELBY GT500 IS PURposeful, almost menacing in a way. The nose is bluff, taller because of a domed aluminum hood that shields a 5.4-liter V-8 topped by a supercharger. To help move air through the engine compartment, the grille and lower intakes are larger and there are additional extractors in the hood surface. The maw looks even more gaping since the standard Mustang pony has galloped off to parts unknown, replaced by a coiled serpent that now nests off to the side.

A new chin splitter accentuates the Mustang's shark-nose look, and that aero aid is complemented by a rear diffuser and deck spoiler. Pull two latches and push a button, and the three-layer canvas roof retracts. It's time to get down to business.

Highly bolstered sport seats with a retro stitch pattern and Cobra logos fit like a glove. A leather-clad steering wheel with convenient thumb grips also sports a snake on its hub. The instrument panel is stock Mustang, and yet something's different—the tach is now on the right, closer to the shifter. The graphite faces with white lettering have a small SVT logo, which tips you off to the car's pedigree. That logo is a programmable shift light, another thoughtful touch to go along with the aluminum-accented pedals and gearchange.

Twist the key and the 5.4-liter V-8 rumbles to life, sending its bass notes down a 2.5-in. exhaust that features an X-pipe and dual tips. Goose the throttle and an Eaton M122 supercharger (upgraded from the previous-generation Cobra's M112 blower) pumps 10 to 12 psi into the combustion chambers. Seated next to me is Jay O'Connell, chief technical engineer of SVT, who says coyly that both horsepower and torque are somewhere between 470 and 480, though final numbers are still pending. For argument's sake, we'll say 475 bhp and 475 lb.-ft. of torque.

Depressing the clutch takes no more effort than on a stock 300-bhp 4.6-liter V-8 Mustang GT. That's because instead of a single


GT500

■ The GT500 is sporty-looking. The Cobra logo adorns the car. Note the tach is now on the right.

plate, the Shelby GT500 has a dual-disc clutch coated with a cerametallic coating. Each disc is only 215 mm in diameter, as opposed to the stock 240 mm, and two of them offer much more surface area and less inertia, allowing the engine to spin up freely. "The cerametallic material is like racing brakes versus base brakes. The material can hang on for much higher temperatures and stand a lot more abuse," O'Connell explains.

I dump the clutch to prove his point. With traction control off, the rear 18-in. P285/40 Goodyear F1 Supercar tires light up, the car steps out slightly but quickly comes back in line while the free-revving engine hammers off the rev limiter. O'Connell smiles and notes that the wider rear tires (compared with the P255/45 radials up front) help keep the rear end in check.

The Tremec 6-speed, with its beefed-up gears, triple synchros in 1st and 2nd, and high multiplication in 1st thanks to a 2.97:1 instead of a 2.66:1 ratio, provides quick, snappy shifts. This is the same gearbox found in the Dodge Viper, but thanks to some changes in the linkage, it feels less balky and much more precise in action. The 3–4 upshift still takes slightly more effort to snick positively into place, but overall, the gearbox's action is intuitive.

After the scorching burnout, we roar up a steep incline on Ford's Hill Course at its Romeo, Michigan, proving ground. Under full throttle, the throbbing exhaust pulses compete with the whine of the supercharger. While not as raucous as the blower on the previous-generation Cobra, there's no doubt that the GT500 is operating under forced induction. Roll out of the throttle, watch the boost gauge drop to zero and the noise all but disappears. Motor around at lower speeds, and the extra boost noise is barely noticeable.

While the GT500 is similar in concept to the hairy GT500KRs of yore, its execution is decidedly civilized. The first impression is that of a tractable, easy-to-drive sporty car with linear power delivery at lower speeds. That linear feel masks the beast beneath—the GT500 is ready to rock when you jump on the accelerator.

Even though the iron-block Triton V-8 and its peripherals including supercharger, intercooler and beefed-up transmission add nearly 300 lb. to the curb weight (much of it on the nose), the GT500 feels remarkably balanced, almost lithe. True, the convertible loses some structural rigidity, but the blow is softened by its improved weight distribution. The coupe, which tips the scales at less than 3900 lb., is about 150 lb. lighter than the convertible, the extra weight attributed to the top mechanism. At just over 4000 lb., the convertible carries this extra mass mostly behind the driver.

In addition to being slightly less nose-heavy than the coupe, the convertible is slightly softer in springing and damping. This not only improves ride, but also compensates for the lack of stiffness inherent with a convertible. Still, O'Connell says that body engineers have gone through the structure and shored up several joints and seams to compensate for the extra weight of the powertrain. These improvements have been incorporated in the base

FORD SHELBY GT500 CONVERTIBLE SPECIFICATIONS	
List price	est $44,000
Curb weight	est 4000 lb
Wheelbase	107.1 in.
Track, f/r	62.8 in./63.0 in.
Length	187.6 in.
Width	73.9 in.
Height	54.5 in.
Fuel capacity	16.0 gal.
ENGINE & DRIVETRAIN	
Engine type	supercharged dohc 4-valve/cyl V-8
Displacement	5409 cc
Bore x stroke	90.2 mm x 105.8 mm
Compression ratio	8.4:1
Horsepower (SAE)	est 475 bhp @ 6000 rpm
Torque	est 475 lb-ft @ 3500 rpm
Fuel delivery	elect. sequential port
Transmission	6-speed manual
CHASSIS & BODY	
Layout	front engine/rear drive
Brake system, f/r	discs/discs
Steering	rack & pinion, pwr assist
Suspension, f/r	modified MacPherson struts, coil springs, tube shocks, anti-roll bar/live axle, 3-link, Panhard rod, coil springs, tube shocks
Wheels	aluminum alloy, 18 x 9 in.
Tires	Goodyear F1 Supercar; 255/45-18 f, 285/40-18 r
PERFORMANCE CLAIMS	
0–60 mph	4.5 sec
0–1320 ft (¼ mile)	12.9 sec
Top speed	155 mph*

* Electronically limited

The supercharged 5.4-liter V-8 promises at least 470 bhp and guarantees lots of heart-thumping fun.

coupe and convertible, making all Mustangs better as a result of the development of the GT500. In addition to those body improvements, the GT500 sports a strut-tower brace that ties both sides of the engine compartment together.

These improvements contribute greatly to the solid feel of the convertible. There's no cowl shake, shimmy or rattles usually associated with an open-top vehicle. The convertible feels a little more fluid than the coupe, but even over tar strips and other road imperfections, the body is solid.

With slightly more effort needed than in the stock GT, the steering is accurate and nicely weighted, although off-center feel could be a bit crisper. O'Connell said additional tuning will sharpen that response by launch. Needing no extra work is the braking. Larger 14.0-in. front discs are clamped by 4-piston Brembo calipers, while 2-piston calipers work on the rear 12.4-in. discs. The brake pedal feel is positive, with firm feedback making it a breeze to modulate the stopping power.

The overall driving experience of the GT500 is pleasant in normal driving and exhilarating when you're on it. The handling is fairly neutral until the massive power is tapped to induce power oversteer. Lift the throttle and the back end settles into place. The predictable nature of the suspension is owed to its simplicity. While the previous Cobra had an independent rear, SVT decided to work with the car's stock live axle setup, refining it to match the characteristics of the car. O'Connell said a modular approach to an independent rear (on the previous car, the independent rear bolted into the same space as the stock axle) would have added weight, cost and still would not have had the optimum geometry because of the packaging constraints. The GT500 is no Ford GT, but it doesn't try to be. And buyers who will be looking to race the car will find that upgrades to the live-axle rear setup will be easy and inexpensive.

There's that word, inexpensive, which is really the charm of the GT500. Although pricing has not been set, word is that the coupe will start at around $40,000, with the convertible costing approximately $4000 more. There's not much out there that offers this kind of performance for so relatively little money. Ford is banking on it and hopes to find 10,000 buyers a year starting June 6. Serious business, indeed.

5 Questions with Carroll Shelby

R&T: What is your involvement with the Shelby GT500 program?
Shelby: That's hard to decipher. It's got my name on it. I got talking to John Coletti and Edsel Ford about the Ford GT, and then got talking about what a Mustang should be. We just sat around and brainstormed. Time has passed for old hot-rodders like me who just went out and built cars. Now you have all these young hot-rodders, like [SVT Director] Hau Thai-Tang and [SVT Chief Technical Engineer] Jay O'Connell, who can build it for you. All I look at is setting objectives for what you want the car to be. And, of course, I drive it and give them a few suggestions. I'm really high on Hau and Jay. They have made something that will be very desirable for the price.

R&T: Besides the open top, is there anything different dynamically in the convertible versus the coupe?
Shelby: It's 150 pounds heavier on the rear end; you can feel that when you start approaching the limits. It helps the weight balance a little bit, and it starts oversteering earlier. That doesn't make a difference to the average guy. Because of the extra weight, it will be a little slower on acceleration. I like the coupe better for handling, but I also love the convertible; it will stay tight a lot longer. No one has built a convertible with this kind of performance for the dollar.

R&T: Some feel the car should have an independent rear suspension, like the previous-generation Mustang Cobra—what do you think?
Shelby: That's bull. We proved a long time ago that for ordinary driving and going around a skidpad with a straight rear axle, you can do it as well as you can with an independent rear. It takes a lot of engineering, weight and cost to do an independent suspension. By not doing it, we took $5000 out of the car.

R&T: What do you see as the competition for the GT500?
Shelby: For horsepower, performance and price, I don't see anything out there. It will be like the Mustang comes out and in four years there might be a Camaro or something. Still, I don't know anywhere you can get nearly 500 honest horsepower with four seats. I think it's way ahead of the competition.

R&T: Is there room in the Ford line for a sports car positioned between the Mustang and GT?
Shelby: Yes, but I see with all the financial problems, it will be probably be built outside the company. I like the Shelby GR-1 concept we did. I would like for Ford to do that, but with the problems they have it's not likely to happen any time soon. Still, I have a few concepts I'm pushing with them.

Bugatti

Veyron 16.4

Behind the wheel of the fastest and most powerful production car in the world

BY PATRICK HONG • PHOTOS BY STEPHANE FOULON

CASTELBUONO, SICILY—WARNING! DO NOT read on if: 1) Your right foot is heavier than your left foot, and 2) Your driver's license is one ticket away from being revoked.

Okay, you made it this far, which means you are probably at least sane enough to consider the following:

Forget the 660-bhp Ferrari Enzo, the 605-bhp Porsche Carrera GT, the 617-bhp Mercedes-Benz SLR McLaren, or even the mighty 627-bhp McLaren F1. These supercars are simply slugs compared with the new 2006 Bugatti Veyron 16.4 (16.4 for 16 cylinders, 4 turbochargers). This $1.2 million "hyper-exotic" boasts 987 bhp (1001 metric horsepower) and 922 lb.-ft. of torque, enough to propel the 4160-lb. beast to a top speed of over 250 mph. And according to the factory, a 0–62-mph acceleration run (0–100 km/h) can be done in 2.5 seconds, 0–124 mph can be reached in 7.3 sec., and 0–186 mph in 16.7 sec., faster than you can re-read and comprehend the astonishing stats.

It is not possible to talk about the Bugatti Veyron's high-speed and massive power capabilities without first discussing the technology behind it. However, we'll let renowned McLaren F1 designer Gordon Murray share his expert opinion on engineering and styling of the Veyron in the following pages. I'll focus on what it is like to drive this amazing exotic during the car's introduction in Sicily. In three words:

Amazing!

Thrilling!

Un-be-liev-able!

Climbing aboard the Bugatti Veyron 16.4, you are intimidated initially by the car's impressive specs. In the instrument cluster—beyond the usual tachometer, fuel level and coolant temperature gauges—sits a special dial on the lower left that shows how much horsepower is being used at any moment, up to 1001 metric horsepower. And on the lower right is the speedometer that has 280 mph as the last marker.

Twist the key and turn on the ignition. All you can hear is a quiet murmur, giving no hint of the engine's enormous potential. The interior is furnished in premium leather accentuated by aluminum. The seats are supportive, though the driving position is low and slightly canted toward the center due to the intruding left front wheel well. This also doesn't help the vision forward, which is partially blocked by thick A-pillars. Tap the 7-speed direct-shift transmission (DSG) gearshift lever to the right once and you are in 1st gear. Slowly feed in more throttle and the Veyron responds with a slow crawl.

Unlike other high-horsepower supercars where there's a risk of stalling the car because of high horsepower and a hard-to-use clutch, or the gut-wrenching sound and feel of a hydraulic-actuated clutch slipping, the Bugatti scoots away with minimal fuss. In the first 100 ft., you can already tell the Veyron is very civilized. Loaded with the luxurious amenities such as a stereo with CD player, navigation system, air conditioning, etc., combined with a docile low-speed driving character, the Bugatti could be used to drive to the store or run errands.

But what fun is that, driving a hyper-exotic around town?

Find an open road. Romp on the throttle. Unleash the Veyron's 8.0-liter quad-turbocharged 987-bhp W-16 engine. This 2-ton ferocious beast catapults forward and accelerates at more than 1.1g, albeit with just a slight pause before the power really kicks in. Once on its way, the rocketship ride is smooth but forceful, thanks to its seamless direct-shift transmission, which delivers this enormous power appropriately to all four wheels.

On long stretches of a Sicilian highway, the Veyron can get up to speed so fast that the speed dial goes up just as quickly as the rpm dial. Cruising at 140 mph is effortless. Pedal to the metal and the Bugatti charges up to 170 mph in an instant, just as effortlessly. Unfortunately, the continual stream of local Sicilian traffic never allowed for any faster speed runs, as the Veyron's triple-digit closing speeds make even light traffic seem heavy. Also, its shock tuning is fixed with no adjustment for sport or comfort, so the gaps on Sicilian highways and bridges pound the double-wishbone suspension relentlessly, preventing you from forcing the Bugatti into achieving higher speeds.

There are three basic speed settings on the Veyron: Standard, Handling and Top Speed. In Standard mode for speeds up to 137 mph, the car's ride height is set to 4.9 in. Diffuser flaps are open up front, and the rear spoiler remains retracted. For speeds above 137 mph and up to 233 mph in the Handling mode, the ride height is changed to 3.1 in. in the front and 3.6 in. at the rear. When the front diffuser flaps remain open and the rear spoiler is extended fully, the Veyron is designed to maintain a 45/55 front/rear weight distribution even at high speeds. In fact, in Handling setting, the car experiences 772 lb. of downforce, thanks to aerodynamics.

Finally, to reach speeds beyond 233 mph, the car must come to a complete stop and a second key must be inserted to the left of the driver's seat to engage the Top Speed mode. This is to ensure the driver goes through a checklist, including checking tire pressures, before the car is allowed to run without a speed governor. The Top Speed setting puts the Bugatti ride height at 2.6 in. up front and 2.8 in. at the rear. The front diffusers close and the angle of the rear spoiler is decreased to reduce drag. Of note, if you are driving in the Top Speed mode and apply the brakes beyond a predetermined threshold pressure, the car automatically reverts to Handling mode. In addition, the Handling setting can also be activated below 137 mph via a button on the center console.

At slower speeds, the Bugatti Veyron's Michelin PAX run-flat tires generate noticeable tire noise. The ride is firm, and can be surprisingly harsh on roads that are not well maintained. On Sicily's twisty mountain roads, the Veyron's 4160-lb. curb weight never over-ran the car's ability to carve a corner. The steering is extremely responsive and gives good feedback from the front tires. The weighting is a bit lighter than preferred, though there is still a positive and confident on-center feel. Shifting is a breeze, thanks to the steering-wheel-mounted paddles. But with the engine's enormous power and flexibility, no matter what gear you are in, just romp on the throttle on corner exit, point the car straight ahead and let the W-16 take you on a thrilling ride like no other in the world.

After only a brief drive in the Bugatti Veyron 16.4, you can't help yearning for more. It's hard not to be addicted to the tremendous horsepower and torque. With the production capped at 300 units, about 50 per year over the next six years, I'd better find a way to persuade Bugatti that I need another turn in the Veyron for a more "in-depth" assessment. Or I'll have to start saving for the $1.2 million price tag it commands.

TECHNICAL ANALYSIS

Anatomy OF A SUPERCAR

The road to 250 mph is a technically fascinating one

BY GORDON MURRAY • PHOTOS BY STEPHANE FOULON

THE BUGATTI VEYRON 16.4 IS NO DOUBT the result of many thousands of engineering hours, and certain elements of the car are indeed cutting-edge concept and design. The two main areas that demonstrate new technology are the engine and the transmission.

The engine itself is an engineering wonder and includes some interesting new anti-knock sensing. The gearbox and gearchange system are right up to date utilizing dual-wet clutches and twin layshafts. In my opinion, this is the only way to go to attain quick, smooth gearchanges for a vehicle without a manual clutch. Most semiautomatic systems are violent in their application and not very satisfying from a driver's point of view. The Veyron gearchange is fast and extremely well applied. The complete powertrain is a great showcase for the parent company, Volkswagen AG. Another area where the car is pushing boundaries is with its electronic control systems and, in particular, their application. I drove the Bugatti on the road and on the track, which demonstrated just how seamlessly the chassis and powertrain functions have been sewn together.

The chassis/body structure is hybrid like the last Bugatti (EB110) with carbon fiber used for the primary structure and aluminum

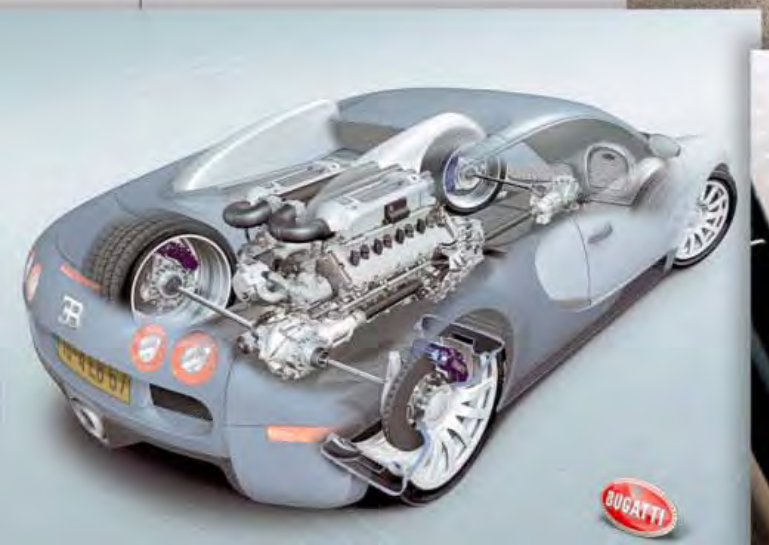
■ The 987-bhp Bugatti Veyron 16.4 (16 cylinders with 4 turbochargers) hyper-exotic is finally here. In addition to its 250-mph plus top speed capability, its interior and exterior styling also make it unique, with many interesting details.


BUGATTI

alloy for the body and front crash structure. In this respect, the all-carbon McLaren F1 and the RTM (Resin Transfer Molding) carbon Mercedes-Benz SLR McLaren are, in fact, more advanced. Carbon-ceramic brakes are used as with the Porsche GT and the SLR.

The aerodynamics is interesting and complex. The design and development have been directed at problem-solving in the areas of cooling and vehicle stability. At such high speeds, the basic shape of the Veyron will generate a lot of lift. Add to this a large frontal area and 10 radiators and heat exchangers, and suddenly here's where the 1001 hp [metric horsepower] dissipates at 250 mph! The C_DA figure [drag coefficient x frontal area] is at the high end of the scale for rear-engine sports cars. At these sorts of speeds, a massive amount (often three or four times the net figure) of downforce has to be generated to overcome the basic lift in order to achieve the target figure for net downforce. The Veyron is a full ground-effect vehicle like the McLaren F1 and Ferrari Enzo. The downforce increases as a square of the speed, so there are large forces to design for at speeds approaching V max [top speed]—these forces eat into available suspension travel and can cause high-speed stability problems.

Compounding this problem is that ground-effect cars are notoriously sensitive to ride height and pitch changes. I solved these problems on the F1 by having just enough downforce for high-speed stability and by giving the driver a manual control over the rear wing for a 50-percent increase in downforce at lower speeds. The F1 is also designed with an automatic "air brake," which deploys when the chassis ECU detects a certain combination of speed and deceleration. The air brake increases the C_D but more important, interacts with the ground-effect forces by increasing the tail vortex and base suction, which results in an increase in downforce of 100 percent and a rearward movement of the aerodynamic center of pressure of about 4 ft., which helps negate the pitch problem. The Veyron uses the McLaren air brake system but also has a hydraulic ride-height control system, which optimizes the ride heights and chassis in-



cidence for different speeds and loads. The F1 goes a little further with automatic brake cooling and fan-assisted boundary control for the rear diffuser.

When designing a car, I like to do a large amount of aerodynamic "block studies"—this being the basic size of the car with a cabin shape derived from engineering and packaging studies. The block model incorporates representative internal airflow for cooling. This process determines air entry and exit holes, along with the basic shape of the car so styling can begin.

As the drag increases as a square of the speed, the power requirement increases as a cube of the speed because the power itself is speed-dependent. The Veyron because of its high C_DA figure and huge cooling drag needs 1001 hp to go 12 mph faster than a McLaren F1 producing 627 hp. To help understand the problem of starting a car program from a weak point aerodynamically, we do some calculations: A turbocharged F1 producing 1001 hp would achieve 281 mph assuming the same drivetrain efficiency. Another way of looking at this equation is that an F1 would need "only" 740 hp to reach the Bugatti's top speed. All this demonstrates just what an uphill struggle the Bugatti team faced to achieve their targets.

Very high top speeds in road cars produce some other very challenging problems. Some are small, such as keeping the windshield wipers attached to the glass, preventing the centrifugal force from opening the tire inflation valves and making the side mirror mounts torsionally stiff enough not to rotate at V max. Then there are much more serious high-speed problems such as a partially open side window being sucked out from the very low local pressure caused by the air accelerating around the A-pillar. Tire designers can design for very heavy vehicles or very high speeds but a combination of the two is a massive challenge. A Bugatti Veyron fully loaded and with aerodynamic load is in the order of 2½ tons at 250 mph!

Weight saving should be by design and not a post process. Weight is the car designer's biggest enemy. It works against you in every single aspect of vehicle dynamics. Power-to-weight ratio is one of the most misunderstood figures in the automotive world. Achieving a good power-to-weight figure by applying huge horsepower to a heavy car is in no way the same thing as achieving the same ratio with a very light car. For all its 1001 hp, the Veyron falls short of a McLaren F1's power-to-weight figure.

For me, car design *is* packaging. To create something truly forward-thinking, a designer has to challenge the accepted major component placement in an automobile. Styling innovation becomes more accessible when the packaging is innovative. With the F1, we set out to design the best driver's car we could, and by being innovative with componentry placement, we squeezed three occupants, a V-12, 90 liters of fuel and good luggage space into a car the same size as a Porsche Cayman. The restrictions on styling and innovations are apparent in the Veyron—the all-wheel drive and power targets must have made the designer's life a nightmare. Although the Bugatti is quite short, it is very wide and suffers from most of the rear mid-engine problems, such as high cowl height, pedal offsets, no luggage space and poor three-quarter rear view.

I have a "real-world" checklist when designing road cars: 1) size or perceived size; is the car intimidating to drive? 2) ergonomics; primary and secondary controls, pedals; 3) luggage capacity, cabin storage; 4) driveability, slow traffic engine characteristics, overtaking; 5) ride and handling; 6) ease of parking.

A road car should be designed with a checkmark against all six.

In summing up the Bugatti Veyron, had I not driven it, I would have great difficulty in deciding just what it stands for and where it fits in. To be absolutely fair, the Veyron team did not set out to challenge the McLaren F1, Enzo or Porsche GT as the ultimate driving machine. This it certainly doesn't do at two tons with turbo lag. It also falls short of the Ferrari 612 Scaglietti and the Mercedes SLR McLaren for high-performance touring because of the outward vision problems and lack of luggage space. Where it absolutely succeeds is as a massive technical achievement—a statement for VW AG. And it will be guaranteed a place in automotive history because of the performance figures.

On paper, its nearest relative by specification is its brother, the Bugatti EB110—multi-cylinder turbo engine, hybrid construction, awd and impractical on the road. It is much nearer the SLR for totally accessible performance for almost everyone, thanks to the electronics—but without the ergonomics and luggage space. I have a lot of admiration for the perseverance of Bugatti president, Dr. Thomas Bscher, and his technical team for delivering the vehicle program and creating a unique piece of automotive history.

BUGATTI VEYRON 16.4 SPECIFICATIONS	
List price	est $1,200,000
Curb weight	est 4160 lb
Wheelbase	106.7 in.
Track, f/r	68.5 in./64.6 in.
Length	175.7 in.
Width	78.7 in.
Height	47.4 in.
Fuel capacity	26.4 gal.
ENGINE & DRIVETRAIN	
Engine type	quad-turbo dohc 64V W-16
Displacement	7993 cc
Bore x stroke	86.0 mm x 86.0 mm
Compression ratio	9.0:1
Horsepower (SAE)	987 bhp @ 6000 rpm
Torque	922 lb-ft @ 2250 rpm
Fuel delivery	elect. sequential port
Transmission	7-speed paddle-shift manual
CHASSIS & BODY	
Layout	mid engine/all-wheel drive
Brake system, f/r	15.7-in. drilled & vented discs/ 15.0-in. drilled & vented discs, ABS
Steering	rack & pinion, vari pwr assist
Suspension, f/r	upper & lower A-arms, coil springs, tube shocks, anti-roll bar/upper & lower A-arms, coil springs, tube shocks, anti-roll bar
Wheels	20 x 10 f, 21 x 14 r
Tires	Michelin Pilot Sport PS2 PAX; 265/680ZR 500A f, 365/710ZR 540A r
PERFORMANCE CLAIMS	
0–100 km/h (0–62 mph)	2.5 sec
100 km/h–0 (62–0 mph) braking	103 ft
Top speed	253 mph

The Veyron's 7.9-liter W-16 engine sits midships and is mated to a 7-speed paddle-shift transmission. Inside, aluminum accents abound. And the 1001 metric horsepower dial and a special key to activate the top-speed mode hint at the car's enormous potential.

STYLING ANALYSIS

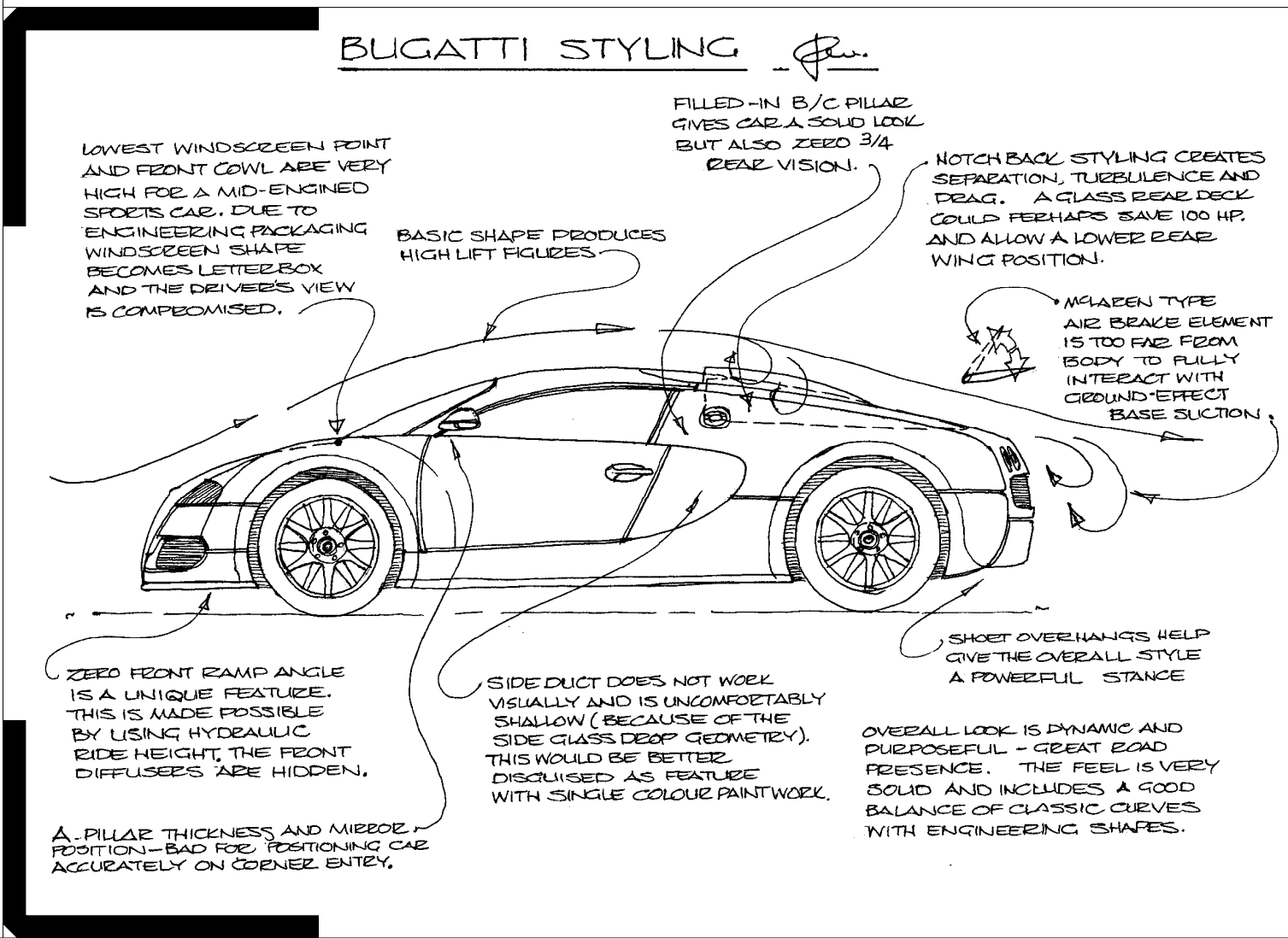
IN THE WORLD OF THE Hyper-Exotic

DESIGNING A REAR MID-ENGINE SUPERCAR is never a simple task and a car with 1001 hp [metric horsepower] multiplies the normal design and development problems by a large factor. The Veyron's design team must be applauded because the starting point was so wrong. Arbitrary targets of 1000 hp and 250 mph and 0–60-mph in under 3 seconds were set at the very beginning of the program. But worse still, a styling model was shown and accepted! This is a bad starting point for any car, but for a high-performance car, it's a disaster.

The Veyron team has done wonders to get where it has today. I can identify with them to a certain degree because with our SLR program, we were also given a "show car" as a starting point—the exception was that we had well researched targets for market positioning, a performance envelope and, most important, an agreed definition of what the car was trying to be. I've probably been a little spoiled in my 40 years of car design where—the SLR apart—every project was absolutely focused with targets and vehicle character totally clear before a model or prototype was even begun. (Nothing in the automotive industry has its function and targets more clearly defined than a Formula 1 car.)

During the McLaren F1 road car program, styling was not started until all the major technical targets were set and all the engineering problems were solved, along with packaging and basic aerodynamic shape.

The styling of the Veyron is growing on



■ **In Handling mode, the Veyron's rear spoiler is fully extended and the ride height lowered to give maximum downforce and traction. Its awd drivetrain rides on special high-speed Michelin run-flat tires.**

For more photos see www.roadandtrack.com

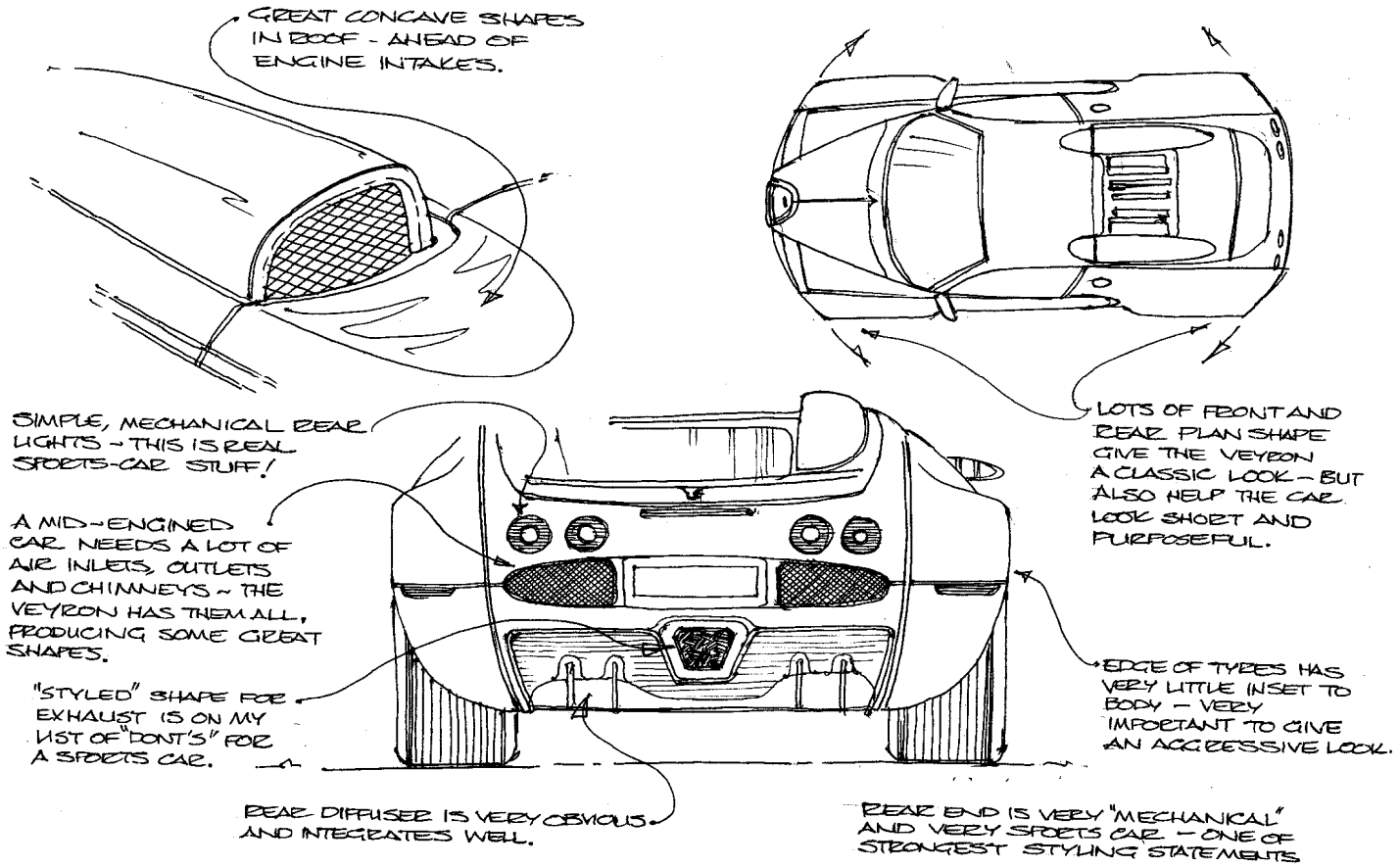
me and certainly works much better in the metal. I'm thankful that the stylist was not tempted by the current trend of the ever-more complicated "melting fruit" look! I really like the top engine intakes, which are works of art in their own right. The styling is a wonderful mélange of classic curves and mechanical edges and elements—this should ensure that the car will still look good years from now, and therefore have a chance of becoming a future classic. The extreme rear of the Veyron has some curves good enough to stroke. The rear end is let down only by the "square" exhaust; an exhaust pipe should be exactly what it says! Wheel design is elegant and technical and echoes past Bugattis.

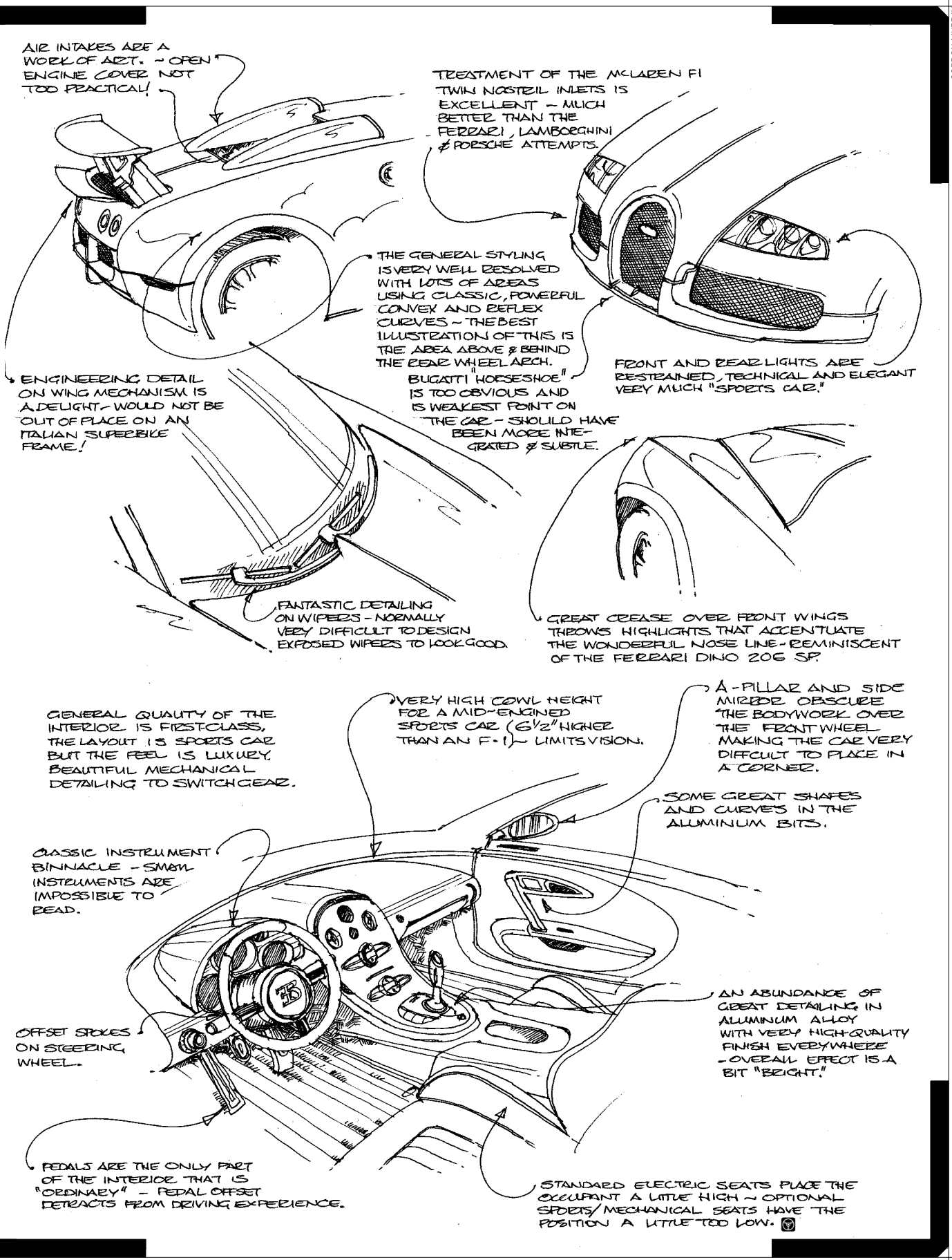
The interior is a strange mixture of simple sports car and over-the-top luxury. The detailing and quality are both fantastic, and the tactile side works very well with a heavyweight feel to the switchgear. Ergonomics has come second place to style with several problems with outward vision and controls.

Most supercars fit into three categories: 1) real world, designed to be used and enjoyed on normal roads; 2) track cars; 3) collector cars, i.e., engineering showoffs. Some supercars fit into two or even three of these categories.

One final point is that I have always felt a little responsible for starting this lunatic chase for top speed with the McLaren F1 (even though top speed was never one of our targets!), and the Bugatti Veyron should put an end to this nonsense and let the designers get on with the job of designing good fun, efficient sports cars.—*GM*

GORDON MURRAY





GORDON MURRAY

ROAD & TEST

DODGE Charger R/T

The Dukes of Hazzard meets *Monster Garage*

BY JOE RUSZ • PHOTOS BY JEFF ALLEN

IMAGINE THIS SCENARIO: those TV and movie rascals from Hazzard county, Bo and Luke Duke, decide to drive their car, the General Lee, to a repair shop for a tuneup. But they get the address wrong and drop the car off at Jesse James's outrageous workshop on the Discovery Channel's popular TV show, *Monster Garage*. When they return to collect their car, no vestiges of the 1969 Dodge Charger remain. "What is that thang?" asks Luke.

That "thang" is DaimlerChrysler Corporation's new spin on a muscle-car classic that rocked the American enthusiast-car market when it was introduced in 1966. With its swoopy styling and hidden headlights, the Charger was a bestseller that lasted through 1974 when the company finally pulled the plug due to stifling emissions standards. Unlike the original, which was a coupe, the 2006 Dodge Charger R/T is a 4-door sedan with a chopped-top look reminiscent of a 1950s' California custom car. Love it or hate it, the new car's styling does attract attention. "I got a 'thumbs-up' from two gals in the office," said our Engineering Editor, "while a gal in a Mustang chased me down for another thumbs-up."

Compared with the original, the contemporary Charger is a big car—200.1 in. long, or about as large as a BMW 7 Series or a Mercedes-Benz S-Class. But "big" means there's plenty of room inside for five: two in bucket seats up front, and three on a bench seat in the rear. And I should add, there's a capacious trunk. Based on a rear-drive platform that's shared with other DaimlerChrysler products, the Charger R/T sports independent suspension, generously sized 4-wheel disc brakes and 18-in. wheels. Of course, it's got a Hemi, a throaty-sounding, electronically fuel-injected ohv V-8 whose 340 bhp and 390 lb.-ft. of torque propel this

two-ton behemoth from 0 to 60 in 5.9 seconds. When not being flogged, the 5.7-liter powerplant enjoys 20-percent-better fuel economy, thanks to Chrysler's Multi-Displacement System, which deactivates four cylinders when full power is not needed. Also contributing to the engine's fuel efficiency is a 5-speed automatic with an "overdrive" top gear.

Details digested? Good, now let's take her for a drive.

Pop open the door, plop down in a nicely contoured, leather-trimmed bucket seat and take in the view. Check out the dash with its large speedo and tach, the easy-to-see-and-use air-conditioning controls and sound system (knobs, not buttons, thank you), and the smartly styled interior. Compared to your typical Detroit sedan of just a few years ago, the Charger's cabin is tastefully designed and looks clean without appearing austere. The choice and quality of materials are quite good and seem almost European in texture and appearance. Or is that Daimler talking?

Glancing outward, you'll find the views are excellent—both looking forward over the R/T's expansive aluminum hood and rearward out its canted backlight. It's all clear on the western and eastern fronts too, thanks to the car's broad side glass.

Twist the key, fire up that wonderfully resonant Hemi, slide the leather-trimmed gear selector into Drive and hang on—to the leather-rimmed steering wheel. The Charger R/T steps off briskly and works its way effortlessly through the gears. Or you can engage AutoStick, which enables you to shift manually by rocking the gear selector from side to side (left for downshifts, right for up). Perhaps to protect against overreving, the transmission upshifts from a lower gear even if the selector is not moved. That 5.9-sec. 0–60 time is not spectacular, but remember this is a *heavy* (4150 lb.) car. Besides, in this day of skyrocketing fuel prices, how many of us will be racing for pinks at the stoplight?

■ **Okay, look *really* hard—there's little stylistic connection with Carl Beyer's 1969 original (above) and the new Charger, but as performance goes, they're kindred spirits. Betcha couldn't get the optional rear-seat DVD player (opposite detail) during the Johnson administration. Magnum interior is clean, elemental.**

In cruising mode, this Dodge is almost as quiet as a cathedral. There's a dearth of wind and road noise, and with the transmission in 5th gear and the engine barely ticking over, there's hardly a whimper from that big V-8, at least until you mash the throttle. That's when those dual exhausts begin to trumpet a melody that's music to an enthusiast's ear.

As reverentially quiet as it may be at cruising speeds, the Charger has seats that are far more comfortable than a church pew. Generously, yet firmly padded, they cushion the tush without feeling like mush (I can't help it; I grew up reading Burma Shave signs). In addition to a host of standard features, our Charger R/T test car was equipped with welcome options: dual-zone

■ **Consistent with its muscle-car past, the Charger R/T's grip disappoints at 0.77g. Ride, NVH and road manners are worlds better, of course.**

■ The Hemi V-8, then and now, defines the Charger. New one makes 340 bhp and all the right sounds, with cylinder deactivation helping fuel economy slightly. Plastic shroud doesn't do justice to the Hemi's past.

air conditioning, heated power front seats, a power sunroof and a Sirius satellite radio system. A rear-seat video system that plays DVDs and CDs will keep the kids from asking, "Are we there yet?"

On the highway, particularly in the twisties, the Charger R/T delivers a ride that is firm, yet not jarring and feels quite controlled. Unfortunately, when it comes to spirited driving, the car feels woefully under-tired. Pulling a modest 0.77g on the skidpad and reaching a sedate 61.4 mph in the slalom, the Dodge exhibits heavy understeer in both maneuvers. Interestingly, those numbers are almost identical to the Mercedes-Benz S500 we tested in May 2005, perhaps proving that "the apple never falls very far from the tree." Bear in mind, however, that the big Benz is also a heavy car (4180 lb.), and that when it comes to handling and performance, weight is the enemy.

To put this new Dodge into perspective and to appreciate how far automotive technology has come in 40 years, you need only drive one of the originals such as Carl Beyer's 1969 Charger, a clean but not quite concours-ready example representing one of the more desirable model years. Fitted with Chrysler's 383-cu.-in., wedge-head V-8, the car does exactly what was intended in the hot-rod-inspired 1960s—go fast in a straight line. Although we didn't test it, Beyer says his blue coupe, which he bought used in 1998, turns 14-second quarter miles, thanks in part to its Edelbrock carburetor, higher-compression pistons and special camshaft. Until recently, the car was Beyer's daily driver, logging about 15,000 miles per year. Oh, it was originally orange until Carl's encounter on a Southern California street. "We were driving along when some guy in a truck pulls up and yells to my wife, 'Hey, Daisy Duke!' She looked at me and said, 'You have 24 hours to change the paint color.'"

Beyer admits that handling is not the early Chargers' strong suit. The steering feels slow, loose and disconnected from the road. Although shock damping is firm, the body tends to roll, and the tires—small in the front, big at the back—are not suited to spirited cornering. Bottom line: The old Charger feels like a rather crude conveyance after the 2006 R/T. "It's roomy and handles amazingly well compared to the '69," says Beyer of the new model.

I concur. Now would somebody please tell the Dukes what that thang is?

2006 Dodge Charger R/T

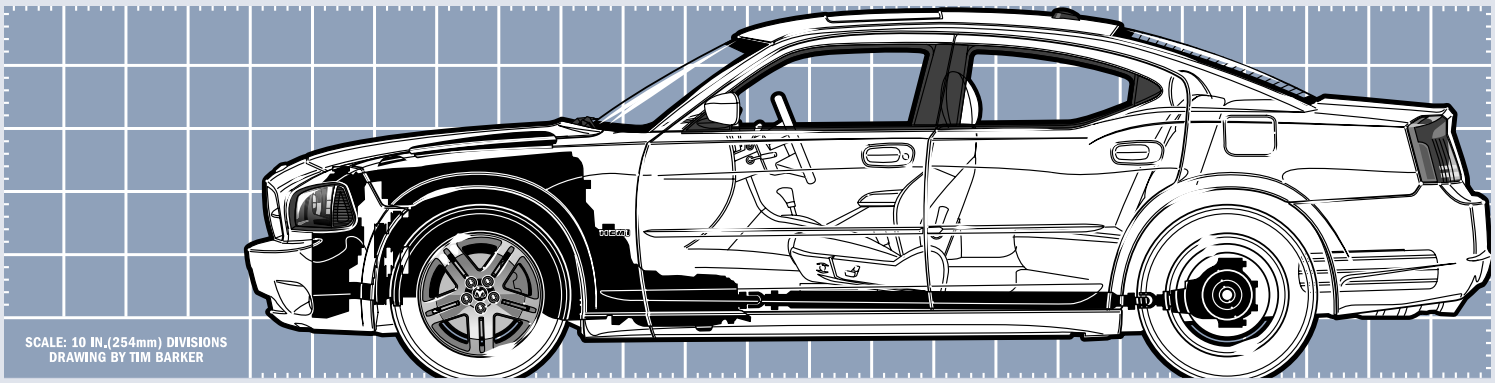
Dodge, a division of DaimlerChrysler Corp., 1000 Chrysler Dr., Auburn Hills, Mich. 48326; www.dodge.com

At a Glance

0–60 mph	5.9 sec
0–¼ mile	14.3 sec
Top speed	est 126 mph*
Skidpad	0.77g
Slalom	61.4 mph
Brake rating	good

List Price $29,320
Price as Tested $33,645

Price as tested includes std equip. (ABS, front multistage airbags, yaw & traction control, cruise control, keyless entry, anti-theft system, leather-trimmed seats, tilt & telescope wheel, halogen headlights; power mirrors, windows, seats & door locks), rear-seat video system ($1150), Convenience Group II incl. air conditioning w/dual-zone control, heated power front seats, power adj. pedals ($955), power sunroof ($950), AM/FM/CD MP3 stereo w/6-disc changer ($400); Sirius satellite radio ($195), dest charge ($675).



SPECIFICATIONS

Engine

Type..... cast-iron block, aluminum heads, V-8
Valvetrain..... ohv 2-valve/cyl
Displacement..... 345 cu in./5654 cc
Bore x stroke..... 3.92 x 3.58 in./99.5 x 90.9 mm
Compression ratio..... 9.6:1
Horsepower (SAE)..... 340 bhp @ 5000 rpm
Bhp/liter..... 60.1
Torque..... 390 lb-ft @ 4000 rpm
Redline..... 5750 rpm
Fuel injection..... elect. sequential port
Rec. fuel..... mid-grade unleaded, 89 pump octane

Warranty

Basic warranty..... 3 years/36,000 miles
Powertrain..... 3 years/36,000 miles
Rust-through..... 5 years/100,000 miles

Chassis & Body

Layout..... front engine/rear drive
Body/frame..... unit steel
Brakes: Front..... 13.6-in. vented discs
Rear..... 12.6-in. vented discs
Assist type..... hydraulic, ABS w/ESP
Total swept area..... 573 sq in.
Swept area/ton..... 276 sq in.
Wheels..... cast alloy, 18 x 7½
Tires..... Continental Conti Touring Contact, 225/60R-18 99H
Steering..... rack & pinion, power assist
Overall ratio..... 16.1:1
Turns, lock to lock..... 2.8
Turning circle..... 38.9 ft

Suspension

Front: upper & lower A-arms, coil springs, tube shocks, anti-roll bar
Rear: multilink, coil springs, tube shocks, anti-roll bar

General Data

Curb weight..... 4150 lb
Test weight..... 4330 lb
Weight dist (with driver), f/r, %..... 53/47
Wheelbase..... 120.0 in.
Track, f/r..... 63.0 in./63.1 in.
Length..... 200.1 in.
Width..... 74.5 in.
Height..... 58.2 in.
Ground clearance..... 6.0 in.
Trunk space..... 16.2 cu ft

Accommodations

Seating capacity..... 5
Head room: Front..... 37.0 in.
Rear..... 35.0 in.
Seat width: Front..... 2 x 17.0 in.
Rear..... 50.0 in.
Front-seat leg room..... 44.3 in.
Seatback adjustment..... 75 deg
Seat travel..... 10.0 in.
Rear-seat knee room..... 25.0 in.

Drivetrain

Transmission: 5-speed automatic

Gear	Ratio	Overall ratio	(Rpm) Mph
1st	3.58:1	10.10:1	(5750) 44
2nd	2.19:1	6.18:1	(5750) 72
3rd	1.41:1	3.98:1	(5750) 112
4th	1.00:1	2.82:1	est (4600) 126*
5th	0.83:1	2.34:1	est (3800) 126*

Final drive ratio..... 2.82:1
Engine rpm @ 60 mph in top gear..... 1800
*Electronically limited.

Instrumentation

160-mph speedometer, 7000-rpm tach, coolant temperature, fuel level

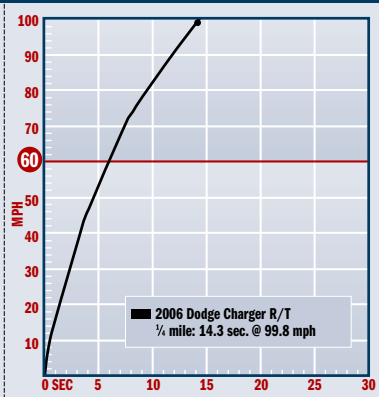
Safety

front & side airbags, front seatbelt pretensioners, anti-lock braking, brake assist, yaw control, traction control (all standard equip.)

PERFORMANCE

Acceleration

Time to speed	Seconds
0–30 mph	2.3
0–40 mph	3.3
0–50 mph	4.5
0–60 mph	5.9
0–70 mph	7.4
0–80 mph	9.5
0–90 mph	11.8
0–100 mph	14.4
Time to distance	
0–100 ft	3.1
0–500 ft	7.9
0–900 ft	11.3
0–1320 ft (¼ mile)	14.3 @ 99.8 mph



Braking

Minimum stopping distance
From 60 mph..... 132 ft
From 80 mph..... 240 ft
Control..... excellent
Brake feel..... good
Overall brake rating..... good

Subjective ratings consist of excellent, very good, good, average, poor; na means information is not available.

Fuel Economy

Our driving..... est 18.0 mpg
EPA city/highway..... 17/25 mpg
Cruise range..... est 324 miles
Fuel capacity..... 19.0 gal.

Handling

Lateral acceleration (200-ft skidpad)..... 0.77g
Balance..... heavy understeer
Speed through 700-ft slalom..... 61.4 mph
Balance..... heavy understeer
Lateral seat support..... average

Interior Noise

Idle in neutral..... 46 dBA
Maximum in 1st gear..... 76 dBA
Constant 50 mph..... 64 dBA
70 mph..... 71 dBA

Test Notes:

The R/T has just the right amount of power to make launching easy. No power braking necessary, just mash the throttle. In Drive, the automatic transmission shifts with little hesitation or delay in the power delivery. • The 225 all-season tires do an adequate job of stopping this 4150-lb. car. • With a yaw control system that can't be disabled, the skidpad and slalom are no fun. Any attempt to slide the rear end out is restricted, hampering slalom times considerably.

Test Conditions:

Temperature	Humidity	Elevation	Wind
94° F	31%	350 ft	light

LAND ROVER Range Rover Sport SUPERCHARGED

Improved performance—before the pavement ends

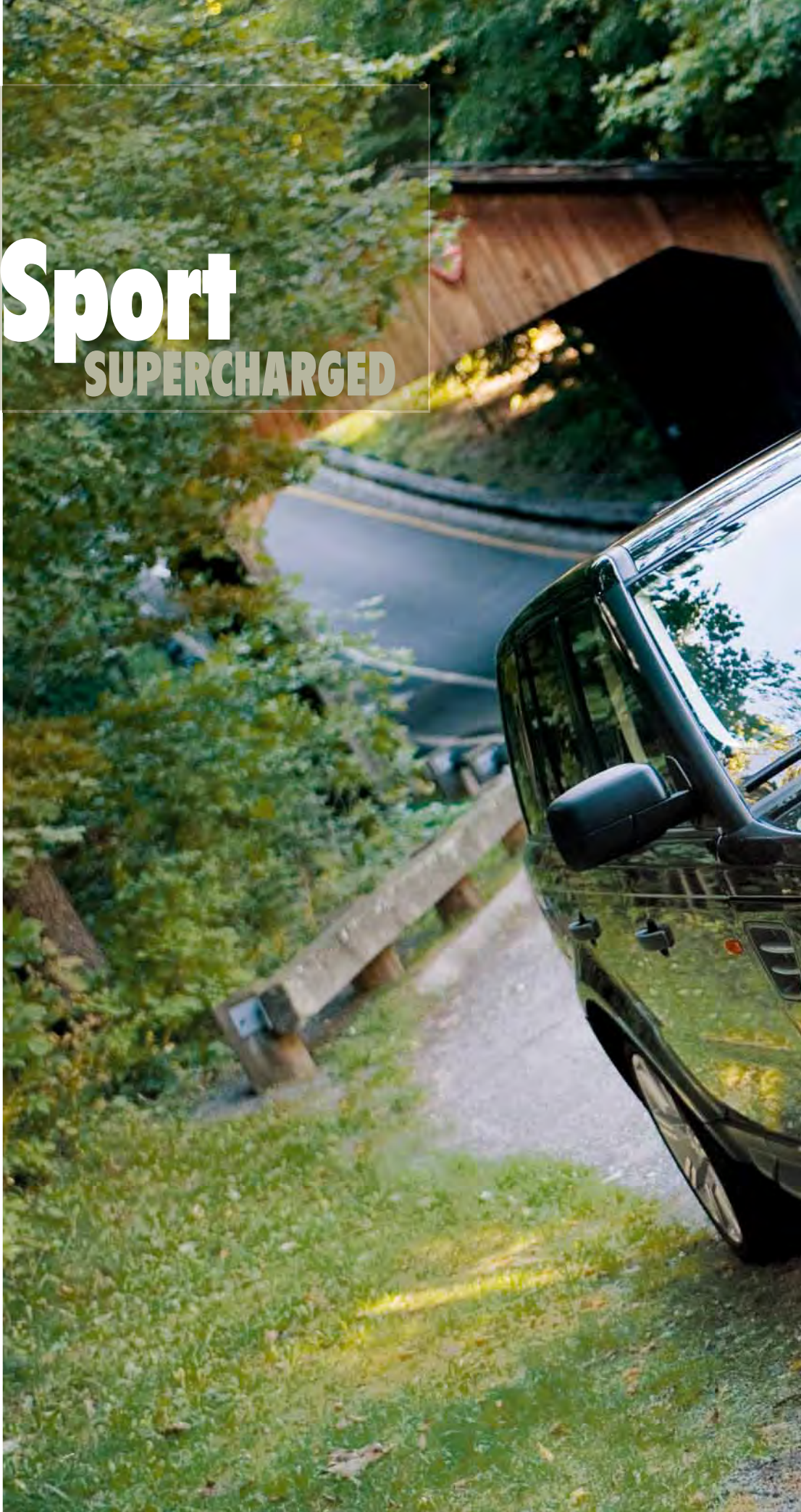
BY JIM HALL • PHOTOS BY MARC URBANO

ROAD & TEST

Ford Motor Company's previous administration had a grand plan to make the company more profitable: Acquire high-ticket luxury car manufacturers and rake in the profits from their higher-margin products. Jaguar, Volvo, Aston Martin and the parent of this road test subject, Land Rover, were all scooped up. Phase one, complete. Unfortunately, the lottery-style windfall profits never materialized. It is said that Volvo has been the only consistently profitable brand of the group, while at the opposite end of the spectrum, Jaguar's total losses are measured in the hundreds of millions. But prospects are finally looking brighter as the other two British brands are on the upswing. Borrowing a page from Volkswagen's Bentley, Aston Martin's new entry-level exotic, the V8 Vantage (Road Test, November 2005 issue), looks to be a major hit. Likewise, Land Rover's top-flight Range Rover is selling briskly, and the dowdy Discovery has been replaced with the remarkably good LR3. Now the latest offering, the Range Rover Sport, should complete the trifecta.

Visually, there's a lot to like about the new Range Rover Sport. Essentially a scaled-down Range Rover on Land Rover's LR3 platform, Big Daddy's lines look great at plus-or-minus 8/10ths size. What's more, the steeply sloped rear glass really does look sporty.

Driving the Range Rover Sport on-road is unlike many SUVs, as it offers a very rewarding experience. The speed-sensitive steering is just right, not too light (carlike) and not too heavy (trucklike) with good feel for the road. Take a corner at speed and you'll most likely find that it could have been taken at a brisker pace. But this shouldn't surprise as the car's suspension is highly developed. Consisting of active air springs that stiffen at high speed




RANGE ROVER

or in cornering, the suspension also makes use of active anti-roll bars, a system Land Rover calls Dynamic Response (standard on the supercharged model, optional on the normally aspirated version). The result is a supple ride that is remarkably compliant on streets or highways.

The quick-reacting Dynamic Response system works equally well off-road. But when the rubber leaves the pavement, it's Land Rover's Terrain Response that really shines. This sophisticated traction system allows the driver the choice of five different settings to tackle virtually all conditions or terrain: "General Driving" for normal on- and off-road conditions; "Grass/Gravel/Snow" for slick/icy conditions; the self-explanatory "Mud and Ruts," "Sand" for the soft stuff, and "Rock Crawl" for crossing rock outcroppings. Each setting optimizes a host of vehicle functions, including gearchange points, ride height, traction and stability control, the locking and unlocking of differentials, anti-lock brake operation and engine mapping for optimal traction. A hill descent feature is also included.

Immediately after a heavy downpour that created some very slick and slimy conditions on a horse farm outside of Chicago, all that was required of our British ute was to throw the transmission lever into "Low," twist the Terrain Response dial (located on the console between the front seats) one click to the right (Grass/Gravel/Snow), and we were on our way. A little throttle modulation and steering input were all the driver had to worry about. Simple. Borrowing a line from *The Caine Mutiny,* the Range Rover Sport's Terrain Response system is "designed by geniuses to be run by idiots."

Perhaps most amazing of all is the off-road traction the Range Rover Sport has considering its large alloy wheels are shod with what are essentially sporty performance tires! Its tight turning radius is also commendable.

The cabin is typical Range Rover luxury, albeit at a slightly lower level. Most notable is the more businesslike center console and less wood trim. The leather seats offer excellent comfort, as our 850-plus-mile lap around Lake Michigan proved, though extra side bolstering would be welcome to hold off-roaders more snugly, but this is nitpicking as, let's face it, the biggest challenge facing the majority of Land Rover owners is traversing the speed bumps at

■ **While the Range Rover Sport has a long list of standard features, the supercharger upgrade adds a redesigned grille and side vents, Brembo brakes, adaptive directional headlights, stainless-steel exhaust and other cool swag.**

ROAD & TEST

2006 Land Rover Range Rover Sport Supercharged

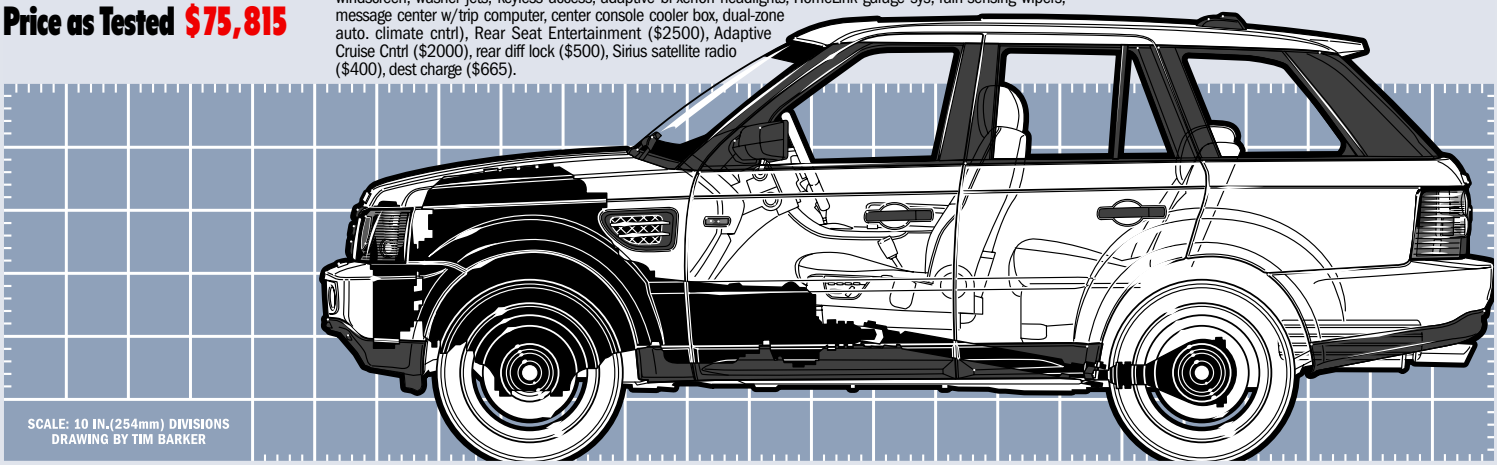
Land Rover North America, One Premier Place, Irvine, Calif. 92618; www.landroverusa.com

At a Glance

0–60 mph	7.2 sec
0–¼ mile	15.5 sec
Top speed	140 mph*
Skidpad	0.77g
Slalom	58.4 mph
Brake rating	very good

List Price $69,750
Price as Tested $75,815

Price as tested includes std equip. (ABS w/electronic brake force distribution, yaw/traction/roll cntrl, hill-descent cntrl, dual front airbags, seat-mounted side airbags, side curtain airbags, security system, GPS DVD nav sys, 13-speaker Harman Kardon Logic 7 audio sys; pwr windows, mirrors, door locks, sunroof, seats; heated seats, windscreen, washer jets; keyless access, adaptive bi-xenon headlights, HomeLink garage sys, rain-sensing wipers, message center w/trip computer, center console cooler box, dual-zone auto. climate cntrl), Rear Seat Entertainment ($2500), Adaptive Cruise Cntrl ($2000), rear diff lock ($500), Sirius satellite radio ($400), dest charge ($665).



SCALE: 10 IN.(254mm) DIVISIONS
DRAWING BY TIM BARKER

SPECIFICATIONS

Engine

Type..... aluminum block & heads, supercharged V-8
Valvetrain..... dohc 4-valve/cyl
Displacement..... 256 cu in./4196 cc
Bore x stroke..... 3.39 x 3.56 in./ 86.0 x 90.3 mm
Compression ratio..... 9.1:1
Horsepower (SAE)..... 390 bhp @ 5750 rpm
Bhp/liter..... 92.9
Torque..... 410 lb-ft @ 3500 rpm
Redline..... 7000 rpm
Fuel injection..... elect. sequential port
Rec fuel..... premium unleaded, 91 pump octane

Warranty

Basic warranty..... 4 years/50,000 miles
Powertrain..... 4 years/50,000 miles
Rust-through..... 6 years/unlimited miles

Chassis & Body

Layout..... front engine/ all-wheel drive
Body/frame..... unit steel
Brakes: Front..... 14.2-in. vented discs
Rear..... 13.8-in. vented discs
Assist type..... vacuum, ABS, EBD
Total swept area..... 453 sq in.
Swept area/ton..... 157 sq in.
Wheels..... cast alloy, 20 x 9½
Tires..... Continental 4x4 Sport Contact, 275/40R-20 106Y
Steering..... rack & pinion, elect. vari pwr assist
Overall ratio..... na
Turns, lock to lock..... 3.1
Turning circle..... 38.1 ft

Suspension

Front: upper & lower A-arms, elect. pneumatic springs, tube shocks, elect. adj anti-roll bar
Rear: upper & lower A-arms, elect. pneumatic springs, tube shocks, elect. adj anti-roll bar

General Data

Curb weight..... 5770 lb
Test weight..... 5950 lb
Weight dist (with driver), f/r, %..... 51/49
Wheelbase..... 108.0 in.
Track, f/r..... 63.2 in./63.5 in.
Length..... 188.5 in.
Width..... 85.4 in.
Height..... 71.5 in.
Ground clearance..... 6.8–8.9 in.
Trunk space..... 33.8 cu ft + 37.2 cu ft w/rear seats folded

Accommodations

Seating capacity..... 5
Head room: Front..... 37.0 in.
Rear..... 37.0 in.
Seat width: Front..... 2 x 17.5 in.
Rear..... 53.0 in.
Front-seat leg room..... 42.0 in.
Seatback adjustment..... 70 deg
Seat travel..... 10.0 in.
Rear-seat knee room..... 26.0 in.

Drivetrain

Transmission: 6-speed automatic

Gear	Ratio	Overall ratio	(Rpm) Mph
1st	4.17:1	14.76:1	(7000) 35
2nd	2.34:1	8.28:1	(7000) 62
3rd	1.52:1	5.38:1	(7000) 96
4th	1.14:1	4.04:1	(7000) 128
5th	0.87:1	3.08:1	est (5850) 140*
6th	0.69:1	2.44:1	na**

Final drive ratio..... 3.54:1
Engine rpm @ 60 mph in top gear..... 2000
*Electronically limited. **Top speed reached in 5th gear.

Instrumentation

140-mph speedometer, 8000-rpm tach, fuel level, coolant temperature

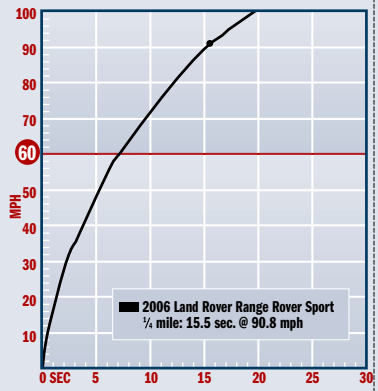
Safety

front, side and side-curtain airbags, traction, yaw & roll control, ABS w/electronic brake force distribution, seatbelt pretensioners (all standard equip.)

PERFORMANCE

Acceleration

Time to speed	Seconds
0–30 mph	2.3
0–40 mph	3.8
0–50 mph	5.3
0–60 mph	7.2
0–70 mph	9.5
0–80 mph	12.2
0–90 mph	15.2
0–100 mph	19.7
Time to distance	
0–100 ft	3.1
0–500 ft	8.4
0–900 ft	12.1
0–1320 ft (¼ mile)	15.5 @ 90.8 mph



Braking

Minimum stopping distance
From 60 mph..... 118 ft
From 80 mph..... 210 ft
Control..... excellent
Brake feel..... good
Overall brake rating..... very good

Subjective ratings consist of excellent, very good, good, average, poor; na means information is not available.

Fuel Economy

Our driving..... 14.4 mpg
EPA city/highway..... 13/18 mpg
Cruise range..... 321 miles
Fuel capacity..... 23.3 gal.

Handling

Lateral acceleration (200-ft skidpad)..... 0.77g
Balance..... moderate understeer
Speed through 700-ft slalom..... 58.4 mph
Balance..... moderate understeer
Lateral seat support..... good

Interior Noise

Idle in neutral..... 43 dBA
Maximum in 1st gear..... 68 dBA
Constant 50 mph..... 65 dBA
70 mph..... 68 dBA

Test Notes:

The supercharged V-8, with 390 bhp, strains down the quarter mile while dragging 3 tons of weight. All-wheel drive coupled with an automatic transmission means easy and consistent drag runs. • Although this is the sportiest of Range Rovers, the skidpad and slalom numbers reflect its incredible mass. Through both of our handling tests the SUV feels sluggish and exhibits moderate understeer.

Test Conditions:

Temperature	Humidity	Elevation	Wind
92° F	31%	350 ft	calm

■ Whether on the highway or back roads in horse country, the Range Rover Sport envelopes its occupants in luxurious surroundings. The small electric cooler can hold two bottles of water and a couple of cans of Red Bull. The rear entertainment system can play DVDs and has inputs for video game systems. Neat tech: The dashboard display screen shows wheel articulation when Terrain Response is engaged.

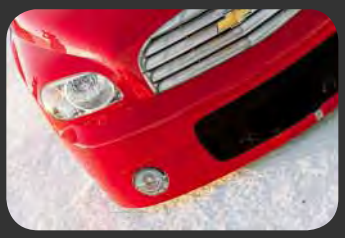
the mall parking lot. Unlike previous generations of Land Rover products, all of the controls are logically placed (what was the deal with those "backward" window controls, anyway?) and have a sturdy, high-quality feel. The cabin's ergonomics is excellent, and there's plenty of front and rear passenger leg room. The rear cargo space is very good, though it is obviously smaller than that of the larger Range Rover. A DVD-based navigation system is standard.

Power comes from a 32-valve 4.4-liter V-8. This engine features an aluminum block and heads, along with variable valve timing and camshaft phasing, with power output rated at 300 bhp at 5500 rpm and 315 lb.-ft. of torque at 4000 rpm.

Our road test machine sports the optional supercharged 4.2-liter powerplant (upping our list price to $69,750), good for 30 percent more horsepower and torque over the normally aspirated version—390 bhp and a whopping 410 lb.-ft. of torque, making quick work of passing sluggish traffic on our Midwest journey. All Range Rover Sports come with a 6-speed ZF automatic transmission with manual gear selection capability. This is truly an enthusiast machine: Slapping the shift lever into manual mode also sets the "Sport" mode, matching revs to downshifts; most luxury sports sedans don't even do this. Adaptive directional headlights, Brembo brakes, a stainless-steel exhaust, heated sport seats, windshield and washer jets and a cool-looking mesh grille and side vents are all standard fare on the supercharged Range Rover Sport. Speaking of cool, this model also gets a small, chilled storage bin between the two front seats. Although it is technically only an electric cooler and not a refrigerator, we found that it chilled room-temperature bottles of water and Red Bull (two each) fairly well.

At $56,750 and a little underpowered compared with the competition, the 300-bhp Range Rover Sport measures up well to the aging, 315-bhp BMW X5 4.4i ($53,600) and the utterly unattractive, 340-bhp Porsche Cayenne S ($57,200). But as it tips the scales at more than 5600 lb. (the German utes are closer to the 5000-lb. mark), you'll need to upgrade to our supercharged test subject to keep up with the others in acceleration. Even then, the sprint from 0–60 mph is accomplished in 7.2 seconds to the Teutonic cars' slightly quicker runs of 6.8 sec. (manufacturers' numbers). No matter. Having driven all three, they are outstanding machines, offering surprisingly good performance given their girth. But it is the Range Rover Sport's tenacious off-road capability (thank you, Terrain Response), its solid on-road performance, stylish looks, and handsome but no-nonsense interior that make it the ute that I would choose—in Vesuvius Orange, please.

For video action, see www.roadandtrack.com



SALT LICKS

■ No ordinary Chevrolet HHR, this one is chopped, rides on a tube frame and can easily exceed 200 mph.

There's more to setting land speed records than mashing the gas

BY DOUGLAS KOTT

PHOTOS BY MARC URBANO

BONNEVILLE SALT FLATS, UTAH—"ECOTEC" is a very PC name for a 4-cylinder engine, perhaps to lull environmentalists into thinking it sips fuel from a dollhouse teacup and emits bouquets of daisies from the tailpipe. To its credit, it's a clean-burning motor. Yet in highly modified form, these 2.0-liter powerplants can take frat-house, Belushi-grade hits from the beer bong, belch through unmuffled side pipes, and make unreal power in the process. How's 925 bhp at 8500 rpm on 110-octane gas, with 40 psi of ice-water-chilled boost from a Garrett GT42 turbo the size of a Backstreet Boy? Your mileage may vary.

Mark Reuss, Executive Director of GM's Performance Division, figured that there are few better places to showcase this kind of mantle-shifting power than the northwest corner of Utah, near the Nevada state line. Yes, the Bonneville Salt Flats where, for nearly a century, brave souls have climbed into and astride every conceivable sort of vehicle—motorcycles, 1930s' roadsters, belly tankers, modified production cars, streamliners—and streaked across this salt-encrusted ancient lakebed. Foot firmly to the floorboard, it's about pitting horsepower against aerodynamic drag, machine against salt, all for glory and a line in the record book. It's about Adrenaline taking over, throwing Fear down an elevator shaft.

Go quick enough and you get a hat…red for records set above 200 mph, blue for

No smooth ride: Bumpy salt separated the HHR (right) from its aluminum belly pan (above). The Cobalt's con rod (center page) tries to escape out the side of the block.

300 mph. Wear blue and you're in the company of salt deities like Sir Malcolm Campbell, Art Arfons, Gary Gabelich, Don Vesco and Craig Breedlove.

Cut to the GM pits, positioned near Mile 4 of Bonneville's long course, and the crew has pulled the front clip off the Chevy HHR, which is painted in the iconic red-and-cream colors of So-Cal Speed Shop. (A smart move, GM partnering with So-Cal and its legendary founder Alex Xydias, as it softens the blow of big corporate dollars descending on what many consider to be the last bastion of the home-garage-built race car.) Not only does this reveal just how far back the longitudinally-oriented Ecotec is mounted…the cam drive lines up with the base of the windshield, with the driver entering through the left *rear* door…but that the front section of the aluminum belly pan is wadded up severely. The salt, you see, is rough and lumpy this week, and it attempted to peel the pan from the tube frame like the skin from a grape when the HHR bottomed out.

Not that driver Jim Minneker, GM Performance Division engineer, 200-mph club member and accomplished road racer, even noticed. "The track being what it was, I couldn't get the power down. In the lower gears I got crossed up there pretty good, but in 3rd gear it straightened right out." Let's remember that redline in 2nd is good for 127 mph, not the sort of speeds you'd like to be steering out the side window. On the delicate touch needed for over-200-mph control: "There's some slack in the steering that you'd bitch about if you were doing a road test. It isn't a high-precision steering thing. You just sorta wanna help it if it needs help and otherwise just leave the thing alone."

Bumpy salt's a bad thing. The HHR is back in one piece, but its run of 208 mph is well shy of the 226.835-mph record in G/Blown Fuel Competition Coupe, but not for lack of power or teeth-gritting determination. It's a fine effort considering the HHR has never seen the salt before, its shake-down runs to 150 mph taking place at GM's Mesa, Arizona, proving ground.

While the HHR's engine ran like the proverbial top, the Cobalt SS sister car, running a near-identical setup, seemed to be a lightning rod for trouble. Driver Mark Dickens, program manager of the GM/So-Cal Bonneville effort and an accomplished open-wheel road racer in his own right, describes his run as he's incrementally feeding in boost (each push of a steering-wheel-mounted button adds another 6–7 psi): "In 3rd it was hooking up good and I gave it more boost…I think I was up to 25 pounds. About 5 seconds later the front end went *bam!* down on the ground and I heard shrapnel go everywhere." A flash oil fire ensued, which was quickly extinguished.

Data acquisition revealed that this happened at 197 mph, and a visual inspection showed the cause: a fist-sized hole in the side of the block, a mangled connecting rod in clear view and its piston likely in particles smaller than the salt crystals. And this was the Cobalt's second engine, the first succumbing to fragmented sparkplug electrodes as a result of detonation. A shame, as last year this self-same Cobalt SS achieved 243.127 mph, not officially a record because at that time, Cobalt coupes were not available in Chevrolet showrooms, as required by the rules. So the G/Blown Fuel Altered record of 212.684 mph, set in 2003 by Minneker in a Saturn Ion Redline, stands.

And then the rains came—hard, turning the packed salt into a mushy, unusable slurry. But not before a GM car bagged a record. The Ecotec Lakester, a remake of the So-Cal belly tanker that Alex Xydias and former *Road & Track* Editor Dean Batchelor drove with great success in the 1950s, is essentially an open-wheel Formula 2000 car under its dorsal-finned, torpedo skin with a lightly modified (312 bhp) supercharged Ecotec engine mounted longitudinally amidships. When driver Don Sherman, *Automobile* technical editor and crusty Bonneville veteran, popped the chute after the 5-mile marker, the Lakester had clocked a two-run average of 189.205 mph, upping its own record set last year in the G/Blown Gas Lakester class by nearly 10 mph.

Appetite whetted for speed and additional record-book entries, GM will doubtlessly make the trek again to this desolate, bright white corner of Utah. The salt will be waiting patiently.

One record fell—Don Sherman drove the So-Cal Lakester to a 189.205-mph average.

Fueling The COMPETITIVE SPIRIT

Unleaded? Leaded? Diesel? Corn-fed? Racing fuels have never been more varied

BY DENNIS SIMANAITIS • PHOTOS BY F. PEIRCE WILLIAMS

Indy Racing League is in a transitional phase: For 2006, its fuel is a 90/10 blend of methanol and ethanol, respectively. Come 2007, IRL becomes pure grain-alcohol-fed. Champ Car continues with 100-percent methanol.

THE RACE CAR PITS FOR AN ARTFULLY ORCHESTRATED STOP. WITH NARY A wasted motion, it's refueled to a precisely calculated level. And then, in mere seconds, it's back into the fray.

But what kind of fuel went in?

It depends, of course, on the sanctioning body, the race venue, the team and, these days, even the sponsor's environmental proclivities. Racing fuels have never been more varied. It's a good time for a Racing Technology look at what's fueling the competitive spirit.

It's quite amazing: Among sports car and rally championships, Formula 1, Champ Car, IRL, Funny Car/Top Fuel and NASCAR, there are six distinctly different kinds of fuel, plus a couple of wild-card possibilities. Here are some tidbits I've gleaned concerning each.

SPORTS AND RALLY CARS—NEAREST *OUR* PUMP

The Federation Internationale de l'Automobile (FIA) specifies that its World GT and World Rally Car Championships use unleaded gasoline supplied by the organizer. Similar situations exist with the Auto Club de l'Ouest's Le Mans, our own American Le Mans Series and other IMSA venues.

The FIA's World Rally Championship is the easiest to describe: Shell is the current fuel supplier. Priority drivers (i.e., the top guns) must use this 95-octane unleaded gasoline. Lesser ranks can get their fuel at commercial gasoline stations noted in the route book. Fuel characteristics and refueling strategies are far down the list of why WRC is so exciting.

Sports-car venues also depend on organizer-supplied unleaded gasoline. Octanes vary from venue to venue, but the official Sunoco Unleaded GT100 of IMSA's GT3 Cup Challenge is typical. It's a street-legal gasoline, with Research Octane Number of 105 and Motor Octane Number of 95 yielding its Antiknock Index, (R+M)/2, of 100. This gasoline's density, its specific gravity, is 0.764. That is, it's a tad more than 76 percent the density of water, roughly midrange for gasolines cited in the *Bosch Automotive Handbook*. (We'll talk more about gasoline density in time.)

Fuel regulations of sports-car endurance racing give rise to interesting tactics as well as strategies. The cars are limited to 90-liter/23.8-gal. tanks at Le Mans, 100 liters/26.4 gal. in FIA GT. Refueling rigs, no higher off the ground than 2 meters (6.6 ft.), depend on gravity alone for their flow. The fuel passes through a restrictor, the diameter of which is 33 mm (1.3 in.).

The fuel cannot be at less than 10 degrees Celsius (i.e., around 18 degrees Fahrenheit) less than ambient; nor can any cooling be applied. A cooler fuel, of course, would be more dense and hence contain more energy per unit volume.

As for tactics, a team must refuel at either the beginning or the end of a pitstop, not during any tire changes. The car cannot be on its jacks; its engine must be shut off; and only five crew members can be in the pit during the actual refueling.

LE MANS GOING DIESEL—AND GREEN!

The strategy of long-distance racing encourages proponents of compression ignition. Diesels have run at Le Mans already, though not with great success. However, both Peugeot and Audi are preparing diesel entries, perhaps for 2006, definitely for 2007. Curi-

ously, a big challenge is gearbox durability when transmitting a surfeit of diesel torque.

In a classic tortoise/hare contest, these diesel cars could give away as much as 12 seconds per lap to their gasoline competitors. Yet one of them could win simply because of fewer refueling stops.

For the 2006 race, the ACO also plans a "green" award, sort of an eco-friendly Index of Performance. Determining it will be things like engine type, fuel type, emissions profiles, even noise levels. Fuel suppliers at Le Mans include gasoline and diesel as well as bio-ethanol among their offerings.

A bio-ethanol car, the Nasamax LM2 entry, has already competed at Le Mans. Its particular fuel is a pure alcohol distilled from sugar beets and potatoes. As this fuel has less than 70 percent of gasoline's energy per volume, the ACO granted the Nasamax a larger tank capacity, 135 liters/35.7 gal. If its entry is accepted in 2006, the Nasamax could be a strong contender for this green award.

OTHER ALCOHOLIC RACING

American open-wheel racing has had a long history of alcohol fuel, specifically methanol. Derived largely from natural gas, methanol can also be produced from wood, hence its "wood alcohol" moniker. An oddity is methanol's lack of visible flame, much to the concern of those confronting a fire in the Champ Car series, where methanol is the official fuel.

Champ Cars have fuel tanks of no more than 35 gal., a race consumption of around 1.8 mpg and race distances exceeding 250 miles. Hence refueling, purely by gravity feed, is an exciting aspect of the sport, with full-course yellows making the pit lane a busy place indeed.

CORN, BACK HOME AGAIN IN INDIANA

Hitherto a methanol series, the Indy Racing League is in the midst of a two-year phaseover to ethanol. At last year's Carburetion Day activities, the Ethanol Hemelgarn Racing Dallara did a 10-lap demonstration run on this "grain alcohol." In fact, the team is backed by a group of companies within the ethanol industry.

In 2006, IRL cars will run a 90/10 blend of methanol/ethanol, respectively. For 2007, it's pure ethanol, and corn-belt proponents are hyping this as high as an elephant's eye.

Those of a historical bent can celebrate this first time since 1927 that an ethanol car competes at Indy. Leon Duray's Miller F.W.D. was so fueled that year, though a contemporary report cites the car dropping out with a "leaking gasoline tank."

No major changes appear necessary in

WHERE WILL YOU BE WHEN THE ACTION STARTS?

2006 SCHEDULE

mazda RACEWAY LAGUNA SECA

A1 Grand Prix of Nations

March 10-12

Twenty-five national teams race identical, 520-horsepower, open-wheel cars with no electronic driver aids, in what is essentially the "World Cup of Motorsports". Each car is painted in the colors of its home country, and the championship is awarded not to an individual driver but to the competing nation.

U.S. Sports Car Invitational

May 5-7

More than 50 Rolex Grand American Sports Car prototype and GT cars do battle in a 200-mile race. Adding to the weekend's festivities is the all-make auto enthusiast gathering, MarqueMadness, which includes seminars, product displays, car corrals, road rallies, parade laps, barbeques and track time for participants.

Red Bull U.S. Grand Prix

July 21-23

The largest motorcycle race in North America and the only appearance of the MotoGP World Championship in the United States. More than 150,000 attendees and 327 million television viewers will catch the two-wheel action at Mazda Raceway Laguna Seca's largest event.

Rolex Monterey Historic Automobile Races

August 18-20

The longest running event on the 2006 schedule is the 33rd Rolex Monterey Historic Automobile Races–one of the most famous historic automobile races in the world. This year's featured marque is Cooper, celebrating both their long on-track open-wheel heritage and their off-track successes, including the popular Mini.

Monterey Sports Car Championships

October 20-22

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the switch of alcohols. Both have high latent heat of vaporization; that is, as they evaporate, they cool the incoming charge considerably more than gasoline does. In generating a denser charge, this partially offsets their meager energy content compared with that of gasoline. Methanol's calorific value is about 50 percent that of gasoline's; ethanol's, 68 percent. Thus, with IRL's change to ethanol, we might see fuel consumption improve slightly from methanol's typical 1.8 mpg and more power as well. On a safety note, ethanol's bluish flame is somewhat more visible.

BRING YOUR OWN OXYGEN TO THE DRAGS

Like the alcohols, nitromethane doesn't score high in calorific value, perhaps 26 percent that of gasoline. But also like the alcohols, it brings its own oxygen into the combustion process. A lot of it, even more than methanol's 50 percent.

This and other characteristics imply its stoichiometric air-fuel ratio—the ideally combusted mixture of intake air and nitromethane—is rich; in fact, an extremely rich 1.7:1. By comparison, isooctane (defining 100 on the octane scale) has a stoichiometric air-fuel ratio of 15.1:1.

Said another way, even though nitromethane hasn't a lot of calorific value, so much of it gets combusted that tremendous power is produced, more than twice that produced by 100-octane fuel.

Not for long, however, because of extremely high thermal and mechanical loads on powertrains. On the other hand, Funny Car/Top Fuel events last only a quarter mile—and, these days, less than 5 seconds!

Don't try this at home, kids (though, in fact, nitrous-oxide injection is, sort of, nitromethane in a bottle).

WHAT ABOUT AVGAS?

Another thing not worth trying at home is aviation fuel. Avgas isn't road-taxed, so it's illegal. Some of it, 100LL, for instance, still contains tetraethyl lead, albeit LL identifies it as low-lead. A number of low-powered aircraft have been certified to run on automotive unleaded. Generally, though, avgas is formulated with characteristics that have nothing to do with road-going applications. And auto fuel has additive packages that aren't necessarily avgas-optimal either.

Another nugget gleaned: Avgas grades all contain powerful dyes; 100LL, for instance, is blue. Any leakage, even after evaporation, leaves the dye as a tracer.

FRIED CHICKEN, BEER AND PLENTY OF LEAD

If ever you seek the efficacy of tetraethyl lead, look no further than NASCAR. Of all the race series we've examined, this is the only one retaining leaded gasoline—and not simply out of Good Ol' Boy tradition.

PHOTO BY RICHARD PRINCE

PHOTO BY RALPH HARDWICK

Direct-injected Audi at Le Mans, top, was frugal with its unleaded high-test. NASCAR, top right, is unique in using leaded gasoline. At right, Shell unleaded is the fuel of World Rally Championship.

In fact, NASCAR has come a long way from behind-the-still workshops (if, indeed, many ever existed). One example: Nick Hayes, ex-chief designer at Cosworth, has recently joined Richard Childress Racing as engine research and development director.

He and other NASCAR engine specialists will continue to rev 358-cu.-in. ohv V-8s beyond 9000 rpm, and do it for hundreds of miles of racing. They'll continue to use Sunoco Supreme Leaded (RON 114, MON 110; specific gravity 0.715; like 100LL, blue in color). And each team's Gasman will continue to heft two 11-gal. cans of it, each weighing as much as 90 lb., during a typical pitstop.

It's generally acknowledged that the lubricity of this fuel's tetraethyl lead is helpful—some say required—in offering NASCAR valvetrain durability.

From time to time, the EPA elbows NASCAR about this disparity of America's premier racing series burning America's dirtiest fuel, and NASCAR squirms a little each time.

BRING YOUR GAS CHROMATOGRAPH TO F1

As you might expect, Formula 1 takes its regulational "petrol as this term is generally understood" and throws immense technology (spelled $$$/£££ /~~¥¥¥~~/~~€€€~~) at it.

Gas chromatography is a regular tool used by suppliers, teams and the FIA to assess F1's special blends of hydrocarbons. There's a full page of particulars in the regulations, beyond the obvious facts that the fuels are all unleaded (specifically, no more than 0.005 gram/liter) and moderately high octane (RON between 95 and 102; MON exceeding 85). Actually, the most interesting regulation concerning F1 fuel turns out to be the one about its density, which must fall between 0.720 and 0.775.

During the 2004 season, it became known that Shell had learned to game its fuel densities for Ferrari's benefit. No doubt, the practice continues to this day with Shell as well as Elf, Mobil and other suppliers. Strategies and tactics explain why.

With driver and full fluids, an F1 car must weigh at least 600 kg (1323 lb.). Cars are built slightly light, adding ballast specifically positioned for circuit to circuit.

Fuel tank size is unregulated (and closely guarded), though it's thought most cars carry 75–130 liters (20–34 gal.). Fuel consumption is 3–4 mpg. Races are just a tad beyond 305 km/189 miles in length.

Thus, refueling is a given. Indeed, as aerodynamics seems to play havoc with close running, refueling remains one of the few tactical elements left. (See "Racing Technology: The Gaming of Formula 1," November 2003.)

Fuel rigs are limited to a delivery rate of 12.1 liters/second. And, note, this flow limitation is defined by volume, not weight.

DENSITY MATTERS

Let's examine the influence of fuel density within its regulated range of 0.720–0.775. In particular, 100 liters of "light" fuel would weigh 72 kg; 100 liters of equally legal "heavy" fuel, 77.5 kg.

How could two teams exploit this 5.5-kg difference?

The less dense fuel gives a team 5.5 kg of ballast to balance the car for optimal handling throughout the race. And, at any point in a stint, its lighter fuel load offers a slightly quicker lap time.

By contrast, since 100 liters takes the same time to replenish (100/12.1 = 8.3 seconds), a team could opt for a more dense fuel fill, the added density translating into more energy gained in the same 8.3 sec. of refueling.

Depending on the circuit, its power requirements, the ease of passing, the nature of the pit lane, the number of fuel stops, etc., etc., either of these weight-efficient or volume-efficient strategies might be just the trick.

What's more, innovative fuel suppliers continue to tweak added calorific value from a bewildering array of hydrocarbons, whatever their density.

They're certainly fueling the competitive spirit.

Tech TIDBITS

By Dennis Simanaitis, ENGINEERING EDITOR

HYBRID HYBRIDS?

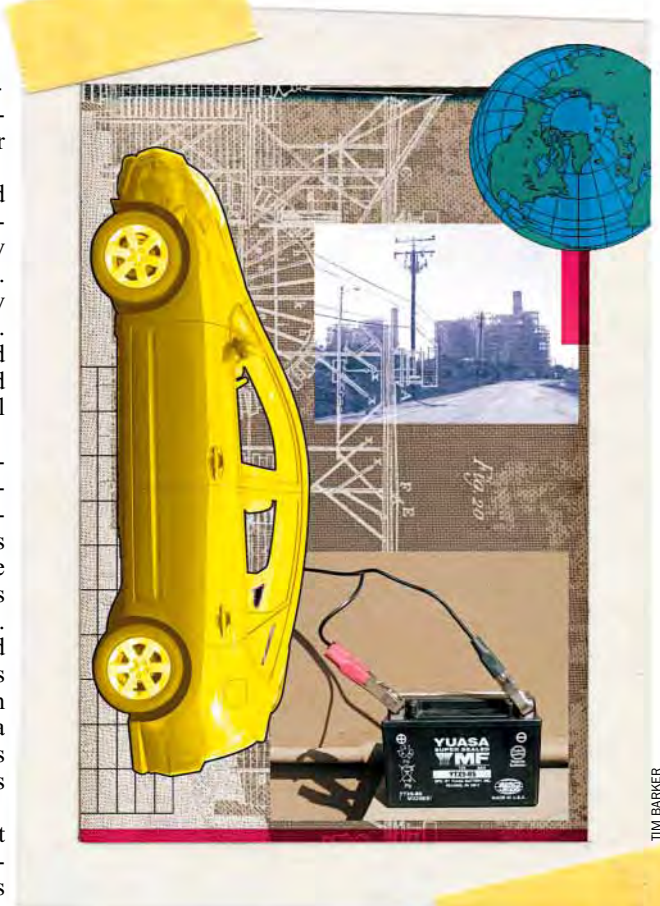
PLUG IN YOUR HYBRID?

Hybrid cars as we know—and love—them make their own electricity. In fact, it's seen as a distinct advantage that they never need to be plugged in.

Yet the idea of a plug-in hybrid is not contradictory. Such a vehicle could have a larger battery pack than a conventional hybrid. And, thus, it could run in purely electric mode for longer periods. The battery would be recharged primarily while parked—and plugged into the conventional power grid.

Proponents claim such electric power is inherently less expensive than that generated onboard. Also, they say there's less pollution. Researchers at the University of California Davis are looking into the concept. DaimlerChrysler has converted some Sprinter commercial vans to plug-in hybrid format, though the company says it's simply a research program. Renault has a plug-in hybrid version of its small Kangoo van.

On the other hand, I wouldn't put much stock in hobbyists filling the cargo area of their Prius hybrids with motorcycle batteries. Toyota devoted considerable R&D into crashworthiness, and I'd hate to see this all wasted.



TIM BARKER

PRIUS POWER

In fact, it's said that some Toyota Prius owners have modified their own cars for plug-in capability. The company opposes this, as it voids the warranty and could damage the electronic controls.

What's more, given the ultra-clean nature of the Prius's gasoline engine, it's not impossible that a plug-in source of electricity could be dirtier than the Prius's onboard generation.

The Prius, unlike some Eastern power plants, doesn't cause acid rain.

By the way, unlike our version, Prius hybrids in Europe and Asia have an instrument-panel button that briefly transforms its propulsion to electric-only. According to Toyota, this allows drivers in crowded or restricted areas to move their cars short distances without firing up the internal-combustion engine.

Lots of European cities have concentric ring roads, with increasingly restricted vehicular traffic further in. There, such pure-electric short-range capability would be advantageous. It would seem to make less sense, however, in our typical urban sprawl.

EVERYTHING YOU WANTED TO KNOW ABOUT THE INTERNAL-COMBUSTION ENGINE, BUT DIDN'T EVEN KNOW TO ASK

It is with some trepidation—especially this time of year—that I recommend a book costing $150, all the more when it is specifically intended as a reference tool for specialists. But, gad, the *Internal Combustion Engine Handbook* is so chock-full of technical tidbits that it could support this column from here to eternity.

For instance, its section on variable valve actuation offers details of the earliest attempt, circa 1918, as well as Audi's, BMW's, Honda's, Porsche's and Toyota's latest.

In a discussion of racing fuels, it gives the recipe, secret at the time, for the all-conquering Auto Union and Mercedes-Benz racing teams during the late 1930s. (Mostly methanol, these fuels also contained doses of toluene, nitrobenzene and castor oil.)

Its chapter on exhaust emissions offers the best summary I've ever read of regulations around the world, their origins, their evolution and potential harmonization.

Yet another example: I knew that Venezuela's crude oil is high in sulfur (this being one of the challenges in North America's adopting Euro diesel technology). The book puts it in perspective with other crudes (Venezuelan, 2.9 percent sulfur; Arabian light, 1.9 percent; Nigerian, 0.1–0.3 percent).

In the Preface, it notes "one person is no longer able to comprehensively present all the important interplays in their full depth." No problem: This volume of 868 pages (and more than 1260 illustrations) is the product of more than 90 authorities.

Shortcomings? The book first appeared in a 2002 German edition; its English translation is an excellent one dating from 2004 (but obviously the technology clock is already tick-

ing). Also, there's a vast bibliography (nearly 700 entries!), but most are in German.

Nonetheless, it's a fabulous source book. Particulars: *Internal Combustion Engine Handbook: Basics, Components, Systems, and Perspectives,* edited by Richard van Basshuysen and Fred Schäfer, SAE International, Warrendale, Pa., 868 pages, hardcover, $149.95; SAE members $119.96; (877) 606-7323; www.sae.org.

HERR SCHMID AND JAMES DEAN

In my June 2005 tidbit on Leopold Schmid's innovative land-speed-record wheel, I observed that it looked like a VW center section. Reader, pen-pal (and self-confessed nit-picker) Lance W. Almon apparently channeled James Dean and directed me to look on page 146 of that same issue. There was Dean in his Porsche Speedster, its hubcaps removed for racing. And, as Lance notes, the Schmid wheel center sure looks like a Porsche's.

HOT LANES ARE COMING

We've seen HOV (high-occupancy-vehicle) lanes, but the latest thinking in traffic-flow management is HOT, as in high-occupancy toll. This would give solo drivers the privilege of traveling in HOV lanes but for a price. What's more, the electronic toll would vary depending on traffic density and time of day.

Solo drivers along I-394 in Minneapolis may pay 25 cents when traffic is its lightest, or as much as $8 if the unrestricted lanes are at a standstill. Car-poolers, buses and motorcycles continue to use the HOV lanes for free.

Other areas with or considering similar schemes include Southern California, Colorado, Florida, Maryland and Utah.

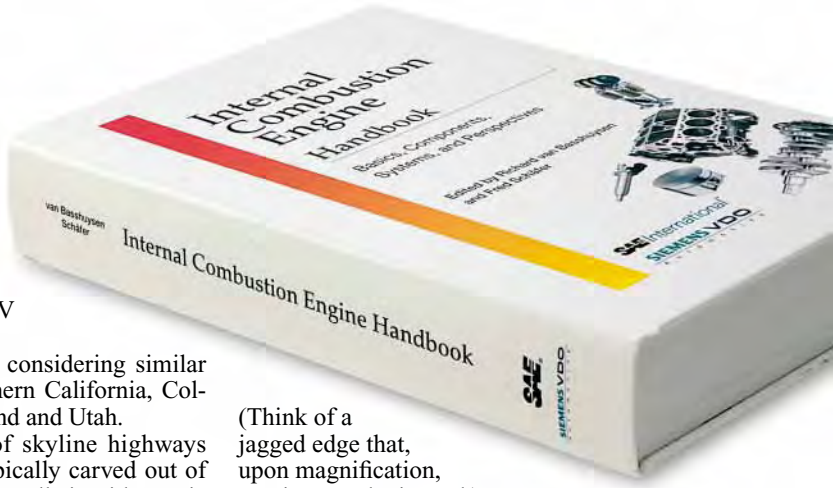
These remind me of skyline highways in Japan, toll roads typically carved out of hillsides and paralleling, albeit with scenic overlooks, the diesel-truck-choked arteries down in the flatland.

In fact, an Acura RL ad on TV seems based on this, the car's interactive navigation system offering its driver an idyllic route overlooking the clogged freeway.

In time, I suspect nav systems will identify the toll of the moment and take this into consideration in making their route recommendations.

FRACTAL ANTENNAS

Do you remember fractals (Tech Tidbits, November 1993)? These mathematical objects are characterized by self-similar convoluted lines or surfaces. Regardless of how close you look, a fractal's shape continues to replicate its basic character.



(Think of a jagged edge that, upon magnification, continues to be jagged.)

Another example, sort of, is a broccoli floret, which has a huge surface area for its volume.

This idea of maximizing surface area for a given volume has application in antenna design. Such antennas can be made 10 times smaller than existing ones. There's the potential for one antenna receiving multiple bandwidths for everything from radio to telephone to GPS. The trade newspaper *Automotive News* gave one of its PACE awards to Advanced Automotive Antennas SL, Barcelona, Spain, for its fractal antennas.

Also, I'd conjecture that fractal geometry could be useful in designing catalyst substrates and fuel-cell membranes, both profiting from lots of surface area in a given volume.

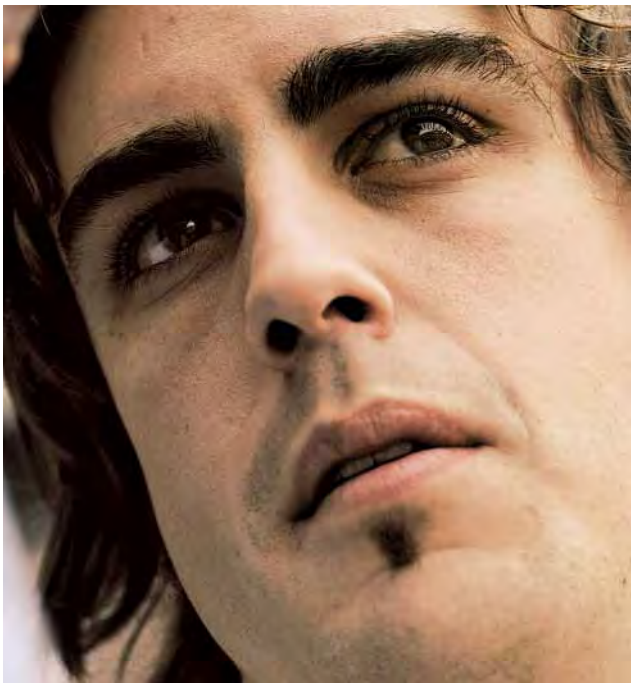
TWILIGHT OF GREATNESS: The Champion Audi R8s started the 2005 ALMS season with a win at Sebring, then carried that momentum through to the LMP1 championship. En route, the Audi R8 solidified its position as the most dominant car in the history of sports-car racing. Photo by Richard Prince

COMMUNICATION NASCAR STYLE: Not one to hide his feelings, Robby Gordon touches base with Michael Waltrip at New Hampshire. Photo by Robert LeSieur/LAT

The Year in Photos

SPORT

The 2005 season captured by our best racing photographers



A RACE OF FIRSTS: 2005 IRL Champion and Indianapolis 500 winner Dan Weldon takes the league's first right turns and his first non-oval IRL win on the streets of St. Petersburg. Photo by F. Peirce Williams

THE LONG VIEW: What most of the ALMS GT2 field saw of the championship-winning White Lightning Porsche 911 GT3 RSR, below right. Patrick Long and Jorg Bergmeister combined speed and consistency to claim the class title. Photo By Rich Chenet

EYE ON THE PRIZE: Despite being Formula 1's youngest champion (and race winner), and the first Spaniard to ever win the GP title, Fernando Alonso manages to maintain his cool both in and out of the cockpit. Photo by Paul-Henri Cahier

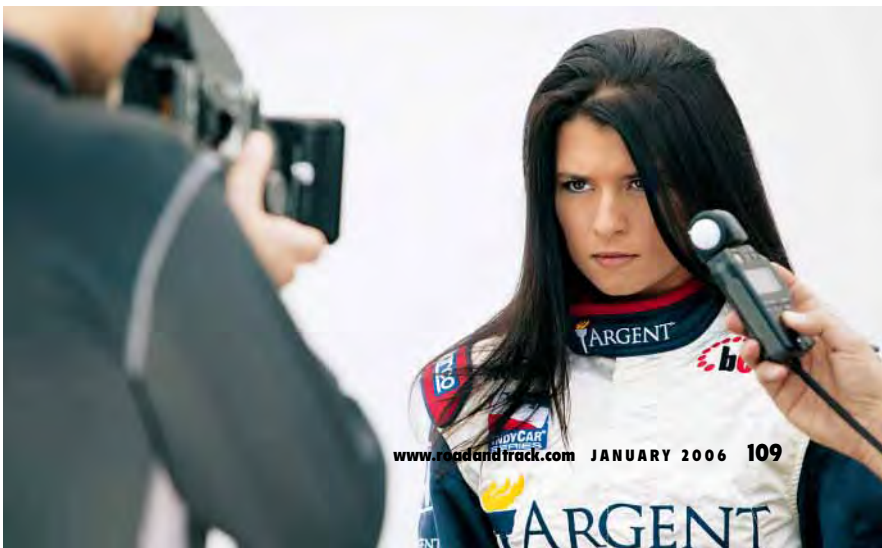
SWEET TASTE OF VICTORY: Alex Zanardi stands atop the podium after winnning the World Touring Car Championship race at Oschersleben, Germany. Photo by Suttonimages.com

FREQUENT FLYER: Finland's Harri Rovanperä launches into space in his Mitsubishi Lancer WRC 05 at the Rally Sardinia, where the cars are undoubtedly as fast in the air as they are on the ground. Photo by Ralph Hardwick

THE BIG BLOWOUT: At the heart of the whole U.S. Grand Prix debacle was a rash of Michelin tire failures that occurred during practice. Photo by Paul-Henri Cahier

BUSY BEHIND THE WHEEL: Frank Stippler applies some opposite lock in his Audi Sport Team Joest A4 DTM, catching a slide at the Norisring round of the DTM Championship. Photo by Suttonimages.com

CENTER OF ATTENTION: Danica Patrick not only won IRL rookie-of-the-year honors, but also the title of the world's most photographed rookie. Photo by Marc Urbano



■ **REVENGE OF THE OLLIES:** The Corvette C6.R of Olivier Beretta and Oliver Gavin showed the way against stiff competition from their own teammates, Ron Fellows and Johnny O'Connell, to capture the American Le Mans Series GT1 class title. Photo by Rich Chenet

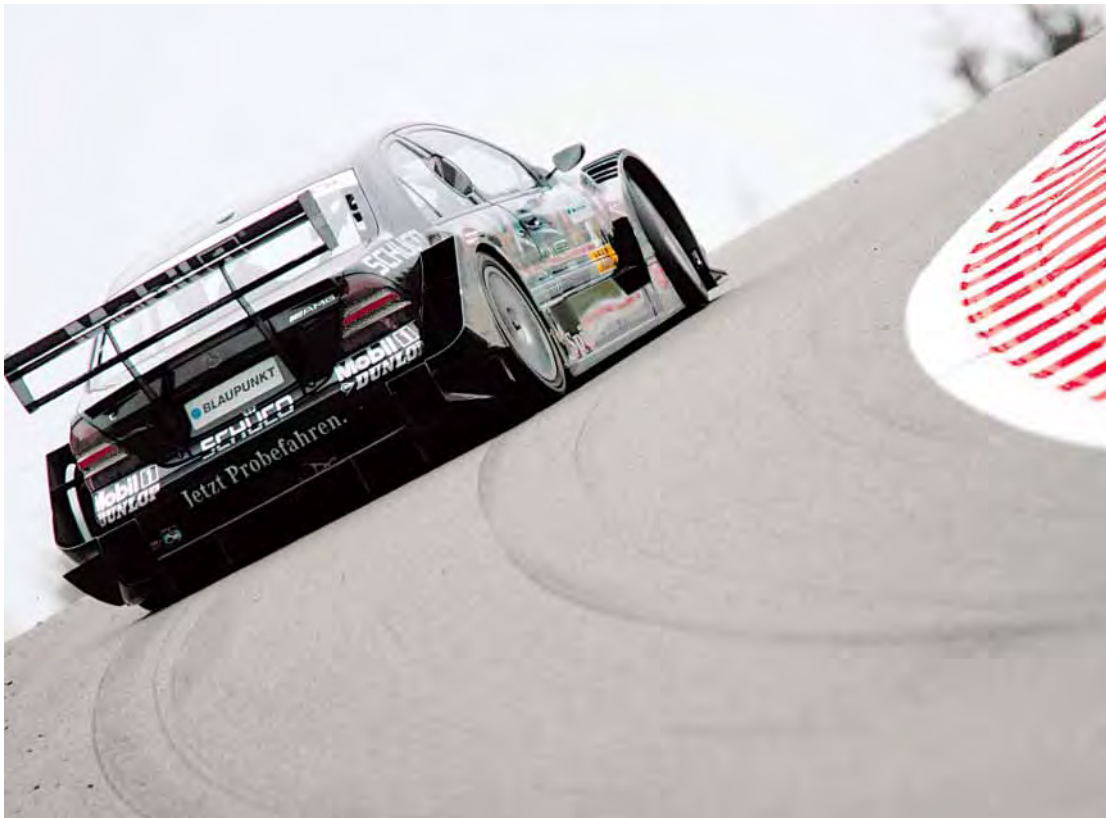
■ **RESIGNATION:** Despite his best efforts, Michael Schumacher faces the realization that his season is lost. Photo by Paul-Henri Cahier

■ **INTO THE NIGHT:** Streaking around Daytona's 33-degree banking, the Brumos Racing Porsche Fabcar soldiers on through the Florida night during the grueling Rolex 24 hours of Daytona. Photo by Marc Urbano.

■ **SOMEDAY, SOMEHOW:** A trio of dreamers checks out their future ride. Photo by Richard Prince

■ **ONCE MORE, WITH FEELING:** Reigning Champion Sébastien Bourdais shows the way at Long Beach, and then goes on to take his second consecutive Champ Car title. Photo by Marc Urbano

■ **MIKA MAKES TRACKS:** Mika Hakkinen shows he's lost neither the speed nor the aggression that carried him to two F1 championships as he slides his AMG Mercedes-Benz CLK DTM through Spa's Eau Rouge during the Belgian round of the DTM championship. Photo by Suttonimages.com



SMELLS LIKE TEAM SPIRIT: The 2005 Formula 1 champ arrives in the pit box for yet another picture-perfect stop. All season long, Renault provided Fernando Alonso with the equipment he needed to dethrone Michael Schumacher and hold off a charging Kimi Räikkönen. Photo by James Moy/Crash.net

THE FURY OF SPEED: Target Chip Ganassi Racing's Ryan Briscoe (airborne) and Cheever Racing's Alex Barron witnessed firsthand the consequences of close-quarters contact. Amazingly, Briscoe emerged with only minor injuries. Photo by Phil Rider/LAT

OUT OF NOWHERE: Perhaps the biggest surprise of the Toyota Atlantic season was the emergence of newcomer Katherine Legge, who won three races and finished third in the championship. Photo by Mike Levitt/LAT

DOGGED DETERMINATION: Finland's Marcus Gronholm takes the less-than-competitive Peugeot by the scruff of the neck, gunning for victory in the World Rally Championship. Photo by Ralph Hardwick

BULL DAZZLE: The Red Bull GT3 Cup lights up the night at Daytona's twice-round-the-clock endurance classic. Photo by Marc Urbano

THE DB IS BACK: After a long absence from sports-car racing, Aston Martin, via David Richards' Prodrive-built DBR9, returned with a vengeance, giving the factory Corvettes a serious run for their money. Photo by F. Peirce Williams

CATCH A FIRE: The paddock's most colorful and outspoken Formula 1 team owner, Paul Stoddard, took his fights to the FIA, for the better of the sport. In the end, he sold his team and moved on. He will be missed. Photo by Bernard Asset

RETURN OF THE TRIDENT: Maserati, like Aston Martin, returned to competition with the MC12. Although not competing for ALMS points, they raced for glory, and to re-establish the marque in the minds of the masses. Photo by Jim Hatfield

WRAPPED IN OIL: For the second year in a row, the Middle East community welcomed the traveling circus that is Formula 1, staging the Bahrain Grand Prix with impressive and entertainng results. Photo by Bernard Asset

SUCKING WIND AFTER WINNING: By his own admission, too fat to be climbing the fence at Indy, Tony Stewart still won the Brickyard 400, exhibiting the drive that has consistently kept him at or near the top of the NASCAR ranks. Photo by F. Peirce Williams

■ **FERNANDO-MANIA:** At every stop of the 19-round Formula 1 World Championship, Spanish masses united to support their national hero as he vied for and eventually secured the 2005 driver's championship. Photo by James Moy/Crash.net

■ **REPLACEMENT KILLER:** Oriol Servia was given the chance of a lifetime, to step in for the injured Bruno Junquiera at Newman/Haas Racing. As reward for their trust, he earned the team second place in the driver's championship. Photo by Mike Levitt/LAT

■ **TIME WARP:** Looking for all the world like Formula 1 at its sentimental U.S. home, the IndyCar series brought open-wheel racing back to Watkins Glen, New York, for the first time since October 1980. Photo by F. Peirce Williams

■ **HANG TIME:** Speed World Challenge GT front-runner, Wolf Henzler, catches some air in his Farnbacher Loles Porsche GT3 Cup at the top of Lime Rock's "uphill" turn. Photo by Richard Prince

■ **ON THE CHARGE:** Kimi Räikkönen was the fastest man in the fastest car, as seen here at Suzuka, where he stormed from last place to win. But McLaren unreliability kept him from claiming the driver's crown. Photo by Paul-Henri Cahier

■ **PRINCE OF POISE:** No matter the conditions, Sébastien Loeb rarely put a wheel wrong in his defense of last year's WRC title, dominating again this year to claim his second consecutive championship. Photo by Ralph Hardwick

■ **FULL CONTACT RACING:** A first-lap, first-turn clash at Petit Le Mans took out the Zytek of Hayanari Shimoda and JJ Lehto's Audi R8. The all-but-indestructible Audi returned to finish an amazing 3rd in LMP1. Photo by Rich Chenet

■ **THE BOY KING:** Fernando Alonso, wearing his signature gold driving boots and held high by team principal Flavio Briatore celebrates before a throng of adoring fans. Photo by Bernard Asset

■ **THE EMPIRE STRIKES BACK:** Porsche's much anticipated return to sports-car racing took place at Laguna Seca, where the Penske-run operation dominated the LMP2 class, scoring a resounding victory that saw the RS Spyder run as high as 2nd overall. Photo by Marc Urbano

Pole POSITION

By Joe Rusz, EDITOR-AT-LARGE

SNOOZEMAKERS

WHENEVER SHE CAN'T SLEEP, MY WIFE doesn't count sheep. She counts NFL quarterbacks. "Peyton Manning, Tom Brady, Donovan McNabb, Michael Vick, Brett Favre…"

Zzzz…

Football's not my thing, so when I have insomnia, I just slip out of bed, pop in a tape of a recent Formula 1 race and watch moderator Peter Windsor conduct a post-race interview with, say, Kimi Räikkönen.

Windsor: "Kimi, you were there in the end, but it was a difficult day. At one point you were trailing Ralf Schumacher."

Kimi: "Yeahtothepitstopwasvery difficultwechangedthetiresandputfuel insoRalfwasquiteabitlightercausehehadhis stop" (sniff, snort) soIdidn'tpushinthebeg inningbecausethetireswasreallyhotonthe backstraightaway" (snort, slurp) "soItriedto lookafterthetiresandthenfinallywhenit startedtodryout" (sniffle, cough) "mytires wereinverygoodconditionandIwasable tostartpushingandIwascatchingupvery quicklyand…"

Zzzz…

As exciting as Kimi is on the racetrack, when it comes to public speaking, he's like Ambien. He begins to talk and I instantly nod off. Our Managing Editor, Ellida Maki, who's a Finn just like Kimi, says, "We don't show our emotions outwardly." Duly noted.

But it's not just the drivers from Finland who need a personality boost. Michael Schumacher, who's German, is often pretty boring. And let's not forget some of the American drivers from Champ Car, NASCAR and the Indy Racing League.

Of course, I don't expect every driver to be a Chatty Kathy (or a Darrell Waltrip) and I accept that some individuals are just plain laconic. But as an interviewer—and a fan—I find it difficult to drum up much enthusiasm for a driver who's as expressive as cement.

Not that it's entirely the driver's fault. Many sponsors, never mind team owners, don't appreciate loose-lipped drivers, and some sanctioning bodies will punish you for being too, ahem, colorful. So it's no surprise that many drivers are reluctant to spout anything more than the usual, "The car run good and we got a great crew."

Gee, can I quote you on that?

Thankfully, we still have a few mavericks. Paul Tracy is always good for a shot from the hip (children, cover your ears), while with Tony Stewart, actions sometimes speak louder than words. Don't you just love it when Helio Castroneves climbs the fence after winning? Come to think of it, don't you like it even more when Stewart tries to mimic Castroneves and struggles, while saying, "I'm too damn fat for that!"?

Even Robby Gordon, who can sometimes be a pain, makes for good copy. As much as I disliked his comments at the time, I have to admit that Gordon gave us automotive writers a gift when he groused about all the attention being paid to Danica Patrick at Indy, maintaining that the only reason she was so fast is because she weighs only 100 pounds. Love him or hate him, Robby got everyone talking about racing for weeks, and that's what the sport needs.

In the past, drivers were colorful characters (on and off the track, I might add), who were always ready with the sound bites. One of my all-time favorite quotes came from Al Unser Sr., who had just won the California 500, driving the last few miles without gauges.

"Al," asked a reporter, "How could you drive without a tach?"

"I don't need a tach," growled Al, "I just drive her till she blows."

That, amigos, is a memorable quote, something that's often missing from modern-day racing, especially F1. Now I know that Kimi, Michael and others of their ilk get paid to drive and not to make speeches. But big-time racing is entertainment, and if you can't provide some colorful words to go with those images of screeching racing cars, we might as well be watching silent films.

Speaking of the movies, one of the best quips ever was reportedly uttered by actor/race driver Paul Newman who had just hung a car on the fence while practicing at Sears Point.

"Do you need a doctor?" screamed an emergency worker.

"What I need is a proctologist, 'cause I had my head so far up my…"

Anyway, you get the message. So here's my plan. This winter, when the season's over, send Kimi and Michael and all those guys to Dale Carnegie or Toastmasters. Then, just before they're ready to go on, slip them a few Red Bulls just to liven things up.

Hmm, I can see it now—Windsor and Räikkönen in the post-race interview.

Windsor: "Kimi, congratulations on winning the Japanese Grand Prix."

Räikkönen: "THANKS, PETE! *MITÄ KUULUU,* Y'ALL! IS ANYONE HERE FROM OUTTA TOWN? HEY, HOW ABOUT THAT ALONSO? WHEW! I HAVEN'T SEEN EYEBROWS LIKE THAT SINCE GROUCHO MARX!"

Ba-da-boom!

Technical CORRESPONDENCE

Edited by Tom Wilson

GETTING COOL, HOOKING UP

TRANSMISSION TEMPERATURE

What is the optimal temperature for automatic transmission fluid?

I have seen recommendations that range from "the cooler the better" to "it should be in the range of 160–180 degrees Fahrenheit." I have installed an additional ATF cooler to my 2004 Honda Odyssey to allow me the capability to tow reasonable loads. To prevent overcooling and ensure fast warm-ups, I then added a remote oil thermostat that will bypass the additional cooler if the fluid temp is below 180.

I still run the ATF through the factory cooler in the radiator first. So, was this the way to go or should I skip the thermostat and allow the transmission fluid to be as cool as possible?

David Purdie
TORONTO, ONTARIO, CANADA

We found it difficult to find an authority who would state an absolute figure regarding the ideal ATF temperature, but considering many hard-working automatic transmissions see fluid temps up to the 240-degree range, 180 degrees F is a marked improvement. Mineral oils degrade with high heat; 250 F is death for most and 235 F is hard on them, so that should give an idea of what to avoid as an upper limit.

On the other hand, some temperature is needed to provide the proper flow characteristics. We'd say 160 F sounds a bit cool, 180 F sounds nearly ideal and 215 F while towing in the summer would not make us worry.

Given your winter conditions, a rapid warm-up is desirable, and thus the thermostat provides a genuine benefit. And removing the thermostat would not materially lower the ATF's temperature when it counted—summertime towing—as the water-to-oil cooler in the radiator will determine the system's lowest operating temperature and the oil-to-air cooler will determine the upper limit.

In fact, the way you've configured your system appears ideal, and is identical to endurance engine oil cooling systems in road racers and heavy equipment. We would make no changes.

550 BHP AND TRACTION PROBLEMS?

I own a 2003 Ford Mustang Mach 1 with a 4.6-liter dohc engine. It has an 8-psi Procharger supercharger with air-to-air intercooler. It cranks out on a dyno 550 horsepower and 470 lb.-ft. of torque. My rear tires are Michelin Pilot Sports, size 275/40R-17 with 32 psi. The rear end is a 3.55:1 limited-slip with also a dash traction control switch.

My problem is when I do a quarter-mile run, all it does is spin in 1st and 2nd gears before it hooks up in 3rd. I have added Eibach heavy-duty front and rear anti-roll bars and rear heavy-duty upper and lower control arms.

I want my car to handle really well on the road and in "normal" driving, but when it comes time to do a street quarter mile against our local Vipers and Corvettes, I don't want to make a fool of myself and my beautiful sports car.

Robert Kumpan
JOHNSTOWN, NEW YORK

Mustangs are not noted for superior rear-axle traction, and adding power only makes things worse. Practically speaking, around the 400 rear-wheel horsepower level, tire spin in 1st and 2nd becomes a problem, and it only gets worse with increased power.

There are many mechanical things you can do to increase rear bite, but they cost money. The best solution is to fit a torque arm rear suspension from Griggs Racing ([707] 939-2244) or Maximum Motorsport ([805] 544-8748). These replace everything in the rear suspension except the rear axle for around $1000 and give an easy, smooth ride, aggressive grip when accelerating, and reduced nose dive when braking. They are actually the rear half of a road racing-oriented suspension system, but they are fabulous drag-racing systems when used with street-oriented shock absorbers and spring rates.

Other options include ladder-type control arms such as those from Lakewood or Southside Machine—these help acceleration but not braking—and upgraded rear control arms, as you've already done (these mainly reduce flexing of the stock arms).

Drag-racing tricks include disconnecting one side of the front anti-roll bar, and front struts with little rebound dampening (90/10 drag struts). The idea is to get the front end to react upwards quickly, thus shifting weight rearward for better rear bite. They make street driving sloppy, to say the least, and we don't recommend them for such duty.

Obviously, the grippiest rear tires you can find are important. And don't worry too much about losing much rubber doing a burnout. A quick burnout—light smoke—puts useful heat into the tire without costing that much tread.

You may have noticed the stiffer anti-roll bars you added don't help acceleration traction. They improve cornering response, but the increased roll stiffness reduces fore/aft weight transfer in high-powered cars because the body rolls as well as pitches when you hit it with 550 bhp. It's a small thing, but refitting the stock front bar should help acceleration. It's all part of the sad fact that things that aid acceleration typically hinder cornering and vice versa.

PORSCHE DRIVING

I recently bought a 2005 Porsche Boxster and am very happy with it. The owner's manual says that oil changes are to be done every 20,000 miles. However, when I spoke to the service manager, she told me I should change the oil every 7500 miles regardless of what the manual says. My driving is typically done on both freeways and surface streets, and my driving style is not aggressive. Please advise.

Also, I overheard a Porsche salesman telling a new Carrera owner to take the car to very high speed and then brake hard repeatedly for the purpose of getting rid of the squeaks in the brakes. He said that easy driving on Porsches will result in squeaky brakes, and the heat generated from hard braking will burn out the "junk" accumulated on the brakes. I am very easy on my brakes and I'm starting to hear some light squeaks when the car comes to a slow stop. Do you agree with what this salesman said?

Vincent Chan
PALOS VERDES ESTATES, CALIFORNIA

Assuming you are using factory-specified oil, we'd lean toward the long oil-change interval as specified by Porsche. As for the brakes, bedding the brakes with five or six hard stops from 80 to 20 mph in rapid succession followed by a cool-down will often reduce squeaking. This process removes a glaze on the pad surface and transfers a film of desirable brake pad material onto the brake rotors.

MIX AND MATCH

Can different brands of tires be used if they are of the same size? As an example, can Michelins be put on the two front wheels and Dunlop tires on the two rear wheels as long as the size is the same? Also, can they be mixed on the fronts and rears, or should the same brand always be on the same sides?

Bill Adams
BUFFALO, NEW YORK

Mixing tire brands is not recommended, as handling characteristics can vary. If brands are mixed, however, do it by axle, not side to side. To use your example, Dunlops on the front and Michelins on the rear.

Do you have a technical question? Send it to RTLetters@hfmus.com, or Technical Correspondence, *Road & Track,* 1499 Monrovia Ave., Newport Beach, Calif. 92663. Be sure to include your first and last name, hometown and state.

ROAD TEST Summary

Make & Model	Issue	List Price[3]	Price as Tested[3]	Engine Type	Horsepower	0–60 mph, sec.	0–100 mph, sec.	¼ mile, sec. @ mph	Top Speed, mph[4]	Braking from 60 mph, ft.	Braking from 80 mph, ft.	Skidpad, g	Slalom, mph	Our Fuel Mileage, mpg
Acura NSX	3-02[13]	$89,000	$91,368	V-6	290	5.0	12.0	13.4 @ 105.9	175	117	215	0.91	65.8	18.4[2]
RL[1]	1-05	$48,900	$49,470	V-6	300	6.7	16.5	15.1 @ 95.1	130[5]	126	224	0.86	65.1	19.0[4]
RSX Type-S	9-05	$23,670	$24,240	I-4	210	6.7	16.6	15.0 @ 94.9	130[5]	132	235	0.83	67.1	22.3[2]
TL	4-04[17]	$32,650	$35,395	V-6	270	6.3	15.9	14.8 @ 96.6	147[5]	123	210	0.87	65.8	21.0[4]
TSX	10-04[17]	$26,490	$29,035	I-4	200	7.8	19.5	15.9 @ 90.4	130	133	237	0.78	64.0	24.3[2]
Ameritech McLaren F1	12-97	**$890,000**	**$1,131,120**	V-12	627	3.4	7.7	11.6 @ 125.0	**231**	127	215	0.86	64.5	11.5
Aston Martin DB9[1]	1-05	$155,000	$166,295	V-12	450	4.8	11.0	13.2 @ 110.0	186	133	231	na	65.5	12.0[4]
Vanquish	9-02[13,14]	$225,000	$249,826	V-12	460	4.7	10.8	13.2 @ 112.9	190	125	228	0.88	65.7	13.3
V8 Vantage	11-05	$110,000	$117,745	V-8	380	4.7	11.4	13.1 @ 107.9	175	**107**	197	0.96	68.6	17.6
Audi A3 2.0 T	7-05	$26,140	$29,585	I-4t	200	6.4	16.8	14.9 @ 94.8	130[5]	138	246	**0.71**	61.7	25.0[4]
A4 2.0 T Quattro	8-05	$29,450	$35,995	I-4t	200	6.4	17.5	14.9 @ 94.2	130[5]	120	215	0.86	65.5	17.9[2]
A6 3.2 Quattro[1]	4-05	$40,900	$45,370	V-6	255	7.0	17.4	15.2 @ 93.8	130[5]	129	227	0.84	61.6	19.3
A8 L[1]	5-05	$68,500	$73,570	V-8	330	6.5	15.4	14.8 @ 97.8	130[5]	127	219	0.82	65.5	13.9[2]
S4	8-05[19]	$46,100	$54,370	V-8	340	5.3	13.4	13.8 @ 101.7	155[5]	119	216	0.87	67.2	18.0[4]
S4 Avant	11-05	$47,100	$55,795	V-8	340	5.7	14.2	14.1 @ 99.7	155[5]	117	204	0.85	68.7	12.2
TT Rdstr 3.2 Quattro DSG	5-04[18]	$42,900	$47,415	V-6	250	6.3	15.8	14.7 @ 96.3	130[5]	118	209	0.86	66.7	22.9[2]
Bentley Continental														
Flying Spur[1]	8-05	$164,990	$171,190	W-12t	552	4.6	11.5	13.1 @ 106.7	195	118	210	0.86	64.1	12.0[4]
Continental GT[1]	9-04[18]	$149,990	$161,587	W-12t	552	4.4	10.8	12.9 @ 110.2	198[4]	120	213	0.84	63.8	12.4
BMW M3 Comp Cpe[19]	9-05	$47,300	$55,840	I-6	333	4.8	12.0	13.4 @ 105.6	155[5]	114	196	0.88	67.3	17.0[4]
Z4 3.0i	3-05	$40,900	$48,620	I-6	225	5.5	14.5	14.1 @ 98.8	155[5]	110	196	0.92	67.4	18.2[2]
330i	8-05	$36,300	$42,865	I-6	255	6.2	16.9	14.9 @ 94.1	130[5]	116	209	0.83	66.6	16.5
530i[1]	6-04[17]	$44,300	$54,120	I-6	225	7.2	19.2	15.5 @ 90.8	150[5]	131	231	0.83	60.7	21.1[2]
545i[1]	6-05	$55,000	$62,620	V-8	325	5.2	12.7	13.7 @ 104.0	150[5]	121	214	0.89	66.1	17.5[2]
645Ci[1]	4-04[17,18]	$69,995	$76,765	V-8	325	5.3	12.8	13.7 @ 103.6	149[5]	111	196	0.93	65.8	19.0[2,4]
745Li[1]	5-05	$73,300	$84,020	V-8	325	6.1	15.1	14.5 @ 98.6	149[5]	117	203	0.88	65.8	15.3[2]
Cadillac CTS[1]	6-04[17]	$30,490	$43,880	V-6	255	6.6	18.9	15.0 @ 91.9	149[5]	138	242	0.83	64.0	20.1[2]
CTS-V	2-04[17]	$49,995	$50,690	V-8	400	5.0	11.4	13.4 @ 109.0	163	115	202	0.87	66.0	17.1
STS[1]	8-04[17]	$46,800	$63,590	V-8	320	5.9	15.2	14.3 @ 97.5	155[5]	120	210	0.81	62.3	15.6
Chevrolet Cobalt SS	9-05	$21,430	$23,910	I-4s	205	6.2	15.9	14.8 @ 96.8	142	118	212	0.84	66.9	22.3[2]
Corvette Conv.	9-04	$52,250	$57,826	V-8	400	4.8	11.2	13.2 @ 107.9	186[4]	119	204	0.96	na	20.0[4]
Corvette Coupe	3-05[17]	$43,445	$53,545	V-8	400	4.5	9.8	12.8 @ 114.5	186	110	194	0.98	70.2	12.9[2]
Corvette Z06	12-05	$65,000	$71,595	V-8	505	3.9	8.8	12.2 @ 120.7	198	109	197	0.99	69.6	17.0[2,4]
Chrysler Crossfire	1-04[15,16]	$33,620	$34,495	V-6	215	6.7	16.2	14.9 @ 96.0	150	114	199	0.89	69.6	22.4[2]
Crossfire SRT-6 Conv[1]	S&GT[18]	$49,120	$51,195	V-6s	330	4.8	11.6	13.3 @ 107.5	158[5]	117	199	0.84	67.6	18.0[4]
300C[1]	5-04[17]	$32,370	$37,310	V-8	340	5.6	13.8	14.1 @ 101.1	126[5]	126	227	0.79	62.4	18.3
300C SRT-8[1]	3-05	$39,370	$45,295	V-8	425	4.9	11.5	13.3 @ 108.2	165[5]	122	208	0.90	66.5	16.0
Dodge Magnum SRT8[1]	11-05	$37,320	$43,035	V-8	425	5.2	12.2	13.6 @ 105.9	170	116	207	0.87	66.3	14.4
SRT-4	9-04[17]	$20,450	$21,780	I-4t	230	5.9	14.9	14.5 @ 98.4	148[5]	118	209	0.85	67.3	14.8[2]
Viper SRT-10	3-05	$81,495	$84,495	V-10	500	4.0	8.7	12.1 @ 119.3	189	112	197	1.02	71.4	10.0[2]
Viper SRT10 Coupe	12-05	$83,145	$87,190	V-10	510	4.2	9.3	12.3 @ 118.3	190	113	196	0.97	67.8	13.0[2,4]
Ferrari Enzo	7-03[15,16]	$643,330	$652,830	V-12	**650**	**3.3**	**6.6**	**11.1 @ 133.0**	218	109	188	1.01	73.0	13.3
F430	1-05	$171,000	$200,204	V-8	483	3.5	8.1	11.7 @ 120.1	198	113	192	na	na	12.0[4]
F430 Spider[19]	9-05	$195,000	$205,000	V-8	483	4.0	9.2	12.3 @ 116.9	193	**107**	191	0.90	70.9	11.6
612 Scaglietti[1]	9-05	$259,855	$269,829	V-12	532	4.6	10.2	12.8 @ 115.4	199	115	202	0.91	66.0	**9.4**
Ford GT	12-03[16]	$149,900	$150,525	V-8s	500	3.8	8.8	12.2 @ 121.6	190	117	199	0.99	69.5	15.0[4]
Mustang GT	12-04[17,18]	$24,370	$26,675	V-8	300	5.3	13.5	13.9 @ 101.4	143	131	233	0.84	64.9	18.0[4]
Honda Accord EX V-6 Coupe	3-04	$25,900	$26,360	V-6	240	6.3	15.7	14.8 @ 97.2	130[5]	127	228	0.81	63.9	23.3[2]
Civic Si	12-05	$19,999	$22,249	I-4	197	6.8	16.8	15.1@ 94.6	129	133	228	0.85	68.6	19.7
S2000	3-05	$32,950	$33,465	I-4	240	5.4	13.8	13.9 @ 100.2	156	115	206	0.91	69.7	23.3[2]
Infiniti G35 Sport Coupe	8-04[17,18]	$32,450	$34,010	V-6	280	5.9	14.2	14.4 @ 100.6	155[5]	112	199	0.92	66.7	18.4[2]
M45 Sport[1]	6-05	$49,550	$50,760	V-8	335	5.3	13.3	13.8 @ 101.4	145[5]	115	201	0.91	63.6	16.3[2]
Jaguar S-Type[1]	6-04[17]	$41,850	$48,795	V-6	235	7.9	21.1	16.1 @ 87.7	121[5]	130	232	0.83	63.4	21.1[2]
XJ8 L[1]	5-05	$62,830	$65,795	V-8	294	6.1	15.2	14.5 @ 97.9	121[5]	125	223	0.79	64.0	14.5[2]
XK8[1]	9-03[15,16]	$74,330	$75,650	V-8	294	6.1	15.3	14.5 @ 97.4	155[5]	125	222	0.85	64.0	19.0[2,4]
Lamborghini Gallardo	3-04[17,18]	$165,900	$183,905	V-10	500[6]	4.0	9.1	12.3 @ 117.4	192	110	194	0.95	68.6	13.0
Murciélago	5-02[13,14]	$273,000	$290,805	V-12	580	3.6	8.7	12.0 @ 121.0	205	122	213	0.90	65.7	10.0
Lexus GS 430[1]	6-05	$51,125	$61,180	V-8	300	5.7	14.3	14.2 @ 99.5	149[5]	126	219	0.85	64.8	17.6[2]
IS 350[1]	10-05	$36,000	$42,000	V-6	306	6.0	14.9	14.5 @ 98.6	142[5]	128	222	0.80	61.3	17.5
Lotus Elise	3-05[18]	$39,985	$44,460	I-4	190	4.6	12.4	13.3 @ 103.1	148	115	203	**1.03**	72.6	19.2[2]
Maserati GranSport[19]	9-05	$98,172	$103,522	V-8	395	4.8	11.4	13.2 @ 109.2	180	115	199	0.88	72.2	15.0[4]
Quattroporte	12-04	$95,500	$105,350	V-8	394	5.1	12.8	13.6 @ 103.6	171	109	197	0.88	65.8	15.6
Maybach 57[1]	9-03	$308,000	$315,500	V-12t	543	4.9	11.9	13.4 @ 106.4	155[5]	121	212	0.74	60.4	12.1
Mazda MX-5 Miata	10-05	$20,435	$27,610	I-4	170	7.0	21.5	15.4 @ 88.7	130[5]	112	200	0.86	67.7	23.0
RX-8	8-04[16,17,18]	$26,680	$33,100	R-2	238	6.1	16.1	14.6 @ 95.6	148[5]	110	193	0.89	68.4	13.8[2]
3s	7-04	$16,895	$18,305	I-4	160	8.0	23.3	16.3 @ 86.7	118[5]	127	238	0.84	65.2	26.6

Make & Model	Issue	List Price[3]	Price as Tested[3]	Engine Type	Horsepower	0–60 mph, sec.	0–100 mph, sec.	¼ mile, sec. @ mph	Top Speed, mph[4]	Braking from 60 mph, ft.	Braking from 80 mph, ft.	Skidpad, g	Slalom, mph	Our Fuel Mileage, mpg
Mercedes-Benz C55 AMG[1]	11-04	$53,900	$60,525	V-8	362	5.0	11.9	13.5 @ 106.6	155[5]	135	232	0.86	67.6	18.6[2]
CLK500[1]	4-04[17,18]	$52,800	$61,195	V-8	302	5.2	12.6	13.7 @ 104.5	130[5]	121	211	0.84	67.1	18.0[2,4]
CLS500[1]	6-05	$64,900	$72,300	V-8	302	5.4	13.7	13.9 @ 100.9	155[5]	113	200	0.86	64.7	18.0[4]
E320[1]	6-04[17]	$47,450	$50,360	V-6	221	7.4	20.3	15.8 @ 88.6	130[5]	124	225	0.85	64.0	21.1[2]
E500[1]	1-03	$54,850	$62,336	V-8	302	5.9	14.7	14.4 @ 98.8	130[5]	122	221	0.83	64.0	17.0[4]
E55 AMG Sport Wagon[1]	11-05	$83,320	$91,325	V-8s	469	4.4	10.3	12.8 @ 112.4	155[5]	118	218	0.85	62.9	12.1
ML500[1]	7-05	$48,500	$59,015	V-8	302	6.3	16.8	14.8 @ 94.2	130[5]	122	219	0.76	59.4	18.0[4]
S500[1]	5-05	$83,900	$86,530	V-8	302	5.8	14.7	14.3 @ 98.9	130[5]	133	247	0.77	60.4	16.8[2]
SL65 AMG[1]	1-05[18]	$179,000	$186,870	V-12t	604	4.0	8.3	12.0 @ 122.8	155[5]	115	203	0.90	65.8	12.1
SL500[1]	9-03[15,16]	$85,990	$98,365	V-8	302	6.1	14.8	14.5 @ 98.7	155[5]	113	203	0.90	64.6	17.7[2]
SLK55 AMG[1]	5-05[19]	$60,500	$68,075	V-8	355	4.5	10.6	12.9 @ 109.8	155[5]	113	201	0.89	68.3	17.0[4]
SLK350	3-05[17,18]	$45,500	$50,150	V-6	268	5.5	12.9	13.8 @ 103.9	155[5]	114	202	0.91	68.4	16.4[2]
SLR McLaren[1]	7-05	$450,000	$455,750	V-8s	617	3.5	7.5	11.5 @ 126.1	207	**107**	186	0.97	69.6	18.0[4]
Mini Cooper	2-02[13]	$18,000	$21,070	I-4	115	8.5	29.2[4]	16.6 @ 83.5	124	143	253	0.79	67.6	35.0[4]
Cooper S	1-03[15]	$19,300	$22,350	I-4s	163	7.7	20.7	15.9 @ 89.3	135[5]	121	217	0.87	69.5	26.0[2,4]
Mitsubishi Eclipse GT	6-05	$23,000	$26,895	V-6	263	5.8	14.4	14.4 @ 101.0	148	127	224	0.83	64.1	19.6
Lancer Evolution VIII MR	5-05[19]	$34,199	$35,594	I-4t	276	4.6	12.5	13.3 @ 105.9	155[5]	114	197	0.92	70.0	20.0[4]
Morgan Aero 8	6-05	$120,000	$124,450	V-8	325	4.5	11.0	13.0 @ 108.8	160	127	217	0.93	70.1	22.7
Plus 8	6-99	$59,000	$64,779	V-8	190	6.7	na	14.9 @ 91.1	130	**157**	**285**	0.86	61.0	17.7
Nissan Altima SE-R	7-05[19]	$29,300	$30,680	V-6	260	5.9	14.7	14.5 @ 99.4	150[5]	118	201	0.86	66.8	23.0[4]
Maxima 3.5 SE	5-03	$26,950	$34,420	V-6	265	6.5	16.5	15.0 @ 95.4	140[5]	134	233	0.81	62.1	21.0[4]
350Z 35th Anniversary	3-05	$36,100	$38,640	V-6	300	5.6	13.7	14.1 @ 101.8	155[5]	114	202	0.89	67.3	14.4[2]
Panoz LMP-1 Roadster S	4-02	$650,000	$680,000	V-8	600[4]	2.3	4.4	9.3 @ 148.0	181	108	161	1.52	na	na
Pontiac GTO	7-05[19]	$32,295	$33,690	V-8	400	5.0	11.9	13.5 @ 107.1	159[5]	129	226	0.84	64.1	18.0[4]
Solstice	10-05	$19,420	$23,095	I-4	177	7.4	21.5[4]	15.8 @ 86.8	120	114	206	0.88	67.0	21.0[4]
Porsche Boxster	5-03[15]	$42,600	$50,840	F-6	225	6.0	15.7	14.6 @ 96.5	157	113	199	0.91	68.6	21.1[2]
Boxster S	3-05	$53,100	$67,520	F-6	280	5.0	12.2	13.4 @ 105.0	167	**107**	187	1.00	**73.9**	15.4[2]
Carrera GT	6-04[17,18]	$440,000	$460,400	V-10	605	3.6	7.0	11.3 @ 131.6	205	124	199	0.99	71.1	11.0[4]
Cayman S	11-05	$58,900	$74,945	F-6	295	4.8	11.7	13.3 @ 106.2	171	110	190	0.96	71.7	18.0[2]
Cayenne Turbo[1]	11-03	$88,900	$94,980	V-8t	450	5.0	12.6	13.5 @ 103.3	165[5]	121	215	0.83	61.6	12.8[2]
911 Carrera S Coupe	3-05[17]	$79,100	$91,560	F-6	355	3.9	9.6	12.3 @ 114.8	182	108	**184**	0.98	71.7	16.2[2]
911 GT1	9-98	$1,000,000	$1,000,000	F-6t	600	3.4	6.2	10.9 @ 139.5	174	98	154	1.07	na	4.3[4]
911 GT2	8-01[12]	$179,900	$187,724	F-6t	456	3.6	8.9	11.9 @ 120.6	195	116	209	1.02	68.7	14.0[4]
911 GT3	1-04	$99,900	$118,250	F-6	380	4.2	9.5	12.4 @ 113.8	190	119	207	0.92	68.7	16.0[4]
911 Turbo	11-00[11]	$111,000	$118,365	F-6t	415	4.0	9.2	12.4 @ 115.6	190	119	208	0.96	67.8	16.0[4]
Ruf RTurbo	2-02	$200,000	$216,880	F-6t	520	3.8	8.1	11.9 @ 122.7	212	126	225	0.97	65.7	15.7[4]
Saab 9-3 Vector	10-03	$32,495	$33,120	I-4t	210	7.7	18.8	15.6 @ 90.9	146	116	209	0.86	64.8	24.0[4]
9-5 Aero	7-02[13]	$38,650	$40,412	I-4t	250	6.7	17.1	15.2 @ 94.4	150	126	224	0.83	63.3	24.4[2]
Saleen S7	6-03[16]	$395,000	$400,900	V-8	550	**3.3**	8.9	11.8 @ 119.9	220	125	230	0.99	70.6	11.0[4]
Saturn Ion Red Line	9-04[17]	$20,385	$21,755	I-4s	205	6.2	15.8	14.8 @ 97.1	144	117	204	0.85	67.6	16.0[2]
Scion tC	2-05	$15,950	$19,374	I-4	160	7.4	19.7	15.6 @ 89.9	127	126	225	0.82	64.0	23.8
xB	8-05[19]	**$14,245**	**$16,871**	I-4	108	9.4	**34.0[4]**	17.1 @ 79.7	**103**	134	244	**0.71**	57.9	33.0[4]
Subaru Impreza WRX														
Sport Wagon[1]	5-02[13]	$23,495	$26,036	F-4t	227	6.8	18.1	15.2 @ 91.8	149	146	265	0.76	62.1	20.0[2,4]
Impreza WRX STi	6-03[15]	$31,000	$32,550	F-4t	300	4.9	12.6	13.3 @ 103.0	147[5]	111	193	0.88	68.4	20.1[2]
Legacy GT Limited	10-04[17]	$28,495	$29,070	F-4t	250	5.6	15.5	14.3 @ 96.2	137	135	238	0.79	64.9	20.0[2]
Toyota Camry XLE[1]	2-03	$25,405	$31,484	V-6	192	8.7	24.7	16.7 @ 84.0	130[5]	127	225	0.75	62.1	21.9[2]
Camry Solara SE Sport[1]	3-04	$22,945	$24,514	V-6	225	6.6	17.2	15.0 @ 94.1	130[5]	123	223	0.76	61.8	20.4[2]
Celica GT-S	11-99[10]	$23,300	$25,000	I-4	180	6.8	18.2	15.4 @ 91.5	134	130	212	0.86	63.6	24.7[2]
Prius[1]	5-01[12]	$19,995	$20,450	I-4/Elec	**70**	**11.6**	na	**18.4 @ 77.8**	110	154	266	0.72	**57.5**	**40.3[2]**
Volkswagen New Beetle														
Turbo S	1-03[15]	$23,400	$24,050	I-4t	180	7.6	21.8	15.8 @ 87.7	130[5]	131	237	0.82	64.5	23.3[2]
Jetta 2.5[1]	5-05	$21,465	$26,740	I-5	150	9.8	28.4[4]	17.3 @ 81.4	129[5]	128	228	0.80	64.9	21.1
Passat GLX[1]	2-03	$28,750	$30,400	V-6	190	9.2	26.0	17.0 @ 84.2	130[5]	138	253	0.74	61.5	20.0[2,4]
Phaeton V8[1]	5-05	$64,600	$72,365	V-8	335	6.6	16.5	14.9 @ 95.4	130[5]	122	218	0.83	64.6	14.3[2]
R32	6-04	$29,100	$30,625	V-6	240	5.8	14.4	14.1 @ 99.2	130[5]	111	196	0.85	66.1	19.1
Touareg V8[1]	11-03	$40,700	$50,965	V-8	310	7.2	18.5	15.4 @ 91.5	130[5]	117	206	0.83	62.3	14.8[2]
Volvo S40 T5 AWD	8-05	$27,710	$31,965	I-5t	218	6.8	18.4	15.1 @ 92.6	130[5]	129	230	0.82	64.9	17.8[2]
S60 R	8-05[19]	$37,735	$44,605	I-5t	300	5.9	15.0	14.4 @ 97.7	155[5]	121	210	0.84	67.2	19.0[4]
S60 T5	7-02[13]	$34,025	$37,950	I-5t	247	7.0	17.9	15.5 @ 95.0	130[5]	138	241	0.82	61.8	24.5[2]
S80 T6[1]	6-04[17]	$44,525	$48,430	I-6t	268	6.7	16.7	15.1 @ 94.6	134[5]	134	240	0.80	62.3	21.4[2]
V40[1]	5-02[13]	$24,500	$26,975	I-4t	160	7.9	21.0	16.1 @ 86.5	134[5]	145	256	**0.71**	62.4	25.8[2]
XC90 AWD T6[1]	12-02	$39,975	$44,375	I-6t	268	8.8	24.4	16.6 @ 85.9	128[5]	131	233	0.77	60.5	17.0[4]

Data apply to the model at the time (issue date) of testing. Legend: For engine types, I is an inline design, F is a flat and R is a rotary. The number following the letter is the number of cylinders or rotor chambers. An additional letter, a "t" or an "s," designates turbo- or supercharging; **boldface**=extremes in that particular category, excluding nonproduction cars; red=newest entries; na=not available, na/U.S.; [1]automatic transmission; [2]comparison test; [3]price at time of test, some estimated; [4]estimated; [5]electronically limited; [6]DIN bhp; [7]from previous test; [8]altitude-affected; [9]aerodynamically limited; [10]also in 2000 Annual; [11]also in 2001 Annual; [12]also in 2002 Annual; [13]also in 2003 Annual; [14]2003 *Sports & GT Cars;* [15]also in 2004 Annual; [16]2004 *Sports & GT Cars;* [17]2005 Annual; [18]2005 *Sports & GT Cars;* [19]Road Test Update. Back issues: $8.95 each ($10.95 Canada; $15.95 other foreign) in U.S. funds. Send check or money order to *Road & Track*, Back Issues, P.O. Box 50191, Boulder, Colo. 80322-0191, telephone (800) 333-8546.

INTERPRETING THE NUMBERS: Factors that affect test numbers include air temperature, barometric pressure, condition of track surface, tune of test car.
When comparing cars' performances, look for the **Significant differences** in each category, as listed below. This is the amount of difference that is meaningful.
ACCELERATION numbers are obtained using drop-clutch starts and lift-throttle shifts. **Significant difference: 0–60 mph, 0.3 sec.; 1/4 mile, 0.5 sec.**
TOP SPEED is typically as reported by the manufacturer, but occasionally we measure it on a closed test track. Significant difference: 5.0 mph.
BRAKING distances are initiated when the pedal is touched, and just enough effort is used to avoid wheel locking; on cars equipped with anti-lock braking systems, the ABS is fully invoked. **Significant difference: 60–0 mph, 10 ft.; 80–0 mph, 15 ft.**
HANDLING is quantified two ways: The skidpad measures steady-speed cornering grip around a 200-ft.-diameter circle (run in both directions). The slalom, run through eight cones spaced at 100-ft. intervals, samples both controllability and grip during transient handling. **Significant difference: Skidpad, 0.02g; slalom, 1.0 mph.**
OUR FUEL MILEAGE is measured largely during urban driving and basically falls between EPA's city and highway estimates. **Significant difference: 0.5 mpg.**

Road Test UPDATE

PHOTOS BY JOHN LAMM

■ **The GXP and the tC both benefit from extra power. A pushrod V-8, left, propels the Pontiac, whereas a blower enhances the Scion.**

PONTIAC GRAND PRIX GXP

While the Grand Prix has been around since 1997 in the same basic body style, Pontiac has decided to inject some new life by fitting a smaller-bore variant of the Corvette's Gen IV small-block V-8 into this GXP version. While we enjoyed this 5.3-liter engine's easily tapped torque and 303 bhp, the Grand Prix does suffer from mild torque-steer effects that take some of the fun out of quick driving, especially when the pavement gets rough.

On the plus side, there's enough grip from the Bridgestone Potenzas (actually wider in the front: 255-mm section versus the rear's 225s) to encourage brisk cornering, and the seats are both comfortable and well bolstered.

And there are gadgets galore inside, from a head-up display on the windshield to a resettable g-meter that tells you not only how hard you've cornered, but how hard you've accelerated and braked. Unfortunately, the Grand Prix GXP lets us down with the quality of its interior plastics and some egregious exterior panel gaps, areas in which GM is working hard to improve.

—Douglas Kott

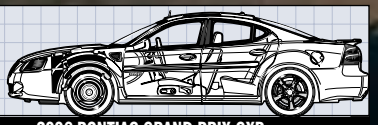
SCION tC WITH TRD SUPERCHARGER

The Scion tC is an attractive coupe in need of more power: Enter Toyota Racing Development, which recently released a California Air Resources Board-approved supercharger that bumps the output of the 2.4-liter 4-banger from 160 bhp at 5700 rpm to 200 at 6200 rpm, a 25-percent increase. Torque has multiplied too, jumping from 163 lb.-ft. at 4000 to 184 at 4200 rpm. Spinning the tC's front wheels has never been so easy, and the need for a limited-slip front differential has never been so apparent.

With the standard pulley, the centrifugal blower—a TRD design built by Vortech—makes 7 psi of boost, a level that doesn't necessitate an intercooler. Although the naturally aspirated 2.4 already has a torquey feel, the blown engine has an especially sweet midrange pull that makes passing at highway speeds a breeze.

At the test track, the supercharged Scion tC hits 60 mph in 6.9 seconds, a half-second quicker than the stock car. Better yet, when the $3200 blower (without installation) is installed by a Scion dealer, the tC's impressive 5-year/50,000-mile powertain warranty remains intact.

—Andrew Bornhop



2006 PONTIAC GRAND PRIX GXP	
List price	$28,735
Price as tested	$31,850
Curb weight	3680 lb
Engine, transmission	V-8, 4-sp automatic
Horsepower, bhp @ rpm	303 @ 5600
0–60 mph	5.9 sec
0–100 mph	15.4 sec
0–1320 ft (¼ mile)	14.4 sec @ 97.1 mph
Top speed	est 147 mph*
Braking from 60 mph	120 ft
Braking from 80 mph	210 ft
Skidpad	0.82g
Slalom	63.2 mph
Fuel mileage	15.8 mpg

*Electronically limited.

2006 SCION tC WITH TRD SUPERCHARGER	
List price	$16,200
Price as tested	$26,811
Curb weight	2980 lb
Engine, transmission	I-4s, 5-sp manual
Horsepower, bhp @ rpm	200 @ 6200
0–60 mph	6.9 sec
0–100 mph	17.1 sec
0–1320 ft (¼ mile)	15.1 sec @ 94.0 mph
Top speed	est 127 mph*
Braking from 60 mph	129 ft
Braking from 80 mph	227 ft
Skidpad	0.84g
Slalom	65.0 mph
Fuel mileage	est 19.0 mpg

*Electronically limited.

PHOTOS BY JEFF ALLEN

PHOTO COURTESY OF THE DALE LAFOLLETTE COLLECTION

■ **The large crowd made parking difficult.**

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