

# ROAD & TRACK

AUGUST 1991 \$2.95 CANADA \$3.95 UK £1.95

# BLACK MAGIC!

FIRST TEST:  
Lamborghini's  
Fire-Breathing Diablo

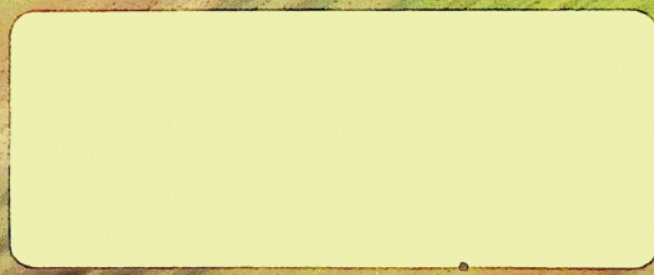


ALSO:

COMPARISON: 8 Euro Sedans Under \$30,000

CLEAN-AIR GASOLINE: Does it Work?

Dodge Stealth Convertible





Sawtooth Wilderness, Idaho:  
Take Highway 75 South, 3 miles  
past 4th of July Creek.  
Head towards the mountains on  
Forest Service Road 208 past  
the marsh and across the bridge.  
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left and continues through the  
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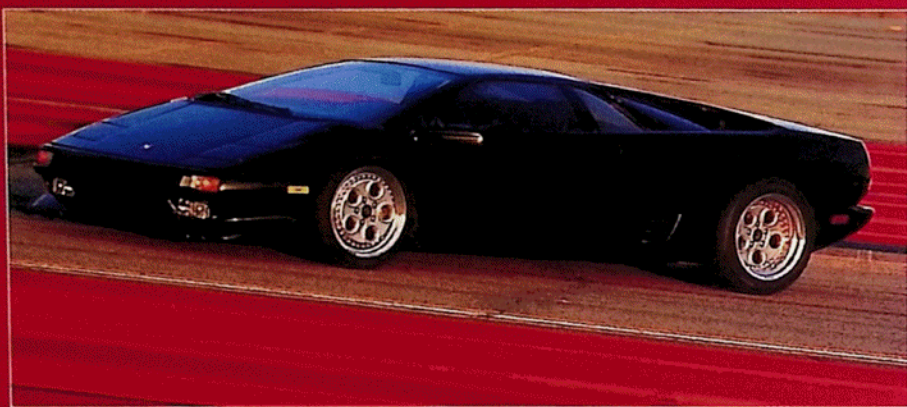


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# ROAD & TRACK

AUGUST 1991

VOLUME 42, NUMBER 12



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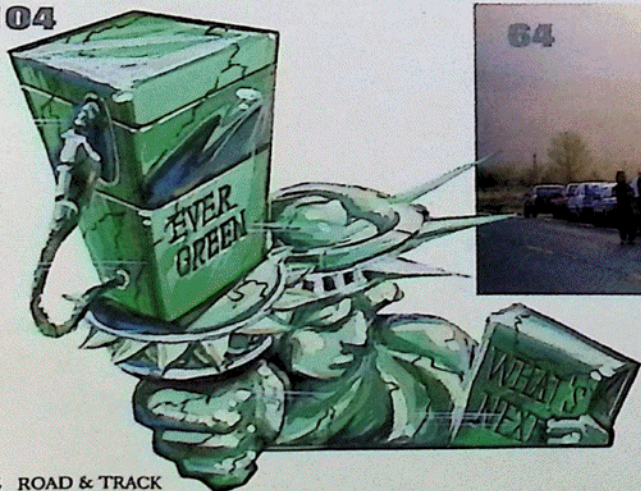
It's not so much a car as it is a phenomenon. Not so much a Countach successor as it is the heir to the Lamborghini throne. But sooner or later, the brass bands stop playing and the multivalve 5.7-liter V-12 starts. We tested the new Diablo as a car and discovered phenomena worthy of the Lamborghini name.

COVER PHOTO BY RON PERRY

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- Saab 9000S—*a comfortable, finely crafted Swedish package*
- Sterling 827SL—*a well-equipped Brit/Nippon amalgamation*
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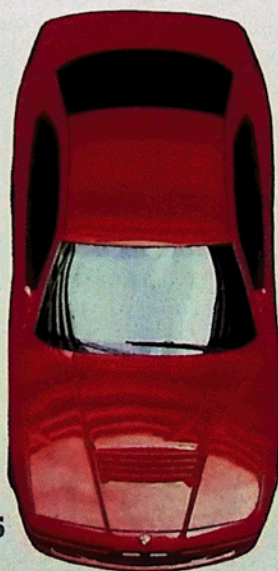
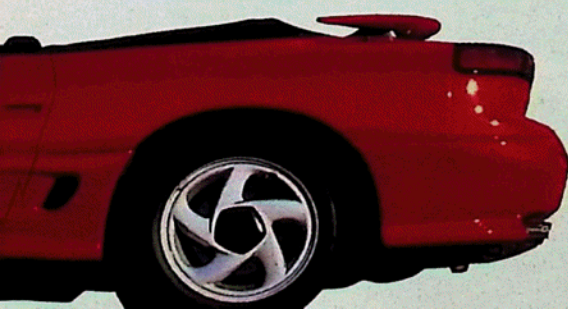
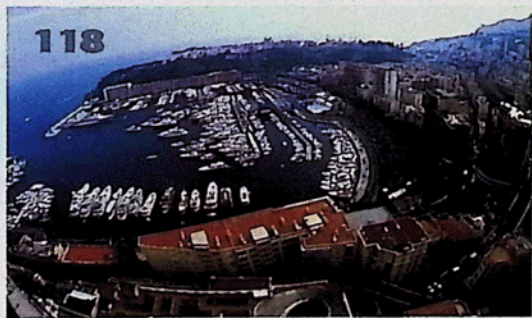
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You get three wishes.





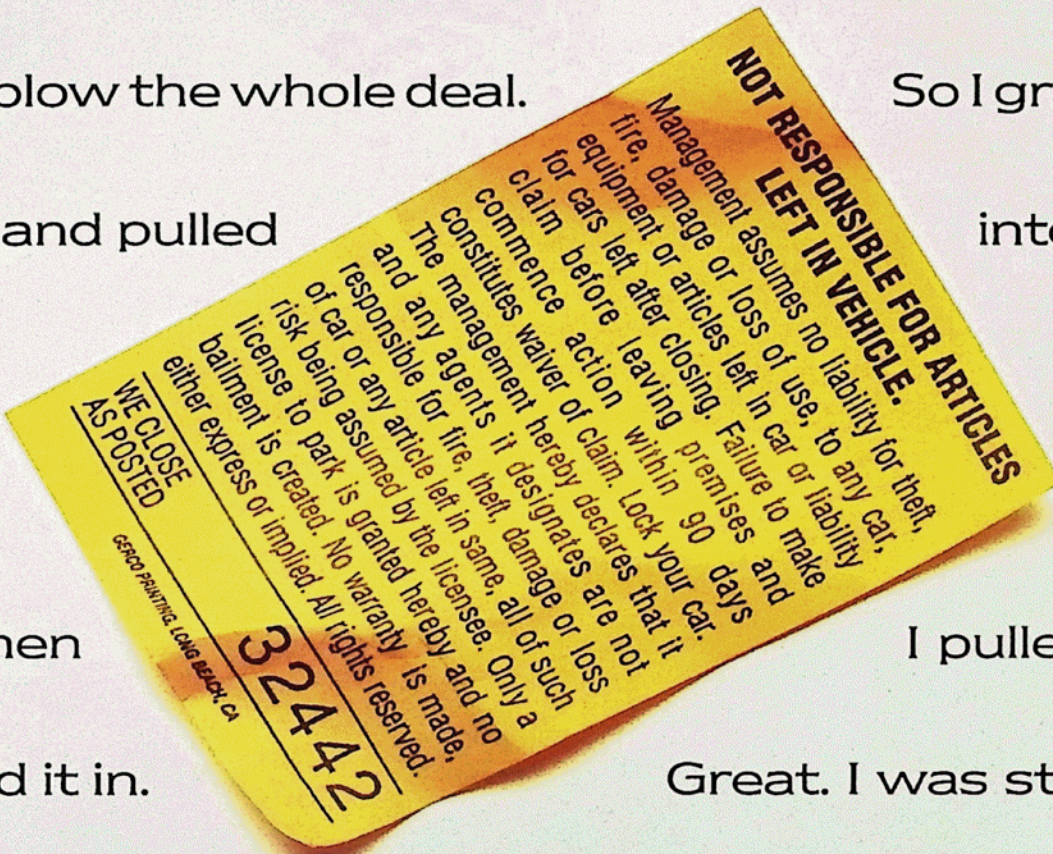


"I go roaring into the lot and bang!  
I get hit with: '75 cents for each 20  
minutes.' Unfortunately, I was going

to have to eat it. Showing up late for this job interview  
could blow the whole deal.

ticket and pulled

So I grabbed the  
into a space.



And then

I pulled out and

backed it in.

Great. I was starting to

freak. I checked my hair. 'Fine.' My teeth. 'Okay.' My tie. 'Too late now.' As I looked down I suddenly spotted it.

NOT RESPONSIBLE FOR ARTICLES

LEFT IN VEHICLE. I laughed!"



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you're doing"

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# PEOPLE & PLACES

To discourage hurrying motorists from ignoring signals and illegally crossing railroad **TRACKS**, the Texas Department of Public Safety has adopted the "Trooper on the Train" program. Law enforcement officers ride on a locomotive with note pads, video cameras and two-way radios trying to catch motorists crossing railroad tracks when the red lights are flashing and the gates are lowering. "If motorists don't have respect for their lives, they are going to have respect for their driver's license points," a spokesman for Southern Pacific railroad said.

A Mercedes-Benz 380SEL, advertised for sale in the classified section of *The New York Times*, comes with a feature that allows drivers to properly deal with back-seat pilots: "One owner since new . . . **ELECTRIC** chair in back."

Arnold Schwarzenegger has asked the Pentagon where he can obtain a **HUMVEE**, a Jeep-like all-terrain vehicle used in desert warfare. It costs approximately \$28,000 and has a top speed of 65 mph. According to a spokesman for LTV Corp., makers of the Humvee, Schwarzenegger wants the car because "It suits his image as tough and strong."

For sale in the *Greensboro News & Record* is a 1965 **HOUSTON** Healey Sprite. Say, didn't they make those in Austin?

Two teenagers in Des Moines, Washington redefined the term "**HARD LUCK**" after robbing a local bank. With loot in hand, they leapt into their car for a quick getaway, but the car did not start. So they got out and checked under the hood, only to discover that the battery had died. They then realized they had left both the car keys and the stolen money locked inside the car. With no way of getting back into the car, they decided to make a run for it, but ran straight into a passing police cruiser.

Advertised in the classified section of Michigan's *Grasse Pointe News* is a 1986 Toyota Celica GT "driven by professional woman, with great **BODY**."

According to a newspaper in Charleston, South Carolina, a **PASTOR** in the area protested his automobile repair bills by declaring to the repair shop, "Your estimate runneth over."

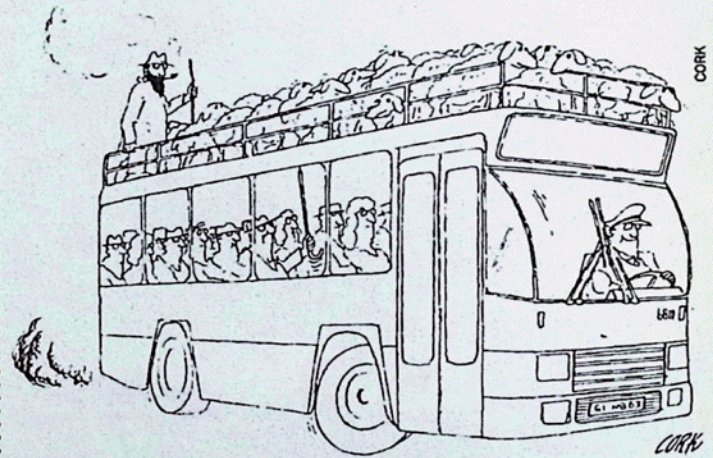
In an insurance book for sports-car rating factors, a Chevy Corvette ZR-1 is listed with an unusual option. Underneath its entry, in parentheses, is the word "**DIESEL**."

The sign of the times? Advertised in a Texas newspaper is a 1989 Mazda **MTV**.

They say getting them in the door is the first step in salesmanship. A car dealership in Nebraska promoted "the **SMOKINGEST** deal in town" by rigging an old Chevrolet with a smoke pot and controlled flames, making the car look as if it were on fire. According to a receptionist at the dealership, passing drivers slammed on their brakes, jumped out of their cars and dashed into the dealership to report the blazing car.

The following garage advertisement shows just how **UNMOTIVATED** some people can be: "Guaranteed engines, gearboxes, axles, etc. supplied and fitted some day."

Alamo Rent A Car has come up with an unusual gimmick, according to *The Wall Street Journal*: The company issues **RECEIPTS** that are waterproof, smudgeproof and shred-proof to survive "life on the road."

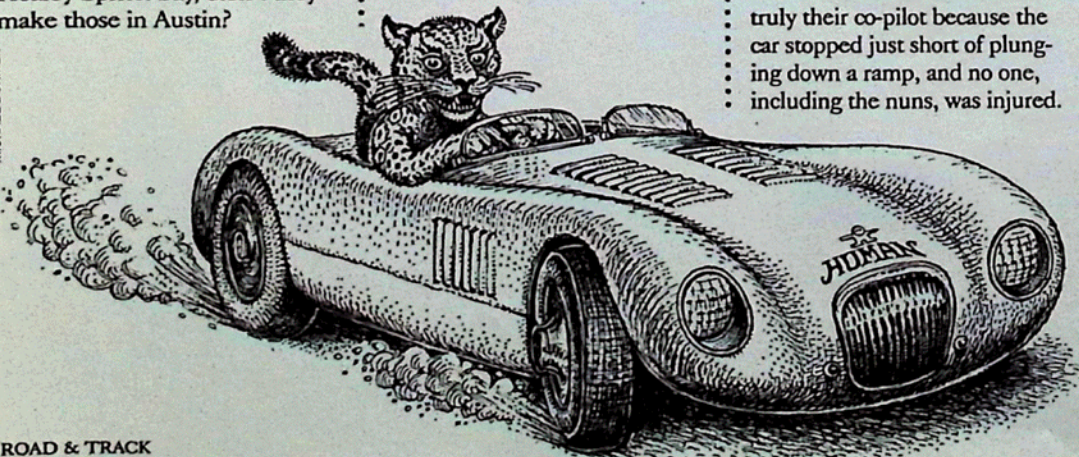


Two nuns in Toronto, Canada were taken for the ride of their life when the floor carpeting of their car became entangled with the gas pedal and the car accelerated out of control. According to a Canadian newspaper, the car sped across a parking lot and shot through a busy intersection narrowly missing a pedestrian and several cars. But **GOD** was truly their co-pilot because the car stopped just short of plunging down a ramp, and no one, including the nuns, was injured.

According to *Environmental Engineering News*, city officials in Jakarta, Indonesia confiscated about 100,000 cycle **RICKSHAWS** in seven months and dumped them into the ocean to "reduce traffic congestion."

Some people consider cars to be much more than transportation; they consider them pets, or even friends. According to *The Los Angeles Daily News*, a Thousand Oaks, California resident calls her 1988 Camaro the Red Hot Heartthrob **PASSIONMOBILE** "because it throbs like a burst of energy . . . communicates vibrantly and has great appeal to the eyes." Another explained that because her 1973 Chevy van is always ready to go, she has named it Van Go.

MICHAEL DORMER





*“We’re convinced if it had been any other automobile my husband would not have lived through his accident.”*

Christine Gutterman, Sarasota, FL.  
Driving: 1988 760 Turbo Wagon



*“I’m certain I escaped injury or possibly even death only because I was driving a Volvo.”*

Carol Wagner, Roseville, MN. Driving: 1978 240 Sedan



*“There was much talk at the rescue scene that the Volvo had saved our lives.”*

Joseph Taylor, Sherman, CT. Driving: 1987 240 Sedan



*“The police and others at the scene of the accident said the seat belt and my Volvo saved my life.”*

Claudette Austin, Warwick, NY  
Driving: 1981 240 Sedan



*“I believe I’m alive for two reasons. I was wearing my seat belt and I was in a Volvo.”*

Dawn Gregerson, San Clemente, CA. Driving: 1980 240 Sedan

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**Winston**

# LETTERS TO THE EDITOR

## We got the beat

To say I enjoyed your Dodge Stealth/Chevrolet Corvette comparison ("Different Drummers," May 1991) would be an understatement. I felt that Douglas Kott was extremely open and honest with the reader and truly understood the character and essence of the automobiles. While I have never driven a Dodge Stealth R/T Turbo, I do own a 1990 Corvette L98, and there was not a single word written that I would disagree with. Thank you.

Kenneth M. Petty  
Fairfield, Ohio

## Yes, but . . .

I was not a bit surprised that the Stealth was faster than the Corvette from 0-60 mph and in the quarter mile. However, I was shocked to hear that the Corvette demonstrated greater slalom

ask if this was a competition at all. The Stealth is a superior vehicle. End of argument, no contest.

Larry Reich  
Wainwright, Alberta  
Canada

Everyone knows that the Corvette will be around longer than the Dodge Stealth R/T Turbo.

Gregory Johnson  
Brooklyn, New York

It's nice to know the Dodge Stealth R/T Turbo is faster, cheaper and more technology-laden than the Corvette L98. But the Stealth offers even more: things like a rear seat and an exclusivity that's absent on the see-everywhere Vette. Also, the R/T Turbo's all-wheel drive makes the Corvette's horrific wet-weather road behavior an anachronism.

And why the Stealth's relatively slow

*duction, while the Dodge Stealth was tested at our usual California test track. Different road surfaces can produce notably different results.—Ed.*

## Off-beats

Your recent comparison between the Dodge Stealth and Chevrolet Corvette illustrates, more than anything, the high cost of driving fun these days. Considering their sticker prices, a more viable car that nearly matches these two in acceleration and slalom speed is the 5.0-liter Ford Mustang LX/GT.

The Mustang is certainly not perfect, given its humble origins and the age of its design, but it does provide the basics that many people want in a high-performance car while requiring a minimum of dollars and effort to keep on the road—all for about \$14,000.

M.M. Madden  
Brecksville, Ohio

Unfortunately you missed it. "Different Drummers" was a fine comparison of two fine cars, both of which are worthy of the lust of the average college student. But you failed to include the real winner in this class, the Nissan 300ZX Turbo. The Z is comparable in performance to both cars, its sticker is in between the two, and it corrects the faults of the Vette and the Stealth. The Z is better looking than the Stealth and screwed together better than the Vette. Ergonomics and long-term reliability are far and away superior to anything Chevrolet or Dodge (Mitsubishi) will ever offer.

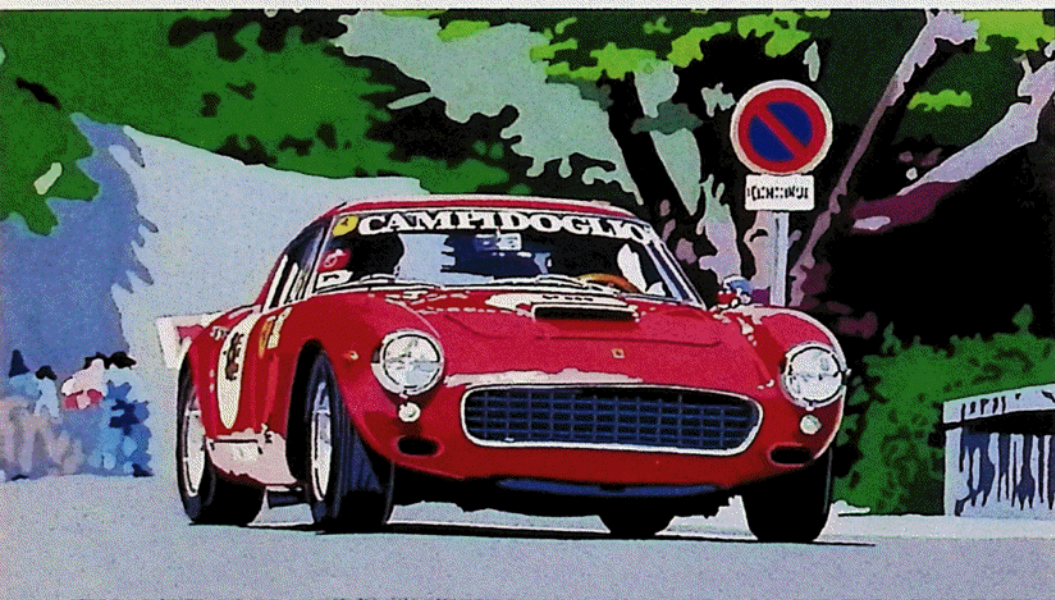
Next time, be sure to include the class leader, not just a couple of the also-rans.

Keep up the good work.

Glenn Peter Gottfried  
De Land, Florida

## Few options

I'm sick and tired of reading about available options on certain autos. Case in point: In your May 1991 issue, you listed the few available options for the BMW 525i as leather, heated seats, limited-slip differential, alarm and phone. Having been spoiled by heated seats on my 1988 325i convertible, I wanted them again for my new 525i.



MARC DE RUCK

speed (64.4 mph versus 63.2). After considering the width and 4-wheel steering of the Stealth, I went back to the September 1990 issue and found that the Mitsubishi 3000GT VR-4 (the Stealth's twin) has a slalom speed of 66.8 mph. Also, the Mitsu-built cars have greater fuel economy, better braking from 60 mph and a host of standard features that the Corvette does not provide. When considering that the Corvette is \$6855 more expensive, I must

slalom speed of 63.2 mph? Especially since the car's mechanical twin, the Mitsubishi 3000GT VR-4, is the slalom record holder in R&T's Road Test Summary. Was there a boulder tied to the back of the Stealth? Or maybe it was forced to tow the Vette through the pylons because it was raining.

Brian N. Odell  
Ballwin, Missouri

*The Mitsubishi 3000GT VR-4 was tested on an airfield in Hawaii at its intro-*

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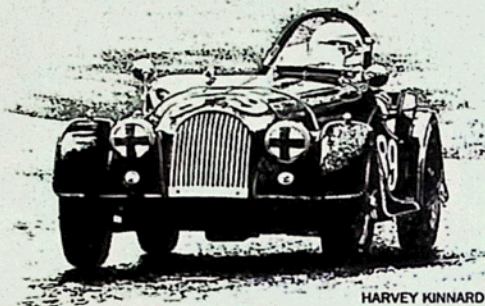
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The dealer's computer razed at me. Only two cars were available in the Southern California area, and none in the color I desired. The choice boiled down to color or option and I reluctantly settled on color. The same situation occurred when I helped a friend buy a new Toyota MR2.

If carmakers are going to advertise their "options," they should actually make them *available*. Or start making their cars as modular as possible.

James Lani  
Orange, California



## Why was it SHO slow?

Your "Four American Flyers" article in the May issue is interesting, concise and for the most part accurate as I, a Taurus SHO owner, can attest. I do, however, take exception to your performance statistics. Your October 1988 test results list a 0-60-mph time of 6.6 seconds and a quarter mile time of 15.2 sec. My car will easily exceed these results at Denver's 5000-ft. altitude. In due respect, it does take seat time to learn to shift quickly, especially the 1-2 upshift so noted in your article.

Alan R. Applegate  
Lakewood, Colorado

*We discussed our 7.6-sec. clocking to 60 mph with Ford and found that it was fairly close to Ford's internal test numbers, which are gained without clutch abuse. Incidentally, the SHO that hit 60 mph in 6.6 sec. was a pre-production model at Ford's proving ground.—Ed.*

## Probably so

When I bought my Taurus SHO in June 1990, the salesman told me they had one in the back that another salesman had rolled at 120 mph. Then I read in the February 1991 issue about the Shogun and its engine that came from a rolled SHO in Dallas. I wonder . . .

Billy James  
Irving, Texas

## Listen to Lucas

I was disappointed to read the derogatory reference to Lucas in your Febru-

ary 1991 issue (Side Glances, page 18). Perhaps I might be permitted to set the record straight.

Lucas today is a major international manufacturer of aerospace, automotive and industrial components and systems with annual sales in excess of almost \$4.5 billion. Our automotive products are used by virtually every car manufacturer in the world, and Lucas holds 127 quality awards from 47 companies, including the Big Three carmakers.

The company's product range encompasses high-tech engine management and braking systems, vital for vehicle performance and safety, together with a growing range of purpose-designed automotive electronics and on-board computers. Lucas technology is licensed to many companies around the world; for example, some 50 percent of Japanese cars, including many top-of-the-range models, are fitted with Lucas-designed brakes.

This expertise now extends far beyond automotive products. Sales of Lucas minicomputer software alone last year exceeded \$500 million. Our computers are used in numerous NASA projects and have been chosen to program-manage the Freedom permanently manned earth-orbital space laboratory and logistical station planned to be fully operational by 1998.

So, while we at Lucas can take a joke, perhaps it is time that these hoary old stories were laid to rest out of respect for the leading vehicle and other companies worldwide that choose to buy our products for their quality, dependability and performance.

M.D. Savage, President  
Lucas Automotive  
Troy, Michigan

## It's not just us . . .

After reading your Long-Term Update on the Mazda MX-5 Miata (May 1991), it appears that Mazda has indeed built a copy of the British sports car of the Sixties. At least when you

consider component reliability or lack thereof. The only thing Mazda missed, to date, is the Lucas electrics. I hope there's room in the back for a toolbox, a Haynes manual and coveralls.

Jim Stouffer  
Chambersburg, Pennsylvania

## Hits and myths

If Joseph Campbell had lived long enough to understand but one more myth, one more totem, it would have been an MG and the Beowulf of them all, the K-3 Magnette. I have installed the Reverend (Phil) Hill's article (January 1991 Salon) with my other holy relics: the Folsom point, the Gettysburg Minié ball, the lower jaw of an Amazonian piranha and the fountain pen of Robert Frost . . . my medicine bundle is complete.

Justin Isherwood  
Plover, Wisconsin

## Hear, hear

The statement in my June story ("Sound-System Update") that "A DSP unit can re-create the artistic ambience of a jazz club, concert hall, stadium, or church . . ." should, of course, read "*acoustic* ambience." There are some things even digital technology can't do.

Ivan Berger  
Technical Editor, *Audio*  
New York, New York

## Dyslexia?

Spotted at a local Oldsmobile dealer:



Is it dyslexia or quality control?  
John P. Petrali  
Churchville, Maryland

## INQUIRIES

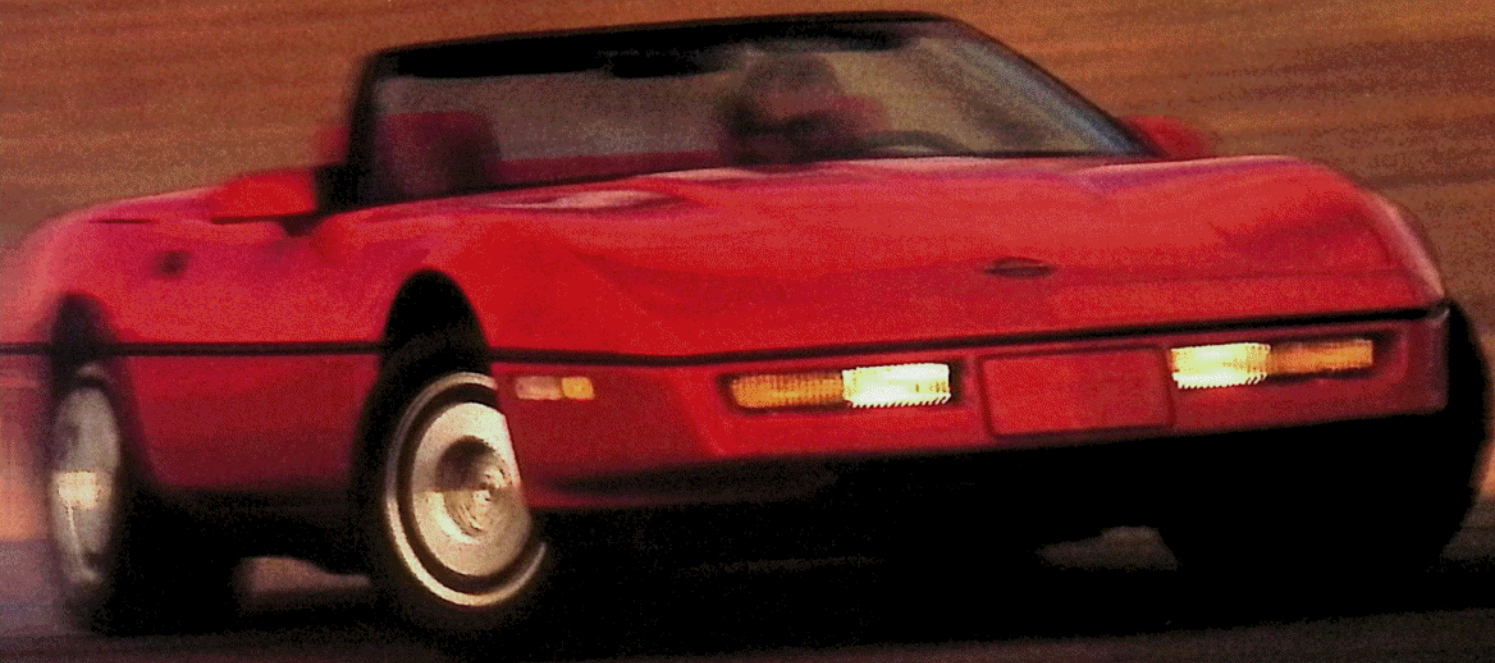
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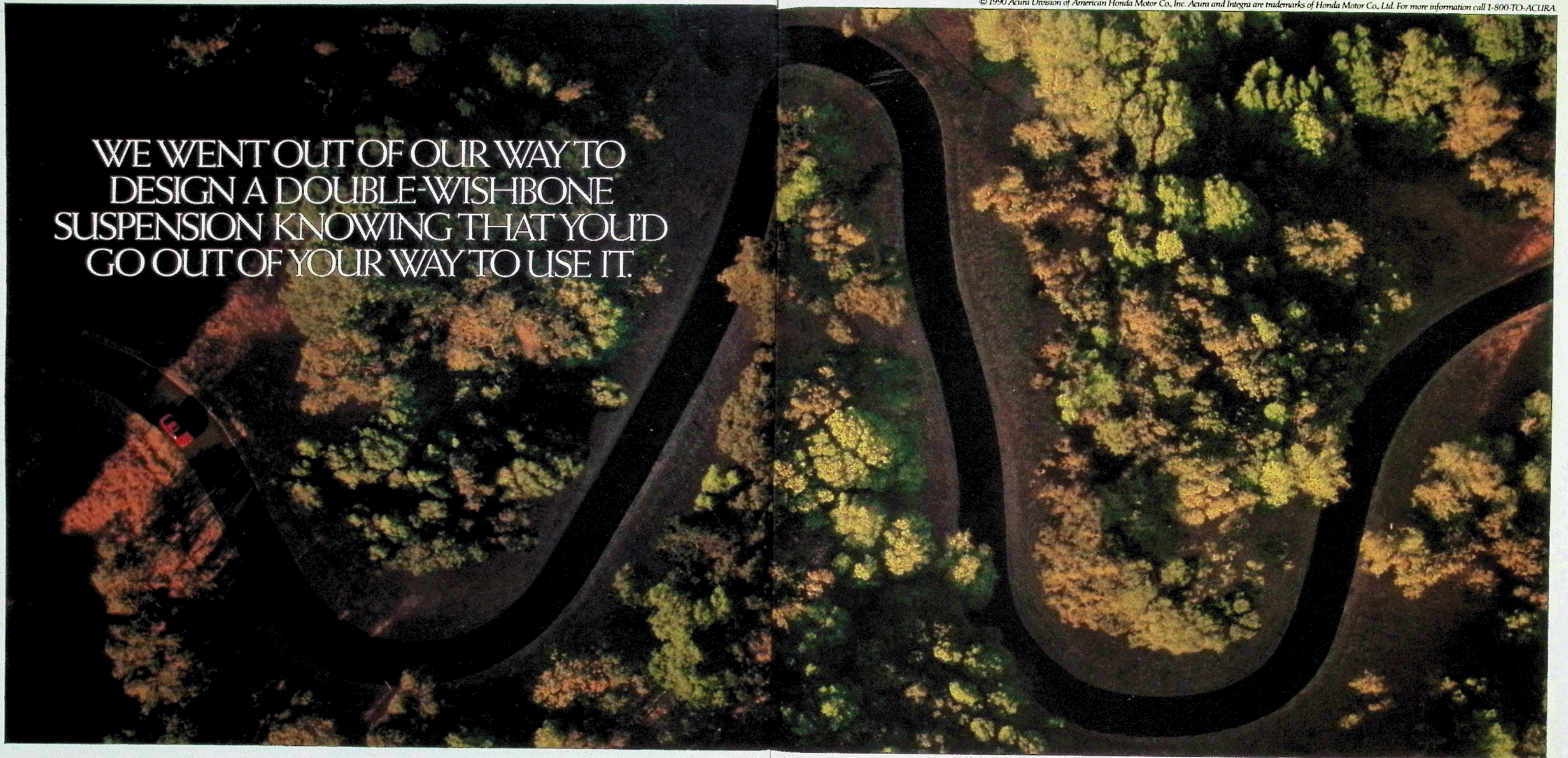


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DESIGN A DOUBLE-WISHBONE  
SUSPENSION KNOWING THAT YOU'D  
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Bumps. Dips. Decreasing radius turns. All things that could easily upset a car's balance. Not to mention a car's drive precisely through twists, turns, corners and curves while providing a solid, comfortable ride. Unless of course you happen to be driving a 1991 Acura Integra. Its responsive 4-wheel double-wishbone suspension system provides a comfortable ride. In other words, sit back, relax and enjoy the road. You're glued to it.

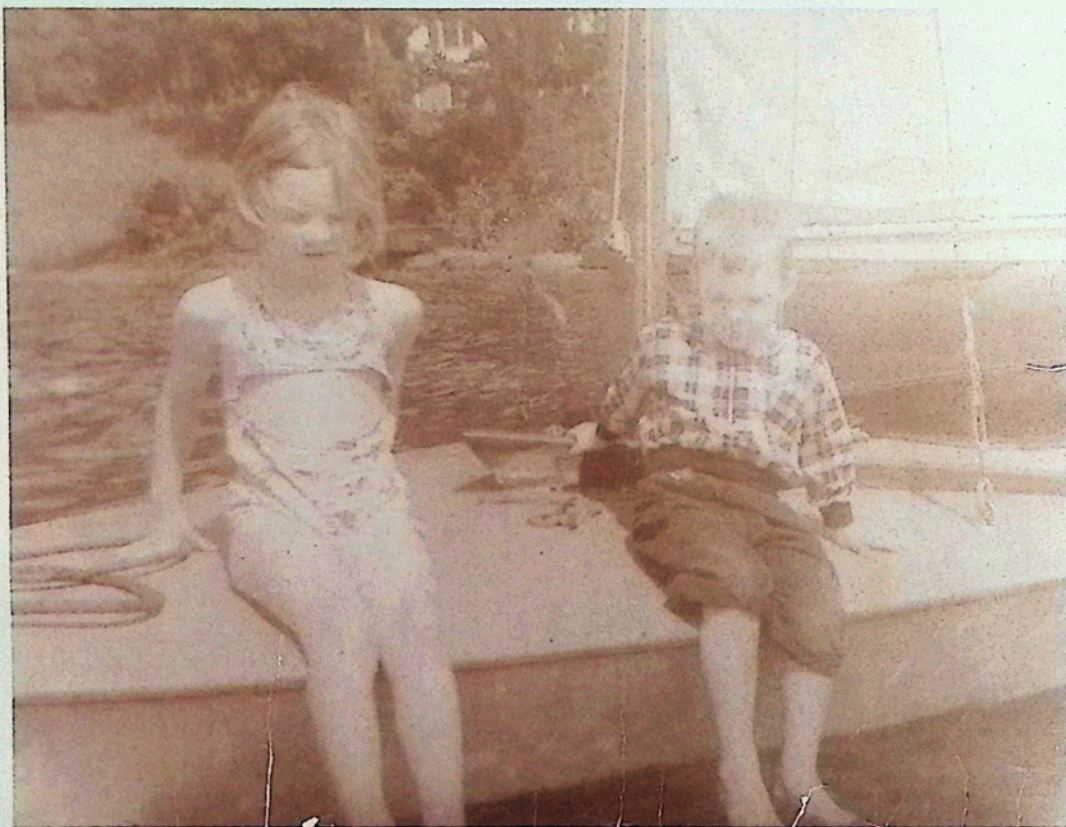




# SIDE GLANCES

BY PETER EGAN

## Wooden boats



**A** FRIEND OF mine in college once suggested that there were two types of people on earth: those who favor shiny, glossy things and those who don't.

These random bifurcations of the human race are generally more inflammatory than instructive, but at least they make for lively arguments when there's nothing on TV or you are driving from Bakersfield to Fresno. In any case, I've always thought that this particular sweeping generalization could be backed up by at least a small body of evidence.

I went to high school with guys who, when they got all dressed up for a prom or some other formal occasion, wore smooth black shoes with a high shine, slicked their hair up with some highly reflective oil product and tended to wear suits of hard fabric with sharp creases, sometimes with a kind of greenish aurora-borealis luminescence

about them. These same guys were often attracted to diamond tie tacks and large rings. And big flashy cars with good wax jobs and lots of chrome. They enjoyed going through life with polished shiny things, reflecting light on all those about them. Looking sharp.

Others among us (I suppose I fell into this group) seemed drawn toward clothing, cars and possessions that absorbed light to some extent, or at least contained a high contrast between glossy and obscure surfaces. Dressed for the dance, we showed up in slightly tweedy fabrics—usually in some color that seemed to be celebrating the annual peat harvest—and wingtip shoes with lots of tiny light-absorbing holes drilled in their shine. The look was more like one of those Edward Koren cartoons in *The New Yorker*, where college professors and beatniks at parties appear to be nothing but human-shaped tornadoes of wool.

In cars, we eschewed excess chrome and metallic paint, favoring solid colors set off by the heavy texture of wire wheels, canvas tops and leather upholstery (the more wrinkled and broken-in, the better). The sports-car boom, particularly the prevalence of English sports cars (which have more texture than downtown Stratford-on-Avon), dovetailed nicely with this sensibility. Even Italian and German sports cars, though more of the shiny-toy school than the British cars, had their fine touches of leather, wood and woven material to offset the gleam.

Porsche owners, of course, could always tone down the embarrassing gloss of too much shiny paint by throwing a leather "bra" over the nose. (BMW motorcycle owners, by the way, often do the same thing, covering their gas tanks in flat-black leather, presumably saving the superb finish beneath for... for whom? And when? Best not ask.)



## HAVEN'T WE MET SOMEWHERE BEFORE?

**Mazda Miata** It may have been thirty years ago, or just yesterday. A little two-seater caught your eye, and you've never been quite the same. Memories like this created the Mazda Miata. A product of both dreams and advanced technology, it's the perfect reason to pursue your love of the classic sports car.

Slip into the cockpit and you're greeted by snug, supportive seats and traditional round analog gauges. Twist the key and the 1.6-liter DOHC engine answers with a throaty growl—a note tuned to perfection by testing more than 100 exhaust pitches.

As you snap through the gears with the short-throw shifter, the front-engine/rear-drive layout and four-wheel double-wish-bone suspension combine to deliver razor-sharp handling. There's little doubt that the Miata is a purist's dream.

Yet this is one dream car that's also thoroughly down to earth. It may well be the most trouble-free sports car you'll ever own.

Even the most jaded critics have fallen head over heels. Every major automotive magazine judged Miata to be one of the best cars in the U.S. In fact, *Road & Track* named it "One of the Ten Best Cars In The World."\* Kind of makes it hard to resist, doesn't it?

So stop torturing yourself. Look up your Mazda Dealer, and take the Miata for a spin. You might just fall in love with a roadster. For the first time, or all over again.

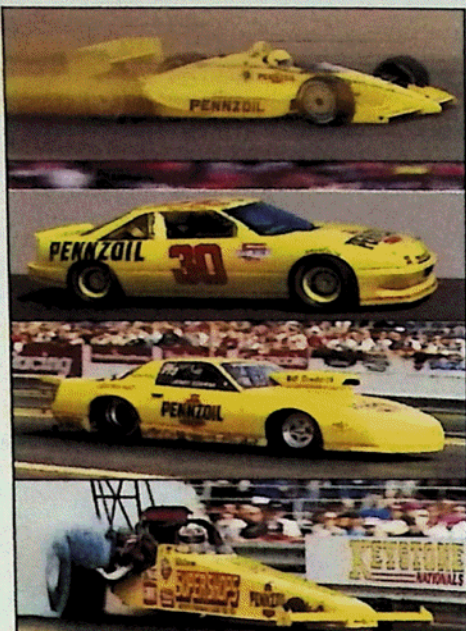
### 36-MONTH/50,000-MILE WARRANTY

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Psychologists, I suppose, might tell us that people who like shiny things are open, outgoing, happy and non-judgmental, while those who lean toward the chiaroscuro are introverted, critical and moody (good journalist material). As I place myself generally in the non-shiny class, I'm sure the group profile is unflattering and I won't pursue the personality ramifications any further.

**F**or years I wondered where this direction in taste came from. Why the difference? Why did I walk past a Mako Shark at a car show to look at a Morgan Plus 4, while my friend lingered over the Corvette? Why did I have this lethal weakness for cars with ash frames and dry rot, while my colleagues bought low-maintenance metal or fiberglass cars without so much as a whiff of compost mold under the carpets? Why did I buy cars that leaked and sprayed cold water all over me when it rained, while others drove cars that were warm and dry inside? Why did I prefer the flapping of a tonneau cover to the glide of an electric window?

Genetics? Environment? A faulty education? Was I frightened by fire trucks or circus horses? Rejected by a Las Vegas showgirl at a tender age?

The answer finally arrived in the mail about a year ago.

It was a flat package sent for my birthday from my dad. I opened it and found he'd made a new, framed enlargement of a fading photograph from my early childhood.

It was a picture of his old sailboat.

A trim little 15-foot Snipe at White Bear Lake in Minnesota. My sister and I were sitting on the deck with our toes dangling in the water. She was 8 and I was 4. A view through the looking glass, not too darkly, at another time.

It was all there: a luffing sail of soft wrinkled cloth, slightly yellowed and off-white, sepia toned in real life and more so now; a canvas-covered deck, painted light brown as I recall; and a tan hull of wooden planks with small lake waves lapping against it. A varnished wood tiller, mast and boom with the grain showing, brass cleats and fittings on the deck; cables, turnbuckles, tarnished brass screws.

The cockpit was small and snug relative to the large area of deck, protected from spray by V-shape splashboards. Ropes and pulleys everywhere. When sailing, we wore kapok and canvas life jackets with straps and buckles. A hardware-intensive environment of wood and cloth held together by bits of metal.

Looking at the picture, I could smell

the boat and the brownish unballed water that shifted back and forth just beneath the floorboards in the cockpit and was slightly fishy with the usual acorns, leaves and twigs floating around. You didn't want to drop your sandwich down there.


In the background of the photo is the ragged green shoreline of summer trees, with the chimneys and dormers of Mah-tomedj village poking out here and there. We lived in a small, cottagelike house back in those trees. We usually

**Why did I buy cars  
that leaked and  
sprayed cold water all  
over me when it  
rained, while others  
drove cars that were  
warm and dry inside?**

drove down to the landing, and my dad let us ride in the trunk of his Kaiser with the sail bag, dinghy oars and life jackets. He said it was okay because the ride was only three blocks, and the oars would keep the trunk from locking us in.

**I** examined the picture for a long time, absorbing the detail and thinking about the boat. It hit me then that nearly everything I like most about older cars goes back in some way to that sailboat.

Not just cars, either. It extends to a preference for fabric-covered airplanes with wooden propellers and seemingly a hundred other things with low durability and high maintenance as the price of charm. The picture made me realize that I've spent most of my life mesmerized by alternate versions of that boat, with either wheels or wings attached. It must have had a powerful effect.

An oversimplification? Maybe. We are affected by so many things while growing up that it may be a mistake to give too much credit to a single object, and I don't mean to overemphasize the possible life-complicating influence of just one small wooden sailboat. But if I had kids and didn't want them filling my garage later in life with musty old parts from early British roadsters, I would never take them sailing in a Snipe or any boat remotely like it. I'd look for fiberglass, or something shiny. 

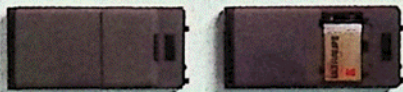


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I HAD THIS DREAM I WAS TRAPPED IN DULLSVILLE.



I HAD DULL NEIGHBORS.



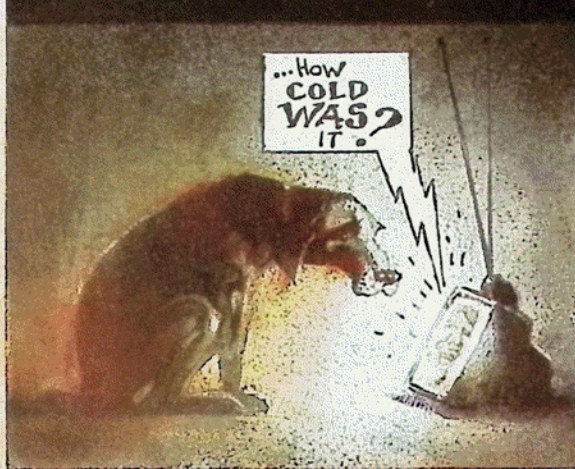
A DULL HOUSE.



NO, A DULL HOUSE.



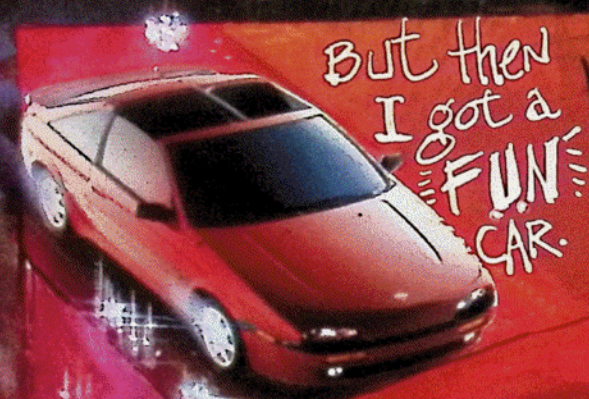
I EVEN HAD A DULL DOG.



LIFE...



WAS DULL.



But then I got a FUN CAR.

THE NEW NISSAN NX™

AND I BECAME the KING



So I took MY NX and LEFT.

-it was SO COOL!

Life... was FUN.



I Zipped AROUND and the TOWN CAME ALIVE.

BECAUSE there WERE other TOWNS in NEED of HELP.

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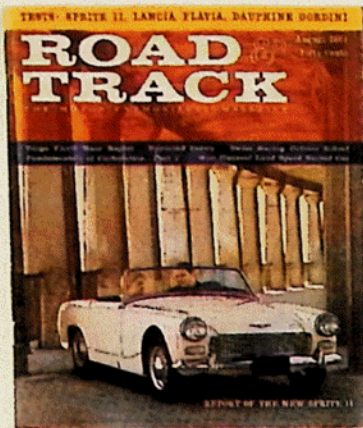


The new Nissan NX2000. 140-hp engine. 0-60 in 7.7 seconds.\* 31 MPG! Standard driver's side air bag. Viscous limited slip differential. Extra wide tires. Optional T-Bar roof and ABS brakes. Does that sound fun or what?



Call 1-800-NISSAN-6 for more information. Smart people always read the fine print. And they always wear their seat belts. \*Source: Motor Trend, 1991. 1991 EPA highway estimates. Use these estimates for comparison.

# YEARS AGO



- Other road tests? The \$3685 Lancia Flavia and \$1596 Renault Gordini.
- Bruce McLaren tried Colin Chapman's new Lotus 20 and got down to the Formula Junior lap record in just 5 laps of practice. More impressive than its 125-mph maximum speed were its amazing road-holding manners.
- Remember Peugeot's delightful Bébéc? According to one story, the diminutive oldtimer was designed by an obscure cycle manufacturer named Etore Bugatti in 1911.

# 30

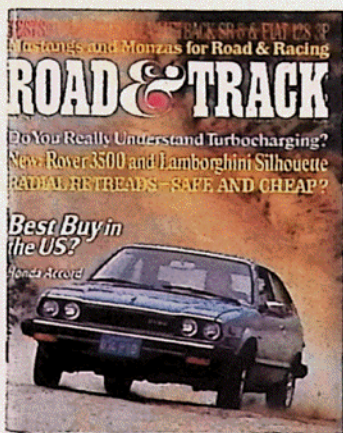
years ago Austin-Healey's latest, the Sprite II, made our cover. Like the first Sprite—the Bugeye (a pricey \$7000 to \$12,000 collectible today according to Peter Bohr's classic-car buying guide in our June 1991 issue)—this \$1858 variant offered “more fun per dollar than anything we had driven for a long time.”

1939 BUGATTI 57C Gangloff conv. cpe. Total mileage less than 50,000 kms, absolutely original, hyd. brakes, supercharged. Dark blue with perfect red leather upholstery, eng. No. 57786. \$4500. O. A. "Bunny" Phillips, "Bugatti Service" since 1928, 8724 E. Garvey Ave., So. San Gabriel, Calif., AT 0-3168.

- In the Targa Florio, Stirling Moss led most of the race until the differential in his Porsche ran dry. Then Wolfgang von Trips brought home the win for Ferrari.



- What comes to mind when you hear the name Raymond Loewy? “Studebaker,” sure, but don’t forget “controversial.” The flamboyant industrial stylist designed his last important car project, the Avanti, in 1961.
- Jaguar advertised the all-new E-Types on our back cover, inventing the moniker XK-E.



# 15

years ago the \$3995 Honda Accord on our cover was the best automotive buy in the U.S.

- IMSA drivers Mike Keyser and Charlie Kemp assisted us in a track test of racing and

- James Hunt crossed the finish line first at the Spanish Grand Prix, so he was victorious—right? Nope, Niki Lauda won. The Brit was disqualified because his McLaren was outside the width regulations.

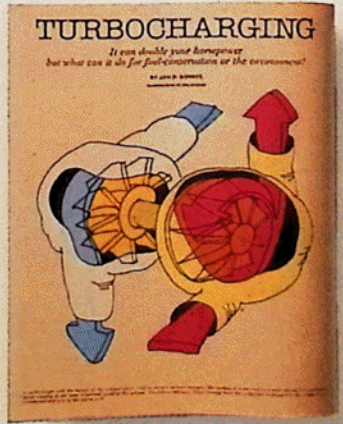


- And racing-great-to-be Jacques Laffite (above) began



- road-going Chevrolet Monzas and Ford Mustang IIs.
- We put the Lamborghini 3000 Silhouette through its paces in Europe: 6.8 seconds to 60 mph, a top speed of 147. The sticker was estimated at \$27,000.
- We included Jan Norbye's primer on turbocharging, a sort of precursor of a technological trend. For example, 15 years ago Porsche's Carrera was the only production car out of 77 listed on the R&T Summary page that was turbocharged; in today's issues there are about 35 out of 115.

- driving for Gitanes Ligier at age 33.



To all but a few,  
it is still a very  
foreign car. 



PEUGEOT  
Beyond the obvious<sup>SM</sup>

1991 Peugeot 405 models are intelligently priced between \$15,490 and \$21,990. MSRP. Excludes tax, title, options, registration and destination charges. In Canada call 1-416-566-1900.

Europeans have long appreciated the remarkable engineering and world-class styling of a Peugeot.

Yet, here in America, a Peugeot 405 is a rare pleasure. Perhaps because a full appreciation of one requires the kind of thorough scrutiny few car buyers exercise.

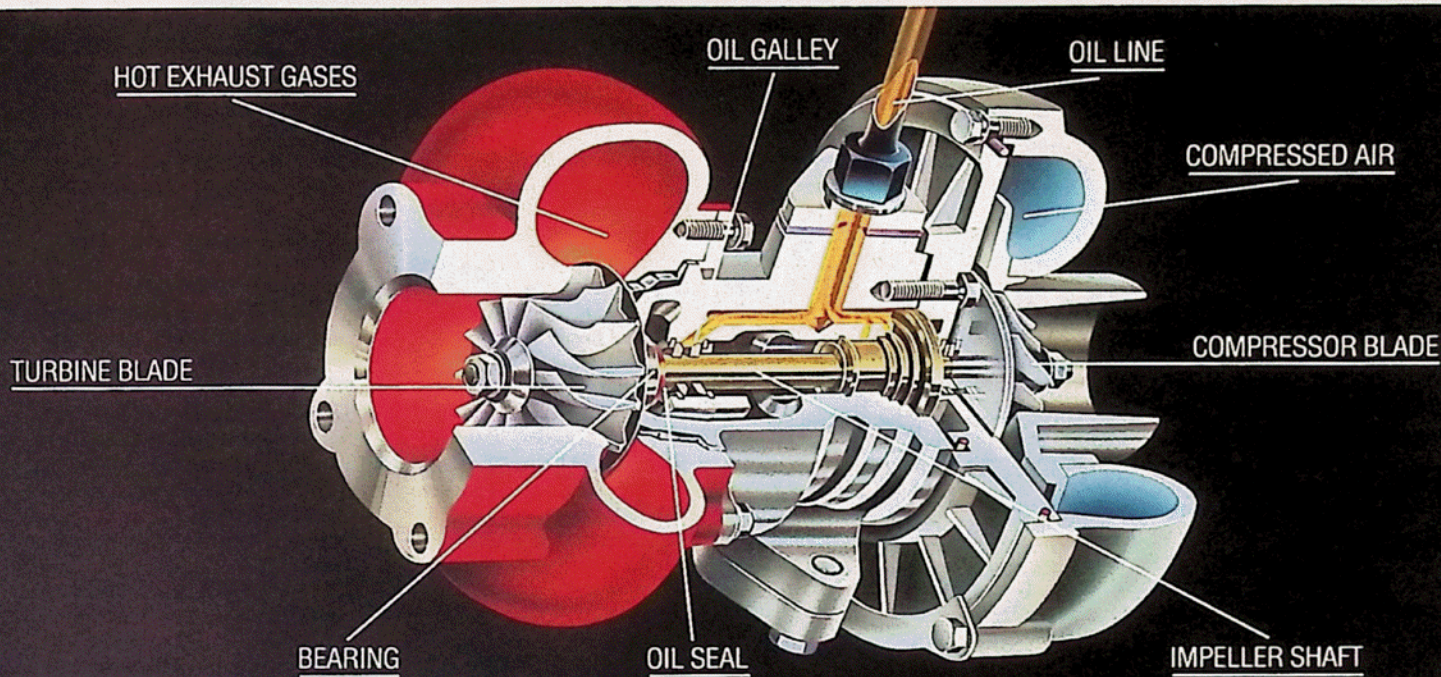
The 405's patented 8-valve shock absorbers, for example, are far from obvious, yet they contribute to the renowned Peugeot road feel that is immediately apparent. Two densities of foam are a subtle but effective way to eliminate seat springs and the road vibrations they transmit. And less obvious still is the sophisticated composite barrier beneath the roof that absorbs road noise.

But you'll quickly understand the value of every aspect of the Peugeot 405 with closer scrutiny. For the dealer nearest you call 1-800-447-4700.





# The hardest chargers in racing.



By compressing the air entering combustion chambers, turbochargers help propel race cars to higher speeds with smaller engines. Likewise they bring street cars high power when needed, and fuel economy when high power isn't needed. The problem is, forces that affect turbochargers — on the track and the street — are truly murderous.

### The 3 enemies of turbochargers.

1. Heat. The devil's own breath — hot exhaust gases emerging from cylinder heads at around 1,600°F — turns the turbine blade that propels the compressor blade along the impeller shaft. (Keep in mind that mild steel melts at 1,300°F.) Intercoolers, which are not even allowed by CART, only cool the air leaving the turbo. There's nothing to cool the turbocharger itself except oil.

2. Starting friction. Since turbochargers are made to run hot, it's only logical that they can be creaky when cold. This is especially true since impeller shafts always turn — even at idle. So the bearings along shafts

must have immediate and effective lubrication.

3. Deposits. In a turbocharger, deposits typically take the form of "coking" — the residue of frying oil. (Now, keep in mind here that motor oil enters the inferno of a turbo from the engine, where it's already likely to be hotter than boiling water.) Coking can devastate turbo bearings and oil seals, which in turn can spoil your day.

You may conclude from all this that any motor oil used to lubricate a turbocharged engine had better be high-quality stuff.



### Havoline Formula<sup>3</sup> to the rescue.

New Havoline Formula<sup>3</sup> Motor Oil from Texaco adds more life to your car in three ways: 1. Overall heat is reduced by oil functioning as a coolant. 2. Startup is helped by effectively lubricating bearings and other components. 3. Deposits are inhibited.

This makes Havoline Formula<sup>3</sup> ideal for most cars, including turbocharged race cars. The Formula<sup>3</sup> that

lubricates the Indy-car engines of Mario, Michael, and Jeff Andretti — and that performed so well in this year's 24 Hours of Daytona — is 100% identical to the Formula<sup>3</sup> you can buy off the shelves of Texaco stations or stores.

Because Texaco is competing for your business, we make it our business to learn from competing on the track. That's true of Formula<sup>3</sup> Motor Oil and also of System<sup>3</sup>, the official U.S. gasoline for the SCCA World Challenge race series.

So the next time you look at a Texaco race car, consider looking to the Sign of the Star for your automotive needs. We're charging hard to win you as a customer.



TEXACO SYSTEM<sup>3</sup> AND  
HAVOLINE FORMULA<sup>3</sup>

# TIME & PLACE

## COMPETITION

- Aug. 2-4 **Meadow Brook Historic Races**, Oakland County Sportsmen's Club, Waterford Hills Race Track, Clarkston, Mich.
- Aug. 3-4 **IROC** race & **CART** Marlboro 500, Michigan International Speedway, Brooklyn, Mich.
- Aug. 4 **SCCA** Liquid Tide Trans-Am Tour, Road Atlanta, Flowery Branch, Ga.
- Aug. 9-11 **HSR** Atlanta Historic Races, Road Atlanta, Flowery Branch, Ga.
- Aug. 10 **SCCA** Liquid Tide Trans-Am Tour & **IROC** race, Watkins Glen International, Watkins Glen, N.Y.
- Aug. 11 **Hungarian Grand Prix**, Hungaroring, Budapest, Hungary
- Aug. 11 **NASCAR** Budweiser at the Glen, Watkins Glen International, Watkins Glen, N.Y.
- Aug. 16-18 **Monterey Historic Automobile Races** (honoring Juan Manuel Fangio), Laguna Seca Raceway, Monterey, Calif.
- Aug. 18 **NASCAR** Champion Spark Plug 400, Michigan International Speedway, Brooklyn, Mich.
- Aug. 18 **SCCA** Grand Prix de Trois-Rivières Liquid Tide Trans-Am Tour, Trois-Rivières, Quebec, Canada
- Aug. 23-25 **SCCA** Subaru Ojibwe Pro Rally Championship, Bemidji, Minn.
- Aug. 24 **NASCAR** Bud 500, Bristol International Raceway, Bristol, Tenn.
- Aug. 24-25 **SCCA** Liquid Tide Trans-Am Tour & **CART** Texaco/Havoline Grand Prix of Denver, Denver, Colo.
- Aug. 25 **Belgian Grand Prix**, Circuit de Spa-Francorchamps, Spa-Francorchamps, Belgium
- Aug. 25 **IMSA** Nissan Grand Prix of Road America, Road America, Elkhart Lake, Wis.
- Sept. 1 **CART** Molson Indy Vancouver, Vancouver, British Columbia, Canada
- Sept. 1 **NASCAR** Heinz Southern 500, Darlington International Raceway, Darlington, S.C.
- Sept. 6-8 **SVRA** Formula 1 Reunion, Watkins Glen International, Watkins Glen, N.Y.
- Sept. 8 **Italian Grand Prix**, Autodromo Nazionale di Monza, Monza, Italy

ADDRESSES: **Meadow Brook races**, Meadow Brook Hall, Oakland University Campus, Rochester, Mich. 48063; **IROC** (Dodge International Race of Champions), 45 Park Rd., Tinton Falls, N.J. 07724-9716; **CART**, 390 Enterprise Ct., Bloomfield Hills, Mich. 48013; **SCCA**, P.O. Box 3278, Englewood,

Colo. 80112-2105; **HSR** (Historic Sportscar Racing, Ltd.), P.O. Box 550372, Atlanta, Ga. 30355-2874; **ACCUS/FIA** (Formula 1), 1500 Skokie Blvd., Suite 101, Northbrook, Ill. 60062; **NASCAR**, P.O. Box 2875, Daytona Beach, Fla. 32115-2875; **Monterey races**, General Racing Ltd., P.O. Box 30628, Santa Barbara, Calif. 93105; **IMSA**, P.O. Box 10709, Tampa, Fla. 33679-0709; **SVRA** (Sportscar Vintage Racing Association, Inc.), P.O. Box 261898, Tampa, Fla. 33615.

## AUTO SHOWS

- Sept. 12-22 **Frankfurt international auto show**, Frankfurt Exhibition Grounds, Frankfurt, Germany
- Oct. 26-Nov. 8 **Tokyo international auto show**, Nippon Convention Center, Tokyo, Japan

ADDRESSES: **Frankfurt show**, Verband Der Automobilindustrie E.V., Postfach 170503, D-6000 Frankfurt 17, Germany; **Tokyo show**, Japan Motor Industrial Federation, Inc., Otemachi Bldg., 6-1, 1-Chome, Otemachi, Chiyoda-ku, Tokyo 100, Japan.

## EVENTS

- Aug. 2-4 **Meadow Brook Hall Concours d'Elegance**, Meadow Brook Hall, Oakland University Campus, Rochester, Mich.
- Aug. 18 **Pebble Beach Concours d'Elegance** (honoring Pierce-Arrow & Rolls-Royce) & **Automotive Fine Arts Society Exhibition**, The Lodge at Pebble Beach, Pebble Beach, Calif.

- Sept. 20-22 **British Invasion Weekend**, Ye Olde England Inne, Stowe, Vt.
- Sept. 21 **Santa Barbara Concours d'Elegance**, Santa Barbara Polo & Racquet Club, Santa Barbara, Calif.

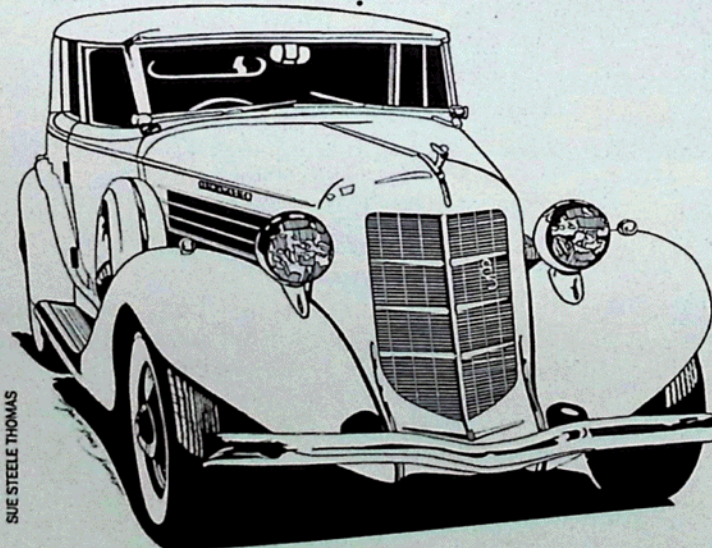
ADDRESSES: **Meadow Brook Hall concours**, Meadow Brook Hall, Oakland University Campus, Rochester, Mich. 48063; **Pebble Beach concours**, P.O. Box 597, Pebble Beach, Calif. 93953; **Automotive Fine Arts Society exhibition**, P.O. Box 613, Temecula, Calif. 92390; **British Invasion event**, Michael Gaetano, 230 Old Connecticut Path, Wayland, Mass. 01778; **Santa Barbara concours**, Wendy MacMurray, 1795 San Leandro Lane, Santa Barbara, Calif. 93108.

## CLUBS

- July 28-Aug. 3 **Porsche Parade**, Sheraton Tara, Danvers, Mass.
- Aug. 2-4 **Borgward Owners Club** National Meet, Harbor House Inn, Morro Bay, Calif.
- Aug. 2-4 **Saab Club of North America** National Convention, Crystal Mountain Resort, Crystal Mountain, Wash.
- Aug. 5-9 **BMW Car Club of America** Oktoberfest, Sheraton Waterbury, Waterbury, Conn.
- Aug. 8-11 **Alfa Romeo Owners Club** National Convention, Holiday Inn, Montgomery Field, San Diego, Calif.
- Aug. 8-11 **Association of Jensen Owners** National Weekend, Cambria Pines Lodge, Cambria Pines, Calif.

- Aug. 8-11 **Tigers East/Alpines East** United XIV, Holiday Inn South, Dayton, Ohio
- Aug. 9-11 **East Coast Volvo Owners** Meet, George Washington Inn, Williamsburg, Va.
- Aug. 10 **AACA** Eastern Division Special National Fall Meet, Butler County Community College, Butler, Pa.
- Aug. 15-18 **Austin-Healey Sports and Touring Club** Encounter '91, Great Valley Hilton, Malvern, Pa.
- Aug. 15-18 **Camaro Club of Michigan** Annual Camaro Street Nationals, General Motors Technical Center, Warren, Mich.
- Aug. 15-18 **Z Owners of Northern California** National Z Car Convention, Sheraton Pleasanton, Pleasanton, Calif.
- Aug. 16-17 **AACA** Grand National Meet, Noelridge Park, Cedar Rapids, Iowa
- Aug. 16-17 **British Motorcars of New England** Annual British Car Festival, Holiday Acres, North Scituate, R.I.
- Aug. 23-25 **Lotus Limited Owners** Gathering, Sheraton Hotel, Waterbury, Conn.

ADDRESSES: **Porsche Parade**, P.O. Box 1435, Boston, Mass. 01945; **Borgward Owners Club**, Gregory Zarcoff, 1155 S. Hayworth Ave., Los Angeles, Calif. 90035; **Saab Club of North America**, Skip Schott, 2416 London Rd., Unit 900, Duluth, Minn. 55812-2221; **BMW Car Club of America**, Harmon Fischer, 430 Brockenbraugh Ct., Metairie, La. 70005; **Alfa Romeo Owners Club**, Pat Garrett, 2468 Gum Tree Ln., Fallbrook, Calif. 92028; **Association of Jensen Owners**, Stephanie Rollins, 9884 Brunswick Way, San Ramon, Calif. 94583; **Tigers East/Alpines East**, John Engle, 3012 Lantz Rd., Beavercreek, Ohio 45432; **East Coast Volvo Owners**, James Stern, 7117 Thomas Branch Dr., Bethesda, Md. 20817; **AACA** (Antique Automobile Club of America), P.O. Box 417, Hershey, Pa. 17033; **Austin-Healey Sports and Touring Club**, John Morrison, 24 Mohr St., Quakertown, Pa. 18951; **Camaro Club of Michigan**, 6856 Apache Trail, Westland, Mich. 48185; **Z Owners of Northern California**, P.O. Box 272782, Concord, Calif. 94527; **British Motorcars of New England**, P.O. Box 666, North Dighton, Mass. 02764-0666; **Lotus Limited**, Foster Cooperstein, 16 Madoc St., Newton Center, Mass. 02159.




Because dates and times are subject to change, last-minute checks with appropriate sanctioning organizations are always advisable.

**"E**uropean touring sedan." Three little words that conjure up serious driving pleasure along with some very serious car payments. Not so with the Volkswagen Passat. It's the perfect balance of German suspension and handling in a car with 16 valves of hardened steel and 4-wheel disc brakes, all at a price that's not too heady. It's

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# AMPERSAND

EDITED BY RICHARD H O M A N

## Honey, I shrunk the NSX

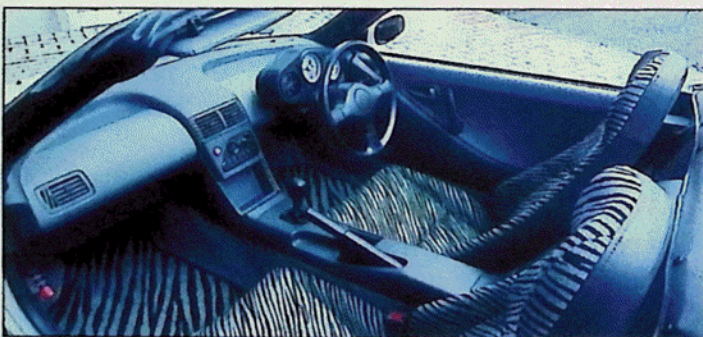
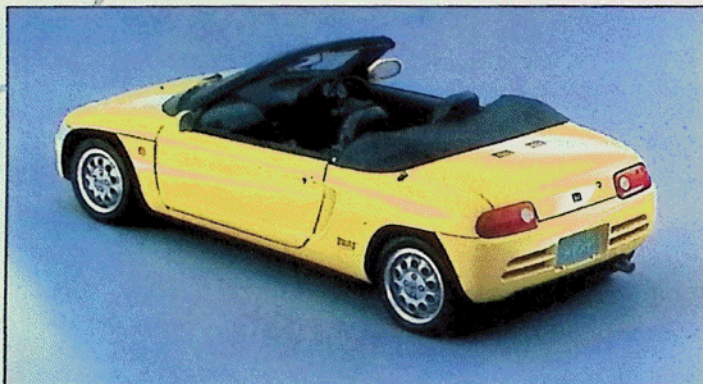
IT'S MID-ENGINE. Each cylinder has four valves. It has five closely spaced gears controlled by a short lever. All-independent suspension, oversize disc brakes all around and bigger tires in the rear than in the front. And it's a 2-seat ragtop!

It's Honda's new micro roadster, the Beat, an exclusive offering to the young Japanese sports-car enthusiast. You could probably buy a half-dozen of these for the price of an NSX and run a family Grand Prix.

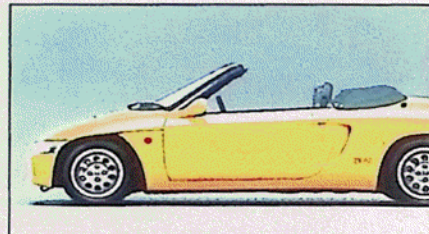
The Beat is powered by a highly tuned version of the Honda Today's inline-3 that displaces all of 656 cc and features a single overhead camshaft operating 12 valves. The engine inhales from triple individual intake tracts, each fitted with its own injector and throttle valve—like Honda's Formula 1 engines, they tell me.

The output is 64 bhp at 8100 rpm, leaving 400 rpm before the needle hits the redline. The tach is calibrated to 10,000 rpm. The powerplant is sharply inclined and placed transversely ahead of the rear axle in unit with a 5-speed gearbox.

The entire car must stay within the light-car (*Kei*) class's dimensional limits. The trunk is only big enough to take a couple of tennis rackets. The front end holds the spare tire and that's about it. The fuel tank is motorbike size, taking 6.3 gal., but fortunately, the



■ Honda's Beat, a mid-engine micro-roadster for those with NSX tastes and bare-bones budgets. Interior has zebra-stripe seats, motorcycle-type gauges.



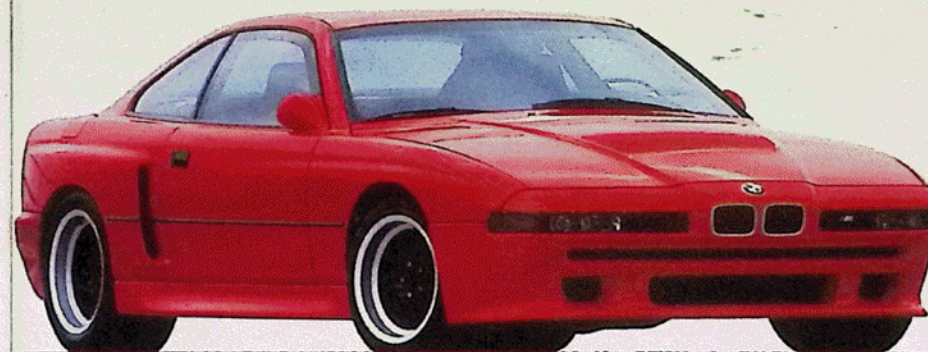
ple of Beats. Its handling was safe and predictable, with a trace of mild understeer up to its limit. And the brakes were really powerful and progressive. It's a baby NSX in manner and character.

—Jack Yamaguchi

Beat is a petroleum miser.

Suspension is all independent by MacPherson struts at the front and Chapman struts in the rear, each of the latter located by twin transverse links and single trailing arm. Steering is rack and pinion, sans assist. Brakes are disc all around, hydraulically operated and power assisted. You can order one with an airbag too. Like a proper mid-engine car with more weight on the rear wheels, the rear tires are bigger and fatter (165/60HR-14) than the fronts (155/65HR-13).

The Beat is not exactly lightweight as far as *Kei*-cars go, so its modest power unit doesn't quite kick you in the back. But on Honda's handling course, a friend and I thoroughly enjoyed playing cat-and-mouse in a cou-



■ Courtesy of BMW Motorsport GmbH, the "M8" is a one-off lightweight 850i with a 500-bhp 5.4-liter V-12 complete with showy carbon-fiber intake plenums and runners.

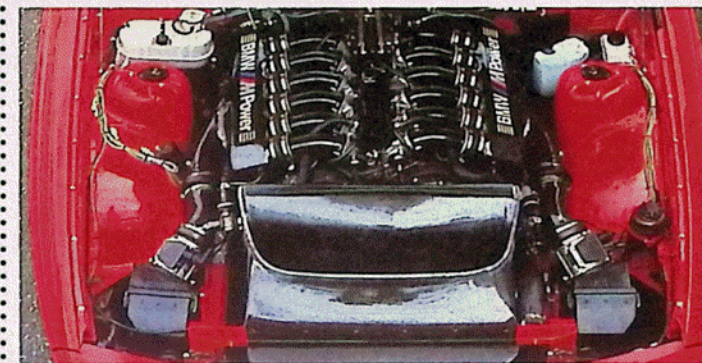
## Bimmers for dreamers

PUT AWAY YOUR checkbooks, because these are two BMWs you'll never be able to buy.

In the red corner, the 500-bhp Kevlar-bodied "M8."

In the green, the Z1-based Off-Roadster.

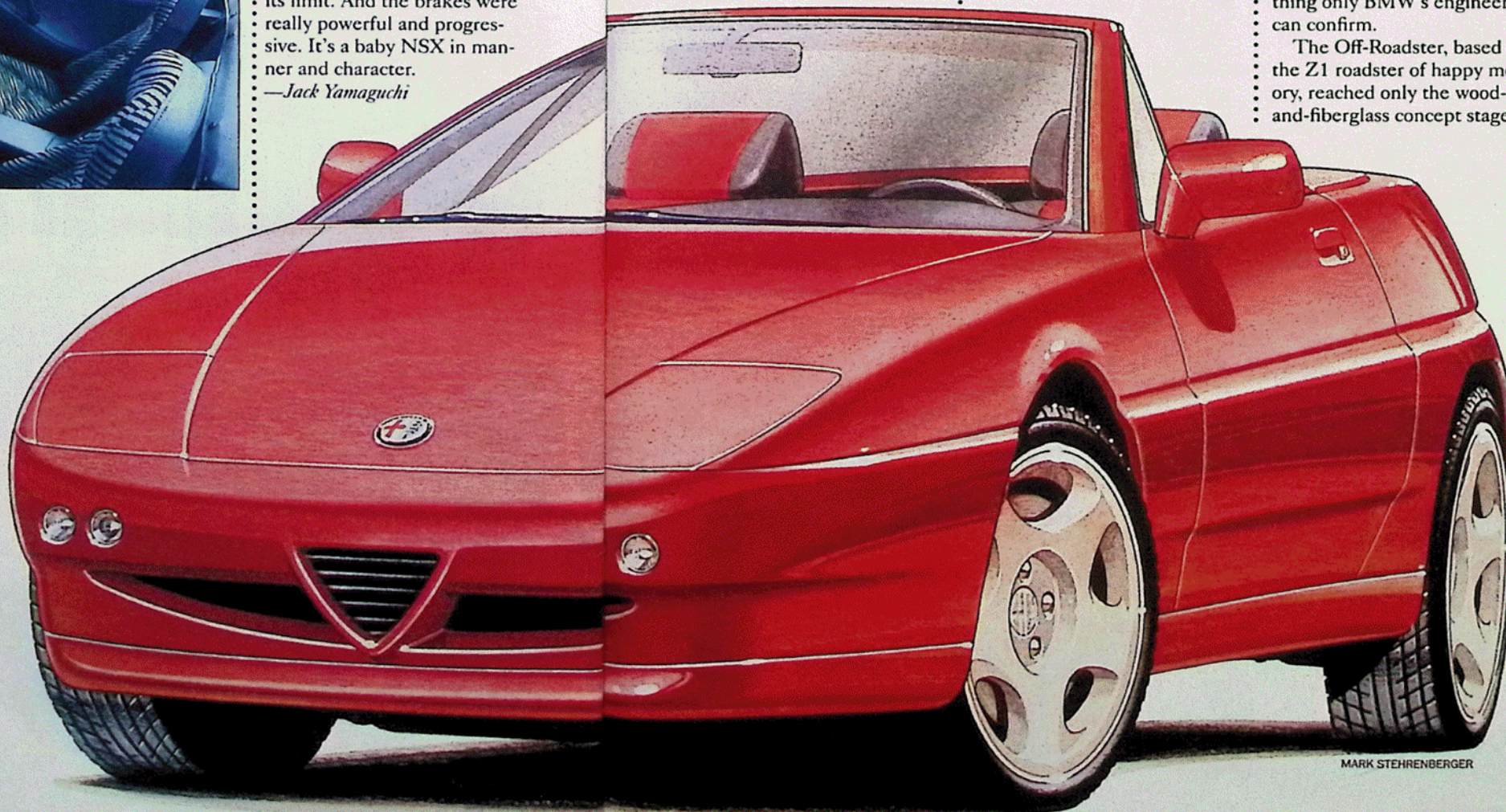
Neither will ever reach the showrooms. The red supercar, touted in the press as an M8, is actually a one-off engine testbed (possibly in connection with McLaren). It might look a bit like the 850i, but the similarity



ends there. BMW Motorsport added a quadcam, 5.4-liter version of the V-12 and took out weight by using Kevlar body

panels and plastic side windows. The result is said to be a near-190-mph top speed and acceleration to match—something only BMW's engineers can confirm.

The Off-Roadster, based on the Z1 roadster of happy memory, reached only the wood-and-fiberglass concept stage.



MARK STEHREMBERGER

## HOT CARS

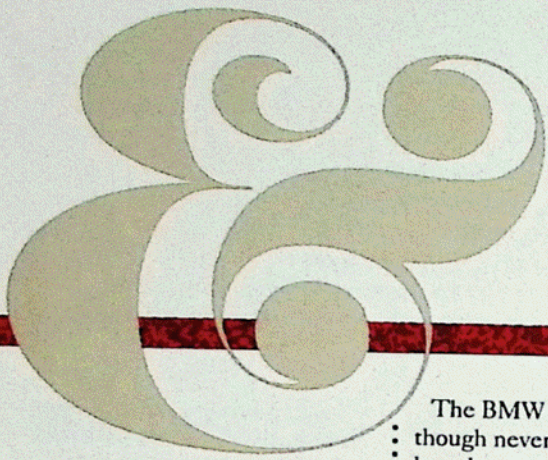
The 1990 car model with the highest overall insurance theft losses is the Nissan 300ZX, according to the Highway Loss Data Institute, an insurance industry-funded firm. The car with the lowest overall losses is the Ford Taurus station wagon. Sports cars accounted for more than 16 percent of the total dollars paid for theft claims, yet had only 5 percent of the total exposure. —Ken Zino

## NEW JEEP

The replacement for the Jeep Wagoneer and Cherokee models was originally scheduled to be on sale now to compete with the Ford Explorer, say American Motors insiders, but the acquisition by Chrysler delayed the project until January 1992. The Cherokee is expected to stay in the line in simplified and less expensive versions to compete with the numerous Japanese 4x4 models that retail for around \$16,000. —K.Z.

## Spider tracks

■ Details continue to filter in about Alfa Romeo's new Spider, the replacement for a model that has soldiered on for 25 years. The new car rides atop a shortened 164 platform and is powered by a 250-bhp 24-valve V-6 driving all four wheels. Top speed is estimated to be 155 mph, and rumors persist that 4-wheel steering will be an option. Pininfarina, who penned the original, supposedly has a hand in the design, though a similarity to the Zagato-built SZ is apparent.



■ From BMW Technik comes the Off-Roadster, a Z1-based proposal.

### MORE AIRBAGS?

A Senate bill has been proposed requiring that supplemental airbags for both driver and front-seat passenger be made standard on all cars by the 1996 model year. Vans, light trucks and sports-utility vehicles would have to be so equipped by 1997. The bill estimates the cost would be only an additional \$200 per vehicle, with the potential of saving 12,000 lives annually.—K.Z.

### MILLIONS OF LIONS

Peugeot produced its 4-millionth Peugeot in May. The little hatchback—a familiar sight across Europe, but not sold in the United States—was introduced in February 1983. Peugeot says it's on course to make the 5-millionth late next year.—R.F.

### Pocket roadster

■ Opel, together with Pontiac, is working on a Corsa-based roadster for a 1993 debut. Loosely based on GM's recently shown 2-cycle runabout, it could be powered by either the GM-developed 2-stroke or Suzuki's inline-3.

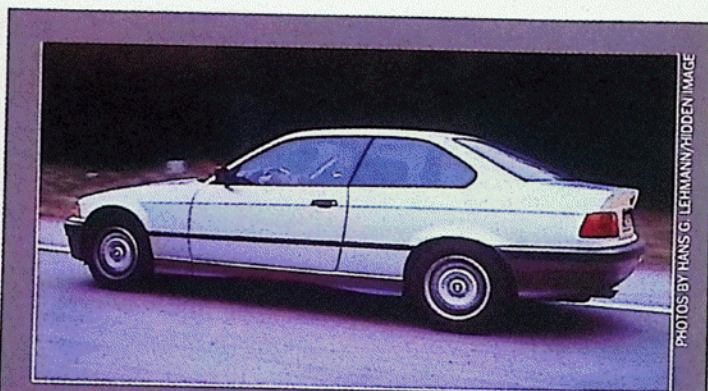
The BMW Technik project, though never a runner, would have been equipped with the all-wheel drive and 170-hp 6-cylinder engine from the 325iX. BMW thought of it as an alternative type of off-roader.

Take a good look. This will probably be the last time you'll see them, because both have been retired.—Richard Feast

### Variations on a Lexus theme

STICKER-WISE YOUR Lexus SC 400 is placed between the LS 400 and ES 250. Our equivalent, the Soarer, covers a much wider price spectrum, from 3.3 to 7.5 million yen (\$23,400 through \$53,200). Obviously there are more variations of the theme to justify the price diversities.

The first engine choice, the base unit, is a twin-turbo 2.5-liter inline-6 featuring dohc and 24 valves. This engine puts out 280 bhp at 6200 rpm and 267 lb.-ft. peak torque at 4800 rpm, which is 10 bhp and 7 lb.-ft. more than the second choice: the LS 400-type quad-



PHOTOS BY HANS G. LEHMANN/HIDDEN IMAGE

### BMW 3-Series coupe and convertible

■ A coupe version of the 3-Series, to be available with a choice of two inline-4s or the 2.5-liter inline-6, will be unveiled at the Frankfurt auto show. The convertible will follow in 1992, along with a 250-hp 6-cylinder M3.

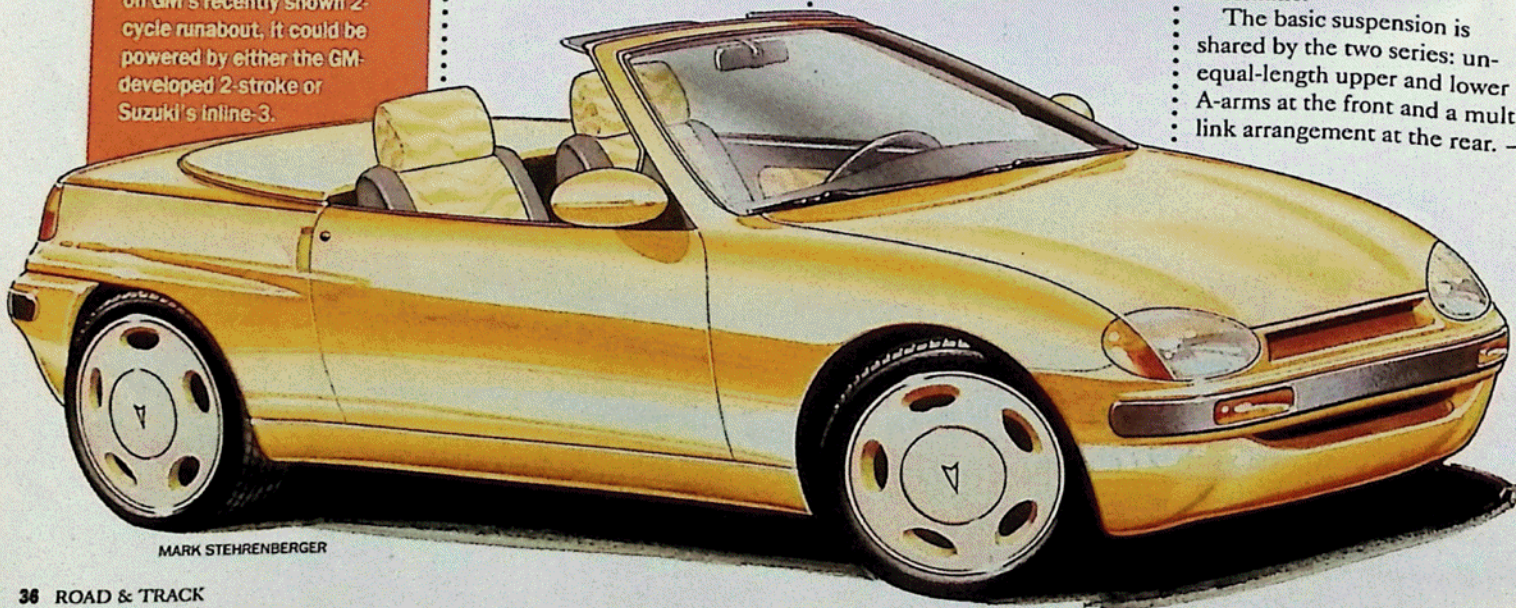


cam 32-valve 4.0-liter V-8.

For the turbocharged inline-6, you choose either a 5-speed manual gearbox or an electroni-

cally controlled 4-speed automatic, but with the V-8 you get only an advanced version of the automatic.

The basic suspension is shared by the two series: unequal-length upper and lower A-arms at the front and a multi-link arrangement at the rear. →



MARK STEHRENBARGER

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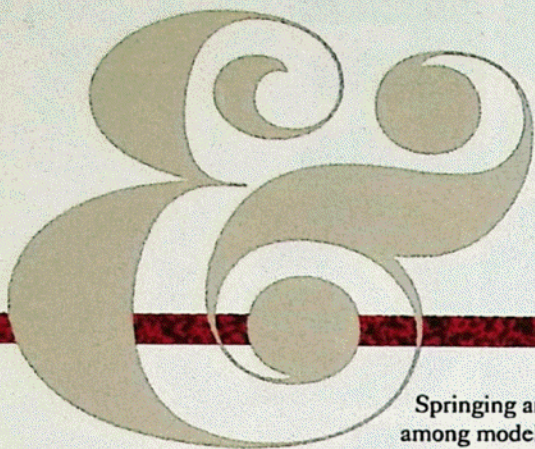


To receive your Almighty Bucks T-Shirt, complete the order form on the other side, and enclose 3 UPCs (those bars with numbers under them) from packs of Bucks plus \$1 for postage and handling.



Rich flavor,  
full price.

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1.



## TORRID TEMPO?

Underneath the mild exterior restyle of the 1992 Ford Tempo, which can be characterized as the automotive equivalent of vanilla ice cream, will reside an optional 3.0-liter V-6 engine. The engine, widely used in Ford Probe and Taurus applications, will provide 145 bhp—40 more than the aged, 2.5-liter 4-cylinder currently installed. A replacement Tempo with a more up-to-date chassis and newer powertrains is under development at Ford of England. It's due in 1994.—K.Z.

## PORSCHE PRICES

Porsche Cars North America Inc. has increased prices on select 911 models by about 2 percent on cars shipped to dealers after last May 1. The Carrera 2 Coupe is now \$61,915 with the Carrera 4 Cabriolet at \$82,215. Prices of the 911 Turbo, 944 series and 928 models remain unchanged.—K.Z.

## TAURUS VAN?

Spring of 1994 appears to be the introduction date of a new Ford midsize van built from the Taurus/Sable platform. The van is expected to be bigger than the current Aerostar but smaller than the Econoline. Front- and all-wheel-drive models will be available.—K.Z.

## ENGINE POLITICS

In France, Peugeot and Renault are not only direct competitors, but also political opponents. Recently, however, the two signed an agreement to join forces in the development of a new V-6 engine to be built by the Société Française de Mécanique, which they have owned jointly since 1989.—Paul Frère

Springing and damping differ among models. The base in-line-6 and V-8 models get coil springs and conventional tube shocks. An upscale, sportier in-line-6 version is fitted with an adaptive shock-absorber system using electronic road-surface sensors. The midrange V-8 models have electronically controlled pneumatic spring/shock units adapted to the suspension. The top-of-the-range V-8 features electronically controlled, hydropneumatic active suspension. The system has completely eliminated metal springs, which Toyota claims is a world-first for production cars; and is combined with Toyota's own electronically controlled 4-wheel-steering system.

The top models are also equipped with GPS (global positioning system) satellite-guided onboard navigation.—J.Y.

## Rejuvenations

REPLACEMENTS ARE IN the pipeline for a number of cars that have been with us with only minor facelifts for more years than most of us care to remember. One of them is the VW Golf Cabriolet, whose current model is still based on the original Golf 1. When the Golf 3 is launched in September, a convertible version will be included with the new model.

Lancia is preparing a further evolution of the Delta Integrale with improved suspension to keep competitive with the current crop of Japanese cars in World Championship rallies. Unfortunately, the 5000 units required for homologation cannot be completed until late this year, so the cars will not compete until next year.—P.F.



Is the grass greener on the other side of the Pacific? Japan-only Lexus coupes can be fitted with hydropneumatic active suspension, electronic 4-wheel steering and satellite-guided navigation.



## Super Coupe facelift . . .

FORD WILL SLIGHTLY revise the outside of the Thunderbird Super Coupe for 1992, but mechanically the car will remain unchanged. Power will still be provided by the supercharged 3.8-liter V-6 engine. Speculation has it that the car will eventually get the dohc modular V-8 that will make its debut in the 1993 Lincoln Mark VIII. So far in the 1991 model year,

the 5.0-liter V-8 Thunderbird is outselling the blown version.—K.Z.

## . . . and then some

A MINNEAPOLIS, MINNESOTA-based speed shop called Dyno Tunes ([612] 497-4844) is offering a Vortec blower package for the 5.0-liter T-Bird that's said to increase output to 280 horsepower and 400 lb.-ft. of torque from the naturally aspirated ratings of 200 bhp and 275 lb.-ft. The street-legal con-

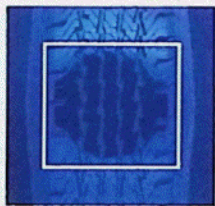
The T-Bird Super Coupe greets 1992 with an aggressive new nose.



PHOTO BY JIM DUNNE/POPULAR MECHANICS



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*Goodyear Wrangler HT keeps you in touch with the road.*

Goodyear Wrangler radials are a tough, steel-belted family of durable radials that really get around. On highway. And off.

And from the Baja to Bengal, Wrangler performance has proven to be a winner.

In fact, in rigorous comparisons against other makes of tires, Goodyear Wrangler radials have been consistently chosen as original equipment by top manufacturers like Ford, Chevrolet, Jeep and Range Rover.

And true to its family heritage, you'll find the Goodyear Wrangler HT to be a tough, steel-belted, all-weather radial that will give you sure handling, excellent treadwear and a smooth, quiet ride on the highway.

But no matter where you're going, on highway, off highway or merely off to work, you can rest assured that Goodyear Wrangler radials will not only take you there, they will also bring you back.

**TREAD LIGHTLY!**  
ON PUBLIC AND PRIVATE LAND

Please remember, if you drive off-highway, tread lightly. Stay on existing paths. Don't forge new ones. America is a beautiful country. Let's keep it that way.



*Goodyear Wrangler radials are the choice of off-road racing legend Walker Evans.*



*Chevy Z71 StepSide*



*Jeep Wrangler Renegade*

*These vehicles use Goodyear Wrangler radials. You should, too.*



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# Everything you really need to know about the Turbo Z.

Dual overhead cams, 6 cylinders, 24 valves, twin intercooled turbochargers, low-inertial-mass turbines, F-25 compressors.

Displacement: 3.0 liters, 2960 cc. Bore and stroke: 87mm, 83mm. Compression ratio: 8.5:1.

Output: 300 bhp, 283 lb./ft. of torque (5-speed model).

0-60: 5.5 seconds. Quarter mile: 14.1.

Aluminum alloy pent-roof heads; aluminum alloy pistons with built-in oil channels; molybdenum-coated skirts; Inconel steel exhaust valves; Kelmet connecting rod bearings; aluminum brackets and engine mounts; forged steel crankshaft; cast iron block.

Variable valve timing control; utilizes a helical gear to advance and retard intake camshaft rotation, optimizing valve timing and overlap throughout the powerband.

Induction system: sequential multi-point electronic fuel injection.

Fuel metering: Electronic Concentrated Control System (ECCS), microcircuitry that monitors ever-changing engine data and adjusts intake and spark timing accordingly.

Spark plugs: platinum-tipped for extended life; centrally located for faster, cleaner flame propagation.

Multi-coil direct ignition: one coil per spark plug provides stable, high secondary voltage throughout 7000-RPM engine operating range.

Electrical system: Piezoelectric transducers, 65-amp-hrs/12-volt battery.

High capacity 90-amp/12-volt alternator with built-in integrated-circuit voltage regulator.

Starter motor, reduction-gear type, capacity: 1.4 kilowatts.

Lubrication system: centrifugal oil pump; full-flow cartridge oil filter.

Cooling system: corrugated fan and tube aluminum radiator; centrifugal water pump.

Thermostat operating temperature C°: 76.5.

Dual intake/dual exhaust; separate tuned intake runners; connected to a tapered port, help maintain high gas velocities, while reducing back-pressure and exhaust turbulence in the combustion chamber.

High-ductile cast-iron exhaust manifold: provides high level of heat dissipation and serves as rigid mounting platform for turbos and plumbing hardware.

3-way catalytic converters, electronic feedback air-fuel ratio control.

Quad chrome-tipped exhaust finishers, electronically governed turbo waste gates.

5-speed manual over-drive transmission, short-throw gearbox, remote linkage, double-cone synchronizers on 2nd and 3rd gears and strengthened 2nd and 5th gears.

Hydraulically-actuated clutch, 800 kg plate capacity.

2-way driver-adjustable low-pressure gas shock absorbers, coil springs, front and rear stabilizer bars.

4-wheel independent multi-link suspension; incorporates race-derived anti-lift/anti-squat geometry; designed to reduce

Multi-link front: includes lower links, upper links, and a third link connection to the kingpin; forward inclination of twisted upper arm provides high degree of caster and camber stiffness; controls nosedive and allows for optimum fore-and-aft compliance.

Lateral acceleration: 0.95g. Speed threshold: 600 ft. slalom: 7.0 mph. (Motor Trend)

Steering ratio: 14.2. Turning circle (cut curb): 34.1 ft.

Lock to lock: 2.4: 15-lb.

Power-assisted 4-wheel disc brakes: 11" vented front, 11" vented rear. Power-assisted front disc brakes: 11" vented front, 11" vented rear. Lightweight aluminum calipers used to reduce unsprung weight and promote heat dissipation.

Aerodynamics: closed-circuit wind tunnel testing conducted with open-measurement section and computer-controlled observation chamber. Wind velocities: 167 mph, generated by 2200-kW direct-current electric motor and single-stage axial flow fan.

Rigidity: 1 mm/10kN (Newton) meters (0.036 in./700 lb.).

Cornering force: 4000 N-meters. Chassis deformation: 1 degree.

Interior noise: idle in neutral: 49 dBA; 60 mph in top gear: 69 dBA. (Motor Trend)

Chassis: monocoque frame, built with aluminum and high-strength, lightweight DURASTEEL™.

Closed section B pillars.

Continuous process arc-welding of major body panels using thermosetting resins.

Exterior Features: body-color front and rear bumpers; body-color front air dam, integrated body-color rear spoiler.

Projection-type low-beam halogen headlights; halogen fog lights integrated into front fascia.

Interior features: leather-wrapped steering wheel and shift knob (manual); power windows with driver-side auto-down feature.

Deep bolster, ergonomically contoured, 7-way adjustable driver's seat; features lumbar and side support, seatback recline, front and rear cushion tilt, headrest height, and fore/aft adjustments.

Instrumentation: primary gauges include analog tachometer, speedometer, turbo boost indicator, coolant temperature, oil pressure level and fuel level indicators.

Major controls and switches housed in pods flanking the steering column: headlights, fog lights, instrument lights, rear window defroster and cruise control on left; front/rear wipers, automatic temperature control on right.

T-bar roof with removable tinted glass panels.

Sound system: Bose® 4-speaker audio system acoustically customized for 300ZX. (Bose is a registered trademark of Bose Corporation.)

Components: Clarion® electronically-tuned AM/FM stereo receiver (modified with three Bose-patented circuits);

Auto-reverse cassette player; automatic diversity-type power antenna system.

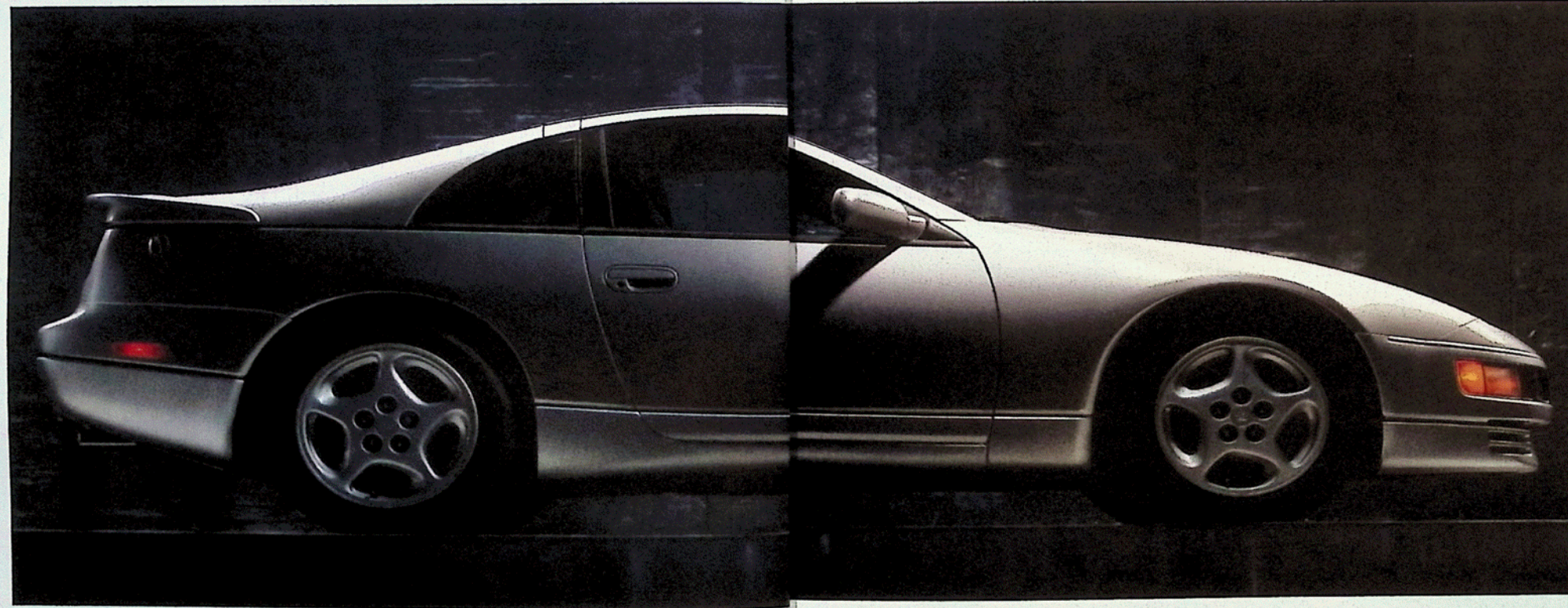
Dolby® noise reduction; (Dolby is a registered trademark of Dolby Laboratories Licensing Corp.)

Speakers: two 4 1/2" full-range loudspeakers encapsulated in driver and passenger side doors; two 6" x 9" full-range loudspeakers mounted on rear shock towers each with its own amplifier/ equalizer.)

Automatic Theft Deterrent System.

Titanium ignition key.

Base price: \$33,500. (M.S.R.P. excluding taxes, title, license, destination charges and options.)



Master cylinder inner diameter (mm): 15.87. Operating cylinder inner diameter (mm): 19.05.

Gear ratios (manual): 1st—3.214; 2nd—1.925; 3rd—1.302; 4th—1.000; 5th—0.752; reverse—3.369. Final drive ratio: 3.692.

High-viscosity silicone oil-filled limited-slip differential: transfers additional power to whichever rear wheel has greater traction.

attitude changes during acceleration and severe braking.

Multi-link rear: includes double upper links, a lateral link and a diagonal A-arm with axial bushing deflection; designed to deflect rearward during cornering and hard braking; movements of links are calibrated to control scuff changes and lateral force while improving toe control, steering response and vehicle stability.

Super HICAS™: microprocessor-controlled twin-orifice vehicle speed-sensing power rack-and-pinion 4-wheel steering;

Generates rapid yaw movements by applying a fractional-second counter-steer (plus or minus one degree);

Continually adjusts its response to vehicle speed, quickness of turn-in and turn angle to deliver crisp transitive maneuvers.

Computer-controlled anti-lock braking (ABS): electronic monitors rotation speed of wheels;

Senses impending lock-up on slippery roads; automatically modulates brake pressure via solenoid valves;

Induces rapid pulsations as ten pulsations per second, enabling driver to steer at the same time

king distance (0): 111 ft. (Motor Trend)

es: high-performance profile steel-belted tires: 225/50ZR16 front, 245/45ZR16 rear.

st aluminum alloy 5-spoke wheels: 16" x 16" front; 8.5" x 16" rear; vented to facilitate cooling the brake system, reduce wheel well turbulence and high speed lift.

Eleven 1/5 scale models built; three models built as full-size clay mock-ups.

Drag coefficient: .32.

Design tools: two Cray supercomputers, (used to build spacecraft, conduct genetic research and explore sub-atomic particles; the single most powerful number cruncher on the planet, capable of performing up to two and a half billion calculations per second.)

Curb weight: 3474 lb. Distribution of inertial masses: 54.7% front/45.3% rear.

Wheelbase: 96.5" Track (front/rear): 58.9"/61.2"

Overall length: 169.5" Overall width: 70.5" Overall height: 49.4"

Headroom: 36.8" Legroom: 43.0" Hip room: 53.5" Shoulder room: 56.7" Interior volume: 75.7 cu. ft.

High-tensile strength steel used for front fenders, outer door panels and unit body reinforcements; zinc-nickel plating used on interior and exterior panels.

Painting process: steel bodies immersed in chemical bath; anti-corrosion undercoating applied via ion electro-deposition; base coat and top coat applied by robotically-controlled electrostatic spray method.

For more information or to order yours, call 1-800-NISSAN-6.



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### BLACK TIE 4x4?

Chevrolet is offering about 5000 of what it calls "first-class travel at coach fare" in the new 4-door S-10 Blazer Tahoe LT. This truck delivers leather seats and trim, special paint, power-actuated windows and locks, air conditioning, a tilt steering wheel, electric mirrors, as well as new tire and wheel combinations. All for a relatively low \$18,756 in 2-wheel-drive versions, \$20,814 for 4x4 models.—K.Z.

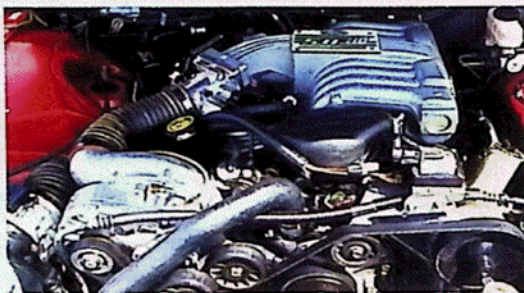
version costs about \$4500 installed or \$3100 for the pieces.

A brief drive of the clean conversion showed impressive results. Acceleration off the line and in the midrange was strong. There's nothing like low-end torque to bring back memories of the musclecar era. Shift quality of the 4-speed automatic transmission suffered, though. The valve body was modified to shorten the time between gear engagement; this, to diminish clutch slippage and increase transmission life. The result is decidedly quick—0.5-second—jolting upshifts, with an unknown effect on durability.—K.Z.



PHOTOS BY KEN ZING

■ A V-8 T-Bird Super Coupe? In essence, that's what Dyno Tunes has created by mating a supercharger to the T-Bird's 5.0-liter V-8, a combination good for 400 lb.-ft. of torque.

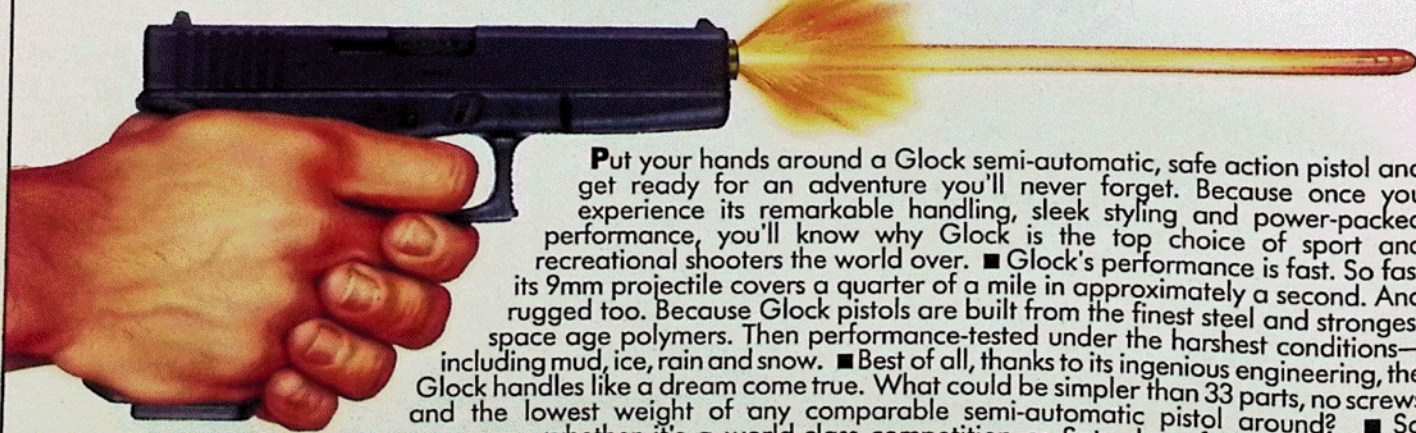


### Alpina update

ALPINA NOW MAKES nearly 500 BMW-based cars per year at its Buchloe premises, 45

miles from Munich. The main focus is currently the 5-Series-based B10 with either a 254-bhp normally aspirated engine or the 360-bhp Bi-Turbo en-

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Put your hands around a Glock semi-automatic, safe action pistol and get ready for an adventure you'll never forget. Because once you experience its remarkable handling, sleek styling and power-packed performance, you'll know why Glock is the top choice of sport and recreational shooters the world over. ■ Glock's performance is fast. So fast its 9mm projectile covers a quarter of a mile in approximately a second. And rugged too. Because Glock pistols are built from the finest steel and strongest space age polymers. Then performance-tested under the harshest conditions—including mud, ice, rain and snow. ■ Best of all, thanks to its ingenious engineering, the Glock handles like a dream come true. What could be simpler than 33 parts, no screws and the lowest weight of any comparable semi-automatic pistol around? ■ So whether it's a world-class competition or Saturday afternoon at the local sport range, aim for the winner's circle every time with Glock.

For a free color brochure on the complete line of Glock semi-automatic, safe-action pistols—plus a free Glock decal, write or call and ask for Dept. RT.



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All responsible firearms owners practice basic firearms safety. Thoroughly read and understand the users manual that is supplied with your firearm. Never use any firearm unless you completely understand its operation and safety features.

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**Tough beards  
can't stand up  
to twin blades.**

**Neither can  
the rain.**

**Lifetime Warranty\***

**Twin Edge Power!  
The first edge cleans...  
the second cleans up!**



Not too long ago, twin edge blades revolutionized shaving. Our new Twin Edge Wipers™ offer the same kind of incredible power—and make driving in a downpour a lot more bearable.

Twice the rain-clearing power in every stroke! The first edge cleans. The second cleans up. Because each refill is really two refills coupled together in one great (*lifetime warranted\**) blade.

Performance style. Better than original. Rally Twin Edge Wipers are remarkably handsome.

Their trim profile fits cars with the most "hideaway" of hideaway wipers.

Our new mounting adaptors mean they fit more of today's cars and trucks than ever before.

Add Rally's heart-stopping Euro colors—Black, Red, and White—for styling beyond compare.

Don't drive another mile without Twin Edge power. Visit your nearest automotive accessories retailer and see our Twin Edge Wipers & Refills in popular 14, 16, 18 and 20-inch sizes.

Or send \$3 (shipping & handling) to: Rally Accessories, Dept RT-3, 5255 N.W. 159th Street, Miami, FL 33014.

We'll send you a catalog and a free Rally sunshade for your windshield.

**\*Limited Lifetime Blade Warranty**

Rally Accessories warrants Twin Edge Wiper Blades against defects in workmanship or materials for as long as you own your vehicle. This warranty applies to Twin Edge Wiper Blades only. Refills, as wear items, are not covered under the terms of this warranty. See package for complete details.

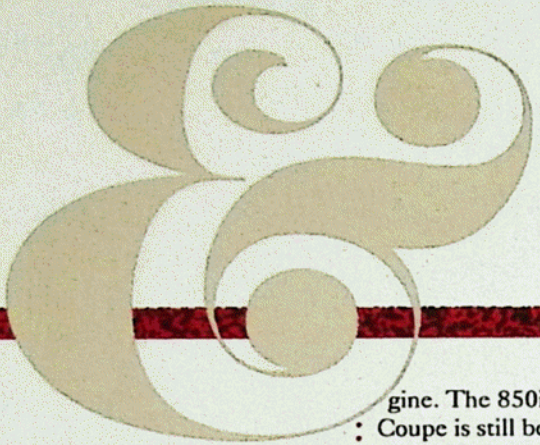
**RALLY**

*The Automotive Accessory People*



PHOTO BY JOHN LAMM

Alpina's B10: normally aspirated with 254 bhp, or twin-turbocharged with 360.



gine. The 850i-based B12 Coupe is still being developed with the target of extracting more than 400 bhp from the V-12 engine. There are also plans to produce a 325i-based twin-turbo model that should be quite exciting. The factory's facilities have been considerably extended, and the experi-

mental department is now completely separate from the production halls.

What is nice about Alpina is that its cars are just as reliable as the originals. For instance, because of the much-increased power of the B10 Bi-Turbo, the original 5-Series clutch, gearbox and rear axle are discarded and replaced with more robust units. A new Alpina model is marketed only after it has passed the same endurance tests as every original BMW model, the *pièce de résistance* being 12,500 miles at full blast on the old Nürburgring.—PF.

### Generation II Corvette

THE 1992 CHEVROLET Corvette will be offered with a souped-up version of the small-block V-8 that's said to give better acceleration and mid-range response. As much as 300 bhp could be available when certification testing is completed on the "Generation II" versions of the V-8. By comparison, the 5.7-liter engine in 1991-model-year trim supplies 245 bhp (250 bhp with performance final ratio) at 4000 rpm. Thus far the ZR-1 output of 375 bhp will remain unchanged, but insiders say more power is planned as the eternal quest for more performance continues.—K.Z.

### Blown Regal

THE ADVANCED-CONCEPTS group at Buick Motor Division has prepared a supercharged, 4-door Regal sedan for management review. Performance is said to be brisk via the same Eaton-supercharged 3800 V-6 engine coming on 1992 Park Avenue Ultra models. →

## EAGLE OPTIMA FLIES OR FLOPS IN 1992

By Ken Zino

The beleaguered Chrysler Corporation is rushing the first of its new LH-body cars into production about one year from now. Prototypes spotted on Michigan roads during testing reveal a surprising, and welcome, similarity to the Eagle Optima show car of two years ago. The unnamed production Eagle LH marks the beginning of a new generation of Chrysler platforms that are not derived from the K-cars (Plymouth Reliant and Dodge Aries) that saved the company from bankruptcy more than a decade ago.

However, if recent Chrysler sales and financial trends continue (and there is no reason in my mind to think they won't), history is about to repeat itself. Chrysler is losing money, big money—more than a half-billion dollars in the first quarter of 1991 alone—and losing market share in these tough times. So much so that Chairman Lido Anthony Iacocca is calling for more pro-

tection from the Japanese, even though his company owns 12 percent of Mitsubishi. But the real battle, as Chrysler plays for time and as sales-savvy Iacocca knows, will be in the marketplace.

Much is known about the LH cars, the result of carefully orchestrated leaks and background sessions for journalists, Wall Street financial analysts, and even politicians. The styling is a departure from the Iacocca-dictated traditional boxes of the past, which begs the question of who will buy the cars. And all the requisite technical features—Independent suspension, multi-valve overhead-camshaft engines, airbags and anti-lock brakes, among other things—are there.

François Castaing, vice president of vehicle engineering who came to Chrysler as part of the American Motors deal, insists that the LH cars will be world-class. There is enough money to do the job right. But LH is still in the future. And the promises are only that, promises, until certified cars are available for testing and customers with approved credit appear in showrooms.

At this moment Chrysler public relations people are working overtime to rebuild—cynics would say create—a reputation for engineering excellence. This job is complicated because most if not all of Chrysler's recent technical successes—Laser and Stealth—have been engineered and built in conjunction with Mitsubishi. So it's no surprise that the American-designed Dodge Viper is the current rallying point.

But beyond the Viper introduction scheduled for December, it looks like a financially drained Chrysler will come to market once again with a line of cars that needs to be an immediate hit if the company is going to survive. LH thus can be interpreted two ways—as in "Lot of Hope" or on the dark side, "Lot of Hype." The real vipers significant to Chrysler's future are competitors—Japanese and domestic alike.



Strongly resembling the Eagle Optima (above), the Eagle LH is pivotal for Chrysler.



PHOTO BY JIM DUNNE/POPULAR MECHANICS

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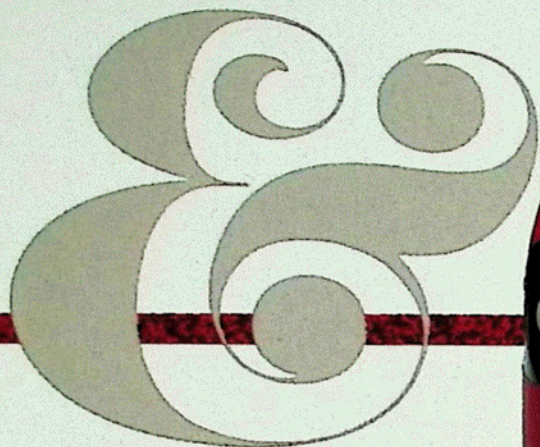
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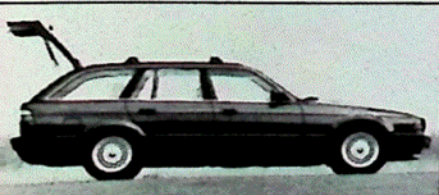


## LATE BREAKING

■ The Facel Vega, the French-made, Chrysler De Soto V-8-powered coupe—R&T called it the “‘poor’ middle-income man’s Bentley Continental”—from the Fifties, may be making a sort-of return in modern dress. The European minds and money behind the project have been talking to Chrysler President Bob Lutz, who says he is “considering” supplying the V-10 engines for the project.

■ Nissan has unveiled a new battery-charging system for electric cars that reportedly reduces charging times by 80 percent. The gist of the system is that it is capable of recharging at a higher voltage than present systems.

■ The car that has held the land speed record since 1983, Richard Noble’s Thrust 2, is going up for sale. Currently housed in Great Britain, the 633.468-mph missile will be auctioned off on October 4, the eighth anniversary of Noble’s record run. Probable price? No one knows, but it is insured at about \$1.6 million.



■ The BMW 5-Series-based Touring wagon will make its public debut at the Frankfurt auto show in September. The 6-cylinder Touring will come in two versions—520i and 525i. No word yet as to the possibility of importing the wagons into the United States.

With 200 horsepower, large P225/60R-16 Uniroyal tires, anti-lock brakes and a 4-speed automatic transaxle, the blown Regal could be more of an “ultra” model than the new Park Avenue Ultra, which weighs about 300 lb. more.

Proponents of the project argue that the blown Regal offers a chance to appeal to completely different buyers than the ones who now own Regal models. This target group includes owners of Nissan Maxima, Toyota Cressida or Lexus ES 250 models—near-luxury sports sedans selling in the low-\$20,000 range—and (at the other end of the scale) the \$35,000 BMW 5-Series.

Another more conservative Buick faction argues that a Regal Ultra (or whatever it’s called) isn’t in keeping with Buick’s traditional American car image. It’ll be interesting to see who wins.—K.Z.

## Mazda Sentia, your new 929

MAZDA’S VERY HANDSOME 929 replacement is called Sentia in Japan. It comes in 2.5- and 3.0-liter versions, both quadcam 24-valve V-6s. The 2.5 receives a favorable tax treatment here, so its populari-

## Schuppan 962LM

■ 1983 Le Mans winner Vern Schuppan is now in the business of equipping endurance-racing Porsche 962s for road use. The cars employ carbon-fiber chassis and 3.3-liter, twin-turbocharged flat-6 engines producing upward of 600 bhp. Five super-hot 962LMs and 50 962CRs will be made, to be distributed through a division of Japan’s Art Corporation starting at approximately 200 million yen (\$1,450,000).



■ Mazda’s Sentia casts aside the refrigerator-plain lines of the 929.

ty is increasing.

The Sentia gets Mazda’s electronically controlled 4-wheel steering as standard

equipment. With the car’s stretched wheelbase, it comes in handy on our narrow roads and streets.—J.Y.

## Porsche 968

■ As well as head- and taillight treatments reminiscent of the 928 and “tunnel” front fenders evoking the 911, the 968 will pack a 240-bhp 3.0-liter inline-4.



PHOTOS BY BERND RAUH

Please Tread Lightly on public and private land.



**\$11,999\*** "...the least expensive four-door sport-utility and the most miserly" *Automobile* (23 EPA est. city mpg/25 est. hwy. mpg with 5-speed manual)

## "Credit you give yourself isn't worth having."

We could tell you how tough the Suzuki 4-door Sidekick® 4x4 is, but we think *Road & Track* said it better: "...seemingly indestructible..."


Or we could talk about how much fun it is to drive. Instead, we'd rather you read what the editors of *AutoWeek* said: "...corners more like a sports car than a 4x4."

As for off-road driving, *4WD Sport Utility Magazine* said: "...will travel in the worst places with the best of them..."

And when it comes to roominess, here's what *AutoWeek* said: "...a 6-ft.-2-in. ranger, complete with smokey hat, had headroom to spare."

*Automobile* summed it up best when it said: "...this little lightweight is a heavyweight contender..."

But we'd like to know what *you* think. So call 1-800-447-4700 for the name of the dealer nearest you. Then test drive a Suzuki.

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Everyday vehicles that aren't.™

This vehicle handles differently from ordinary passenger cars. Federal law cautions to avoid sharp turns and abrupt maneuvers. Always wear your seat belt. For specific details, please read your Owner's Manual. \*Manufacturer's suggested retail price. Taxes, title, freight, and license extra. Dealers set own price. ©1991 American Suzuki Motor Corporation.





# Building a resale legend is simple. Just keep building Mercedes-Benzes.

Mercedes-Benz has earned a stellar reputation in a very straightforward way: by stressing strength, safety, reliability and durability in every car it builds. Year after year after year.

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Over a ten-year period, in fact, Mercedes-Benz cars as a line have been shown to retain a higher percentage of original value than any other line of cars sold in America\*.

And this 1991 study shows that while the value of the average 1984 car declined by 69 percent in five



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years, average Mercedes-Benz value declined by just 46 percent.

Of course, no one can predict the future—or the future value of any car. But one prediction can be made with utter certainty: as long as Mercedes-Benz continues to stress strength, safety, reliability and durability in every car it builds, the future will take care of itself.

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# MISCELLANEOUS RAMBLINGS

BY THOS L. BRYANT

IT'S INTERESTING HOW we select our boyhood heroes, particularly in sports. When I was a lad in the Fifties, I adopted certain players or racing drivers as my favorites, and to this day I can't really say why some were chosen and others were not. In baseball, Duke Snider of the Dodgers was my main man, while the football star who seemed to me to be the most glorious was Johnny Unitas of the Baltimore Colts. And on the race tracks of the world, I was a big fan of Billy Vukovich, probably because I had seen him race midget cars in the San Joaquin Valley in California during the late Forties or early Fifties. But far above all the rest, my hero was Juan Manuel Fangio.

It never crossed my mind in those years that someday I would have the opportunity to live in Argentina, the homeland of this legendary driver. And I never dreamed that many years later I would actually meet him and be able to talk with him in his native language. That opportunity came last year here in California during the Monterey Historic Automobile Races at Laguna Seca and the Pebble Beach Concours d'Elegance.

Most of our readers know very well

the amazing saga of Fangio—five times Drivers World Champion, with his greatest successes coming when he was in his 40s, an age when most racing drivers have long since retired from the Grand Prix circus. In 1951, he became World Champion, driving for Alfa Romeo, and then took the crown every year from 1954 through 1957, driving for Maserati, Mercedes-Benz, Lancia-Ferrari and back to Maserati. (Fangio's greatest race was the 1957 German GP at the Nürburgring, which we recaptured in a truly marvelous feature by Héctor Luis Bergandi in the May 1981 issue of R&T.)

All of the foregoing is a rather lengthy preamble to telling you that the 18th Monterey Historic Automobile Races (August 16-18) will pay homage to Juan Manuel Fangio rather than honor a specific marque. This is the year in which *el maestro* turns 80 years of age, and we are all very pleased that Steve Earle, president of General Racing Ltd. (organizer of the Monterey Historics), has changed the format so that enthusiasts from all around the world can salute this incredible racing driver. And in the pad-

dock area of the circuit, there will be a specially constructed museum devoted to Fangio and his racing achievements. Included in the exhibit will be several of the cars he piloted at circuits all over the globe.

What has always been one of our favorite weekends of historic cars and legendary people is going to be better than ever this year.

## Tony Hogg's Cobra

MANY LONGTIME READERS have inquired from time to time about the whereabouts of the 427 Cobra that belonged to the late Tony Hogg, Editor of *Road & Track* from 1975 to 1979. Terry Jackson, who writes a column titled "Hot Wheels" for the *Sacramento (California) Bee*, sent us a copy of his March 29 column announcing that Tony's wonderful car is on long-term loan to the Towe Ford Museum in Sacramento.

Betty Hogg, Tony's widow, commented in Jackson's story, "That car was very special to him. He was interested in cars that *went*, rather than cars that were just for show." That certainly is true, for whenever I review my fond memories of working here with Tony, I

World Champion-to-be Juan Manuel Fangio pilots his Alfa Romeo Type 159 to victory in the 1951 Grand Prix of France at Reims.





PHOTO BY JOE RUSZ

■ The late Tony Hogg in his 427 Cobra.

remember him as an enthusiast who loved to drive performance cars. Mere transportation cars were described rather ingloriously and dismissed as merely useful for going to the market. Tony Hogg was the consummate car enthusiast, and his passion for exciting cars made him a joy to be around. It's heartwarming to know that his Cobra now resides in a place of honor for all enthusiasts to enjoy.

### Dick Teague, 1923-1991

ONE OF AMERICA'S foremost automotive designers, Dick Teague, died of cancer in May, leaving a legacy of influential styling and design from his years with General Motors, Packard, Chrysler and American Motors. But of even greater impact was Teague's wonderful quality as a human being. Dick was a

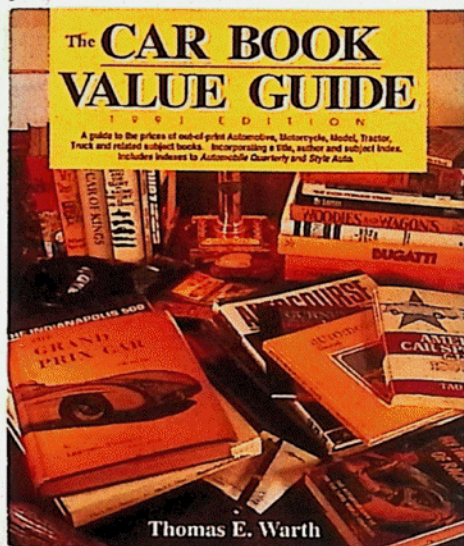
man of enormous talent in styling cars while working with very limited resources, particularly during his 23 years as head of design for American Motors.

Teague was a native Californian, born in Los Angeles, who first worked as a child actor, including parts in the *Our Gang* serials. His film career was cut short at the age of 5 when he lost an eye in an automobile accident. Hollywood's loss was Detroit's gain, however, as Dick followed a winding career path through some of the most exciting and memorable days of American automotive styling. And along the way, he made many, many friends with his warm, sincere manner and down-to-earth personal style. He is survived by his wife, Marian; a daughter, Lisa; and two sons, Rick and Jeff, both of whom followed in his footsteps to become designers. All of us at *Road & Track* are deeply saddened by Dick's death, but we rejoice in having had the opportunity to know him.

### Value guide

ARE YOU ONE of those enthusiasts with a bulging library of out-of-print books and magazines devoted to the automobile? Ever wonder what they might be worth? If so, Thomas E. Warth, the man who started *Classic Motorbooks* 25 years ago and has now

moved on to his own publishing venture, has something for you. It's titled *The Car Book Value Guide, 1991 Edition*, and it is a "guide to the prices of out-of-print Automotive, Motorcycle, Model, Tractor, Truck and related subject books." Includes indexes to *Automobile Quarterly* and *Style Asia*.



Thomas E. Warth

Admittedly, this is rather an esoteric publication, but for those readers who have spent years collecting enthusiast books and magazines, it can be great fun. The guide covers more than 4400 titles published between 1900 and 1989, and lists books ranging in value from \$10 to \$3500, according to Warth. He hopes to make this an annual publication, and he is donating any profits from *The Car Book Value Guide* to Books for Africa, a nonprofit corporation that sends used school textbooks to English-speaking countries in Africa.

Price of the guide is \$19.95, post-paid, from Tew Press, Lumberyard Shops, Marine on Saint Croix, Minn. 55047. The phone number is (612) 433-5744 if you're in a hurry.

### Getting to know you

R&T SENIOR EDITOR Joe Rusz (actually, it's Ruskiewicz, but that's a printer's nightmare) has been a part of our extended family since 1969. Joe grew up in Buffalo, New York and became car crazy at age 8, when he badgered his folks into taking him to the midget auto races at Civic Stadium (now War Memorial Stadium) in the late Forties. After hopping-up his folks' Chryslers as a teenager, Joe's first car was a 1959 Corvette, which was his pride and joy as a member and eventual president of the Clutch Artists, Buffalo's leading hot-rod club.

Rusz later served four years in the U.S. Air Force, which took him to gar-

PHOTO BY JOHN LAMM



■ Dick Teague's creations: (clockwise from top) proposal for '57 De Soto, PPG Aero Wedge, AMC Pacer and the AMX/3.

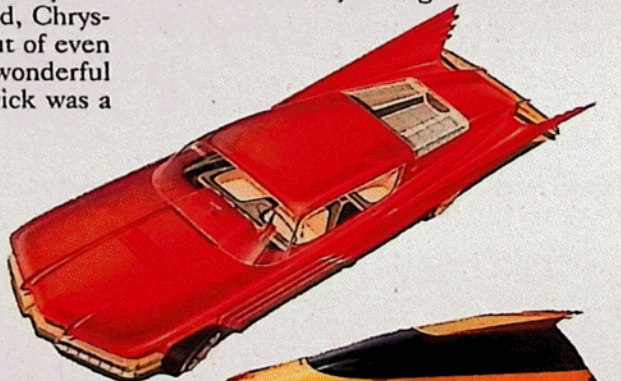


PHOTO BY RON QUERY

den spots around the world: Libya, Alaska, Texas, the Dominican Republic, Okinawa and a year in Biloxi, Mississippi. After his discharge—honorable, of course—Joe came to California in 1966 and completed his college education with an English major/journalism minor at California State University, Long Beach.

Joe's checkered career path had included a stint managing a camera store, working with a roofing crew and other glamorous jobs, so it's no surprise that with his photographic talent and writing ability, he latched onto magazine work with a passion. His first break came as the result of a college class project when he sold a story and photos to *Rod & Custom* magazine. After a period as a freelancer, Joe became the editor of *National Dragster*, the official publication of the National Hot Rod Association.

January 1969 was a big turning point in Rusz's life, for that's when he came to work at our company (then Bond/Parkhurst) as associate editor of *Dune Buggies and Hot VWs*. When that publication was sold, Joe stayed on as company photographer, shooting road tests and feature stories for *Road & Track*, *Cycle World* and *Pickup, Van & 4WD* magazines. Joe joined *Road & Track* in 1972 as staff photographer. In 1975, Rusz was named Motor Sports Editor,



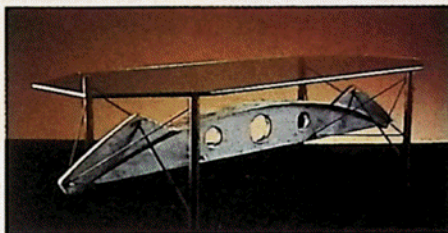
PHOTO BY RICHARD M. BARON

■ Senior Editor Joe Rusz.

in tribute to his remarkable aptitude for and interest in racing of all sorts, and he has been in charge of the monthly column *About the Sport* ever since.

In 1988, Joe was promoted to Feature Editor of R&T, and then became Senior Editor in 1990. Many SCCA club racers, as well as people associated with all forms of motorsports around the world, have come to know and admire Joe for his boyish enthusiasm, devotion to the sport and his far-reaching knowledge. Joe is one of those rare individuals who are genuinely funny as well as talented, and he regularly keeps all of us in stitches at staff meetings. His wife, Carolyn, who is a newspaper edi-


tor with the *Long Beach Press-Telegram*, once told Joe that one of his greatest talents was his capability for providing mirth in their lives. All of us at R&T would certainly attest to that. Beyond that, however, Joe is an exceptional writer, a creative photographer and one of the world's great freehand wine connoisseurs, and we take great pride in working with him.



### Racing table

FOR THOSE READERS whose world revolves around motorsports, Mark Schweitzer, a designer in Atlanta, has conceived quite a remarkable cocktail table called, appropriately, the Formula Table. The unit is based on a formula-car suspension system.

Schweitzer writes, "An occasional Formula 440 or restoration project winds up in the shop. Being an avid car enthusiast, I guess it was inevitable that design esthetics would find its way into my furniture. I hope the table will make furniture shopping a little more interesting for my fellow enthusiasts."

More information can be obtained by contacting Mark Schweitzer Studios, 1213 Dalon Dr., Atlanta, Ga. 30306; (404) 892-1750. 

## August Milestones:

■ Giovanni Bertone is born in Mondovi, Italy, 1884.

■ The Olds Motor Vehicle Company becomes the first automobile company to set up business in Detroit, Michigan, 1897.

■ The Packard Gray Wolf, one of America's earliest racing cars, is taken out for its first trials at the fairgrounds in Warren, Michigan, 1903.

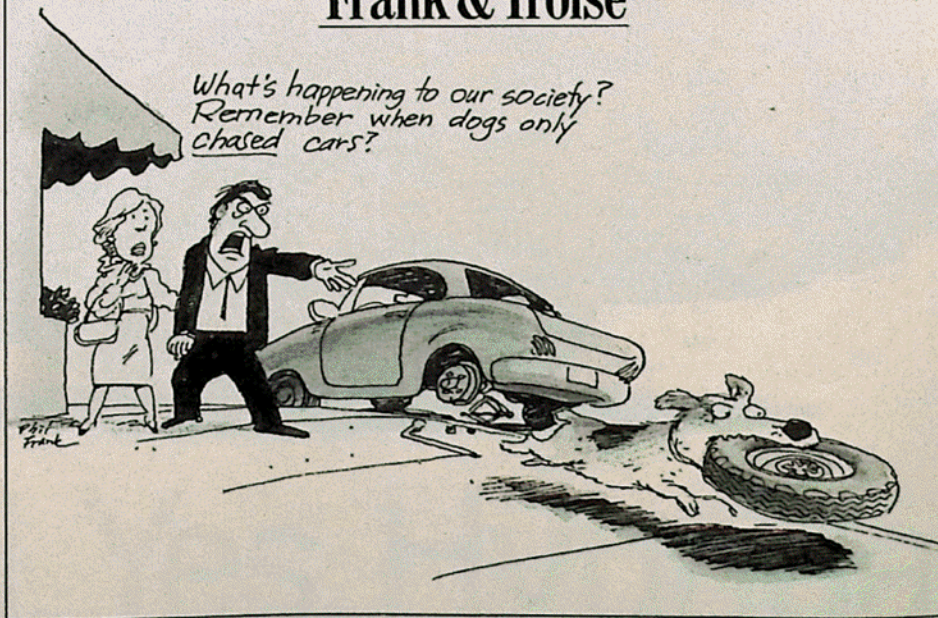
■ Lagonda earns its first competition success when Wilbur Gunn drives a Tricar to victory in the Cycle Club Gold Medal reliability trial, England, 1905.

■ Sakichi Toyoda, owner of Toyoda Automatic Loom Works, founds the Toyota Motor Company, Tokyo, Japan, 1937.

■ MG EX181, with a twincam supercharged engine, is driven by Stirling Moss to a record 246 mph at Bonneville Salt Flats, 1957.

—Otis D. Meyer  
R&T Librarian

## Frank & Troise



It flies in the face  
of convention.  
And we do mean  
flies.

The Sonata GLS V6.

Conventional wisdom tells us all we need to know about most midsize sedans.

You can get five adults into them, but scarce any performance out of them. Especially when it comes to the essentials like straight-line acceleration, overall handling and braking.

Enter the Sonata GLS V6 from Hyundai. With a fresher, smarter set of standards.

Like the largest V6 engine of any import in its class. A refined 3.0-liter, overhead cam power plant with multi-port electronic fuel-injection.

Plus an electronically controlled 4-speed automatic transmission with overdrive. And fade-

resistant, ventilated, power front disc brakes.

The result is a sedan so responsive, zero to sixty, it will outrun a Ford Taurus L, Lexus ES250 or even a BMW 735i. And so well-balanced, seventy to zero, it will stop quicker, too.\*

Sonata's road manners are equally impressive. Thanks to independent front suspension, front and rear stabilizer bars and a host of other technical refinements.

Yet inside, Sonata surrounds you with more passenger room than any car in its class. More than Accord, Camry or Stanza.

And indulges you with its many persuasive

powers: Power steering and brakes. Power windows and door locks. Dual power rearview mirrors. Plus a power antenna.

You'll even find air conditioning, cruise control and a high-output AM/FM stereo cassette with 6 speakers. All standard.

Sonata also boasts a pair of owner protection programs: A 36-month/36,000-mile bumper-to-bumper limited warranty with no deductible. Plus a year's free membership in Hyundai's special 24-hour roadside assistance program.†

The Sonata GLS V6 from Hyundai. Welcome to life in the smart lane.

**HYUNDAI**



Hyundai. Yes, Hyundai.

\*CAR and DRIVER, "ROAD TEST DIGEST," 8/90. †SEE DEALER FOR DETAILS. DO BUCKLE UP. DON'T DRINK AND DRIVE. © 1990 HYUNDAI FOR A FREE BROCHURE AND THE DEALER NEAREST YOU, CALL 1-800-826-CARS.

# Lamborghini DIABLO

Passing the torch and fanning the flames

BY KIM REYNOLDS  
PHOTOS BY RON PERRY



**T**HE BLACK LAMBORGHINI Diablo had finally been coaxed off the flatbed truck and rolled out onto the rubber-smearred asphalt of the Los Angeles County Fairgrounds' dragstrip in Pomona, California. Ordinarily, this is a quiet, almost desolate place of occasional blowing paper cups and droning Cessnas doing touch-and-gos at adjacent Brackett Field.

But today is very different. Circling the Diablo like bees around their queen are all manner of people busy with jobs to do. We're checking out the test gear, photographers are unpacking their cameras, and a video crew—director, cameraman, sound technician and a stun-

ning blond hostess in leather pants—are rehearsing. Today, a new Lamborghini is facing the impartial measure of track testing, and it's an event.

It's strange, really, how the inaugural test of a significant new sports car—particularly one of the Diablo's stature—can have such a magnetic effect on people. Squatting cold and indifferent on the tarmac, the Lamborghini, however, seems unconcerned with the fuss. Like Princess Stephanie of Monaco being gawked at in a sidewalk cafe, the Diablo is simply too beautiful and regal to notice.

Its predecessor, the Countach, was an altogether different animal. It was a

hellion that landed in our laps like a folding knife with all its blades exposed. The Diablo is more subtle, more classy, quietly hypnotizing instead of shaking you by the lapels. Light reflecting from its flowing surfaces beckons you closer, like a spider in its web, perhaps. A considerable 10.2 in. longer, 1.6 in. wider and 1.4 in. taller than the Countach, the Diablo's more graceful styling leads you to believe it could be smaller than the Countach.

Their commonality of wedgy, almost reptilian shapes is understandable because designer Marcello Gandini penned both (the Countach during his years at Bertone; it bowed at the 1971





■ The Diablo, like its Countach forebear, makes quite a statement when its swing-up doors are raised. Inside, there's substantially more room than in the Countach, but the odd double-tier gauge layout of the instrument panel takes some getting used to.



Geneva auto show). However, there's much greater similarity between the Countach and Diablo than between any of his earlier production Lamborghinis, which include the Urraco, Espada and, in particular, the Countach's direct predecessor, the classic Miura. Plainly, the engineers' and stylists' charge was to evolve a new, Nineties' Countach. Which, of course, is a splendid idea.

In fact, squint at the Diablo's profile and you'll recognize the Countach's simple sweeping arch, familiar forward cabin, scissor-opening doors (which Gandini introduced on his 1965 Alfa Romeo

Carabo show car) and long tail. However, his original, fine-edged 1987 proposal for the Diablo's shape met with stony silence when presented to Lamborghini's then new owner, Chrysler.

Some suspect Chrysler's own stylists were eager to try their hand. But one thing is certain: Chrysler was determined that the Countach's faults wouldn't be repeated. And it had two colossal ones—terrible outward vision and cluttered aerodynamics. Ergonomics and wind tunnels, Detroit knows something about, and unquestionably, the Diablo is a better car for it.

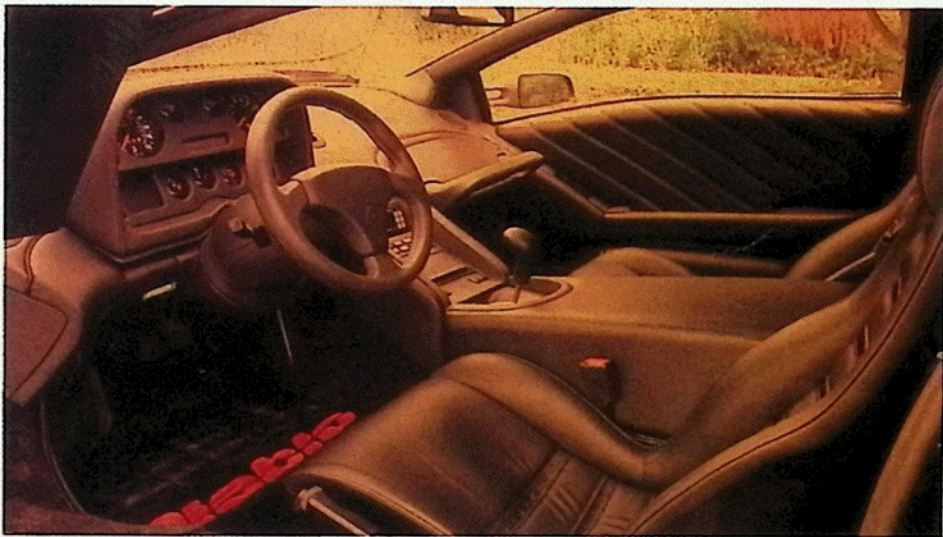
Respecting Gandini's basic design, Chrysler's stylists carefully softened the prototype's stiff creases, ironing out small irregularities that can throw air into a tumbling vortex. The greatest changes were at the rear where the original tall, boxy radiator ducts (echoing the Countach's memorable "ears") were considerably smoothed. The Diablo's stern now flowed like a long cape in a strong wind. It boasts a fine 0.31 drag coefficient, a huge improvement over the Countach's estimated 0.40.

The process was not without turmoil, however. In June 1988, Britain's *Auto-*



ers, rocker panels and transmission tunnel are carbon fiber. Remember the one-off composite-chassis Countach Paul Frère wrote about in January 1988? That car was a rolling test bed for several technologies, the primary one being composites. Now we're beginning to see the fruits of that project (including all-wheel drive, expected to appear on the Diablo in about a year).

**The Countach was a hellion that landed in our laps like a folding knife with all its blades exposed. The Diablo is more subtle, more classy, quite hypnotizing . . .**



Beneath this thin shell of art and aerodynamics is a chassis structure cribbed from the Countach and evidently inspired by John Roebling's Brooklyn Bridge. It's a veritable spider web of tubes encasing the occupants and drivetrain, but now composed of more practical square sections instead of the Countach's round variety. And with a nod to what's been learned about crash safety in the past 20 years, the chassis's center constitutes a robust survival cell of high-strength steel, while the fore and aft ends consist of softer steel, scored here and there for progressive collapse.

*car* magazine interviewed Gandini at his 17th-century home near Turin, during which he erupted, "The new car you see in spy photos is not the car I designed." However, the rift was eventually bridged, and the production Diablo wears Gandini's name. None of his designs ever had before.

Up front, the Diablo splits the air with a flowing, one-piece nose cone. Step away a few feet, ignoring the front fenders' high nostril vents, and you'll see the similarity to the Lotus Elan's face. Farther back, the Diablo's door windows are now one piece, bigger than the Countach's and almost fully retractable into the doors. Stylistically, their forward edges also kink down toward the front wheel wells, emphasizing the steeply angled windshield.

Like the Countach, the Diablo bristles with scoops. Those notched into

the rocker panels cool the oil radiator behind the driver, though the enormous 26.4-gal. fuel tank behind the passenger seat renders the right side vent non-functional. Following the side glazing, two additional intakes gather air; the first, a small slit, provides for the engine's aspiration. The second, a much larger well, feeds air to each rear fender's radiator, while a multitude of louvers below the taillights exhaust the heated flow.

Anyone who's leaned on a Countach and been admonished by its owner knows its body is made of unstressed, thin, pure aluminum. Light, purposeful, but easily dented. (In fact, Lamborghini originally considered stiffer aircraft alloys of the day, but workability ruled against them.)

However, now the majority of the Diablo's body panels are a stiff alloy, though the stress-bearing roof is steel. The front decklid, engine cover, bump-

As similar as the Countach and Diablo chassis appear, the two cars parcel their space in subtly different ways. Up front, the Diablo offers a larger and easier-loading trunk that's reasonable for a weekend trip for two (particularly if it contains the optional fitted luggage). That's important because the Diablo doesn't have the Countach's additional rear trunk, its twin, stacked catalytic converters taking care of that. It also doesn't bother with a spare tire (which the Countach crowded up front). The Diablo dash includes a tire low-pressure warning light; the trunk holds a can of flat-fixer for emergencies.

The most striking alteration to the chassis' layout is the wheelbase, stretched a considerable 5.9 in. That and the additional 1.4 in. in overall



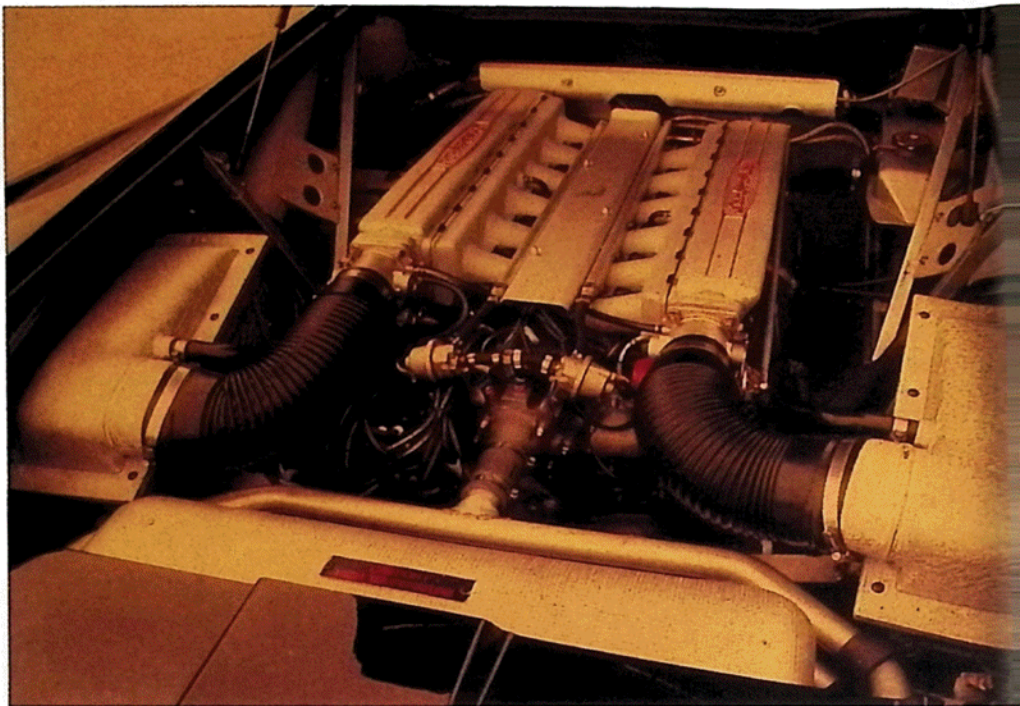
height mean a cabin that's—remember, we're speaking of exotic cars here—nearly commodious. Swing up the driver's door, duck a little, and slip onto the thin, very Italian leather seats, and you'll find reasonable room to work with. Leg room is now adequate, but most significant, our tape measure reports an additional 2 in. of head room, and for most people, it's the difference between looking at your knees or the road.

The seats, by the way, are surprisingly comfortable considering their minimal padding, but you'd better be very thin abeam (they're only 16.5 in. wide). Additional hospitality is provided by a steering wheel adjustable for rake and distance, and a small degree of vertical adjustment for the instrument pod. Unfortunately, for most drivers, the tach and speedometer are partly blocked by the upper steering-wheel rim, no matter what adjustments you try.

Fortunately, improvements in outward vision make up for this. While the bigger side glass should calm claustrophobic passengers, the view through the rearview mirror and over the shoulders in traffic will positively bring tears to the eyes of Countach owners. That's not to say it's great, but finally you can piece together what's in the next lane visually, rather than tactily.

**G**ently raise the delicate carbon-fiber engine cover, and the sight is sure to bring a low whistle from anyone nearby. Physically, the engine is immense and dominated by two long intake plenums interlinked with a dozen straight runners. Oddly, this engine has a rougher appearance than previous Lamborghini powerplants and is a contrast to Ferrari's neat, black or red crinkle-finished twelves. However, the Diablo's V-12 is certainly a dramatic sight in its own purposeful way, in the manner of, say, a Merlin aircraft engine.

Once more the V-12 sits longitudinally and is turned completely around so its nose faces the rear bumper. Bolted to its rear, the 5-speed gearbox reaches far into the cabin, offering a short, direct shift linkage. (Contrary to many people's suspicions, the shift lever doesn't actually enter the gearbox.) The transmission's output shaft feeds a transfer box, stepping the power to the passenger side of the chassis and rearward through a short driveshaft running next to the engine's sump (instead of through it, as the Countach's did). Integral with the sump casting is a delicate differential housing nestled ahead of the crankshaft pulley. And immediate-



ly rear of the engine's nose are the stacked three-way catalytic converters. What with Europe's emissions standards approaching our own, Lamborghini decided to build a one-specification Diablo for sale worldwide.

While obviously derived from the Countach's V-12, the new Diablo unit should be regarded as a truly new engine. The Countach's block, you'll remember, began its production life in 1973 as a slightly peaky 375-bhp 4.0-liter brimming with potential. When Countach production finally ended, not only had its potential been reached, but also efforts to wrench the last drops of power out of it were looking positively desperate. The bores were maximized with the 1982 5.0-liter. In 1985, 4-valve heads appeared, and with the 15th Anniversary Countach, spacers were bolted between the block and heads, increasing the stroke and its final output to 455 bhp. Also impressive, torque had risen from 266 lb.-ft. to 369, but a new engine was plainly required.

The Diablo's alloy block is a redesigned, stiffer casting, displacing 5.7 liters via 1.5-mm-larger bores and a 5-mm-longer stroke. Again, its combustion chambers breathe through four valves per cylinder, but its camshafts are now driven by a single-row chain, which is automatically tensioned. Naturally, being more than a half-liter larger, the Diablo V-12 is considerably more powerful, developing 492 bhp at 6800 rpm (up 42 bhp). But, because of the emphasis on stroke, torque is even greater, rising 60 lb.-ft. to a

**T**he Diablo can suddenly transform itself from a piece of delicate, exquisite static sculpture into a machine of explosive motion.

massive 428 at 5200 rpm.

Bigger combustion chambers are one thing, but unlike Lamborghini's engines of the past, the Diablo's finally has an electronic conductor to direct Sant' Agata's mechanical orchestra. Swapping sequential Weber Marelli fuel injection for the later Countach's Bosch KE-Jetronic, an integral engine-management system gives the Diablo better power, lower emissions and newfound docility.

At idle, the whirring of the radiator's little electric fans holds its own against the enormous engine's rumble for predominate noise. But pull the stiff shifter into the 1st-gear slot, blip the heavy throttle, let out the firm clutch, and the Bull clears its throat.

If the V-12's finish could be compared to a large aircraft engine, its sound is an equally purposeful baritone roar. Not at all like the high-pitched si-

■ Though lacking the neat, wrinkle-finished castings we've come to expect with Ferrari engines, the Diablo's V-12 has jaw-dropping visual impact with its massive plenums and airboxes. Power is 492 bhp, torque is 428 lb.-ft. at 5200 rpm and the sound!—it's like the deep, brassy resonance of a dozen trombones.



ren of a Ferrari twelve, the Lamborghini resonates with a deep brassiness. Think of a dozen trombones. And think of driveability unheard of with the Countach. Lug the engine down to 1000 rpm in 2nd gear, mash the throttle, and it pulls cleanly to its 7500-rpm redline, gaining volume and noticeable urge at about 4700 rpm.

One of the most fascinating aspects of an exotic like the Diablo is how suddenly it can transform itself from a piece of delicate, exquisite static sculpture into a machine of explosive motion. Just like that the Diablo can disappear from sight, its tail seemingly shrinking as it charges for the quarter-mile stripe. Our best accelera-

tion run produced a 0-60-mph time of 4.5 seconds, the quarter mile passing in 13.3 sec. at 114.0 mph. As impressive as that sounds, it doesn't match Lamborghini's claimed 4.0 sec. to 100 km/h (62 mph). But we're not doubting their figures. Our test car, lent to us by *Road & Track* friend Dan Tsujioka shortly after its arrival in Southern California,

■ Around the skidpad, the Diablo generates 0.91g with little fuss. Body roll is virtually nil, and balance in this sort of steady-state cornering is much more manageable than the car's rear-heavy weight bias would suggest.

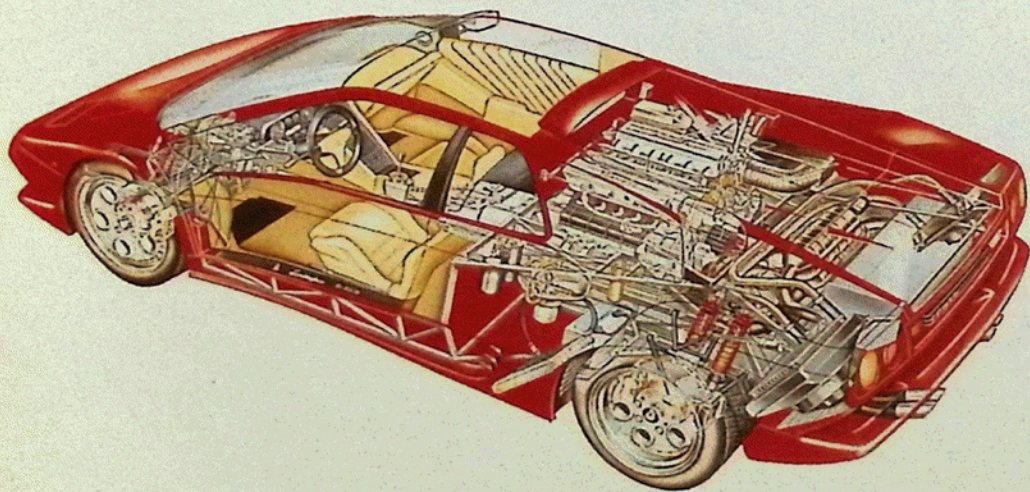
had only 300 miles on the odometer. Also the track's ambient temperature hovered at 90 degrees. We're sure Dan's Diablo will deliver all of Lamborghini's purported performance given better circumstances.

Comparatively, however, its acceleration is superior to the Countach's. Despite being more than 300 lb. heavier than the last Countach we tested (a 420-bhp 5000S Quattrovalvole in March 1986), the Diablo is 0.7 sec. quicker to 60 mph and arrives at the quarter mile a third of a second sooner.

Brakes are 13.0-in. vented discs up front, and 11.2-in. vented discs at the rear. Ordinarily, we'd chastise Lamborghini for not equipping the Diablo with an anti-lock system, but given its excellent stopping distances (142 ft. from 60 mph and 247 ft. from 80 mph), plus the brake pedal's remarkable sensitivity, this would sound like carping.

At each corner, the Diablo's suspension is very similar to the Countach's effective design: tried-and-true upper and lower A-arms (of welded steel tubing and painted black), anti-roll bars and twin, coilover shocks at the rear. You really don't expect a car like the Diablo to ride very smoothly, but its

**Soon to come: all-wheel drive and a semiautomatic transmission!**



considerable weight and added bushings at the suspension's pick-up points have clearly improved composure when the going gets rough.

In deference to Mr. Tsujioka's fondness for his car, its tail-heavy weight distribution and Pomona's guardrails (which appear to be at eye-level to the Diablo driver), our slalom test was postponed for a safer environment. We'll be reporting those results soon.


When we circled the skidpad, however, the Diablo's handling was clearly a surprise. Judging from its specifications, you'd expect a ticklish degree of oversteer with lifted throttle, plus a willingness to do the same when the pedal's mashed. But the Diablo faithfully followed its steering directions, nearly oblivious to its almost 500 bhp and unequal weight distribution. Shod with the big Formula 1-derived Pirelli P Zeros (245/40ZR-17 fronts, 335/35ZR-17s at the rear), which are also fitted to the Ferrari F40 and upcoming Jaguar XJ-220, the Diablo delivered a dramaless 0.91g.

Several months ago, Senior Editor Joe Rusz had the opportunity to drive a bright yellow Diablo on Italian *autostrade* as well as the Varano racing circuit near Forno (R&T, December 1990).

From his track driving, Joe reported, "With power on, it understeers in slow corners but remains neutral in fast ones. Power off, it oversteers no matter what." At the lower speeds of our skidpad testing, our test Diablo felt less delicate, a difference we can only ascribe to variations in the two cars' suspension tune. Indeed, that early Diablo was also troubled with a sticky steering rack, while our test Diablo's was merely heavy. As Lamborghini settles into normal Diablo production, perhaps the bugs are being ironed out.

In the next several months, the Diablo is due some interesting technical additions. Topping the list is all-wheel drive, rather elegantly achieved with a viscous unit and short carbon-fiber driveshaft attached to the transmission's nose, taking up to 17 percent of the engine's power to a front differential. In fact, the present Diablo's front-wheel hubs are already designed to accommodate the halfshafts.

Another expected feature is a curious semiautomatic transmission that allows the use of a conventional shifter without the clutch. Unlike Porsche's Tiptronic, the standard shift pattern will be retained, and engagement quickness will be adjustable by the position of a ring on the shifter itself.

These two developments suggest more than we could have guessed when reports of a Countach successor first began to filter in. Considered alone, the Diablo is a faster car than the Countach, and in every respect, it's a better car as well. And that alone deserves due compliment. But whereas the Countach was the product of a tiny company working well beyond its means, the scope of the Diablo's ambitious dimensions suggests a changing Lamborghini. One that's no longer content just to survive in Ferrari's shadow. We suspect there are going to be some fascinating years ahead around Modena. 

# Lamborghini DIABLO

## IMPORTER

Lamborghini U.S.A., Inc.  
7601 Centurion Parkway,  
Jacksonville, Florida 32256

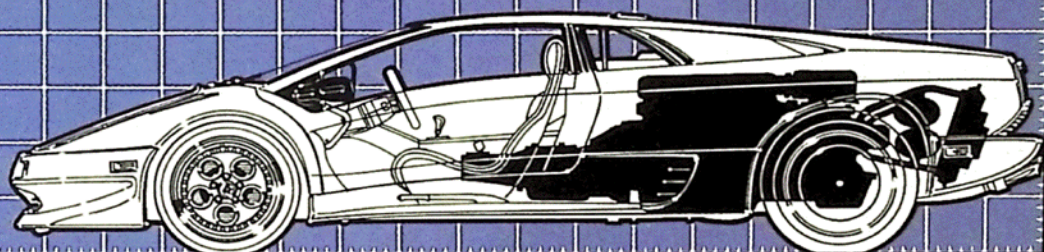
## PRICE

List price, all POE ..... **\$239,000**  
Price as tested ..... **\$239,000**  
Price as tested includes std equip. (air cond, AM/  
FM stereo/cassette, CD player, leather interior, elect.  
adj mirrors & window lifts).

## TEST CONDITIONS

Temperature ..... 90° F  
Wind ..... calm  
Humidity ..... 21%  
Elevation ..... 990 ft

0-60 mph ..... **4.5 sec**  
0-1/4 mi ..... **13.3 sec**  
Top speed ..... **est 202 mph**  
Skidpad ..... **0.91g**  
Slalom ..... **na**  
Brake rating ..... **excellent**



SCALE: 10 in. (254 mm) DIVISIONS  
DRAWING BY BILL DOBSON

## ENGINE

Type ..... aluminum head & block,  
**V-12**  
Valvetrain ..... dohc 4-valve/cyl  
Displacement ..... 348 cu in./5707 cc  
Bore x stroke ..... 3.43 x 3.15 in./  
87.0 x 80.0 mm  
Compression ratio ..... 10.0:1  
Horsepower  
(SAE) ..... **492 bhp @ 6800 rpm**  
Bhp/liter ..... 86.2  
Torque ..... **428 lb-ft @ 5200 rpm**  
Maximum engine speed ..... 7500 rpm  
Fuel injection .. Weber-Marelli elect. port  
Fuel ..... prem unleaded, 91 pump oct

## CHASSIS & BODY

Layout ..... **mid engine/rear drive**  
Body/frame: aluminum, composite &  
steel/tubular steel  
Brakes  
Front ..... **13.0-in. vented discs**  
Rear ..... **11.2-in. vented discs**  
Assist type ..... vacuum  
Total swept area ..... 519 sq in.  
Swept area/ton ..... 287 sq in.  
Wheels ..... cast alloy; **17 x 8 1/2 f,**  
**17 x 13 r**  
Tires: Pirelli P Zero; **245/40ZR-17 f,**  
**335/35ZR-17 r**  
Steering ..... **rack & pinion**  
Overall ratio ..... na  
Turns, lock to lock ..... 3.2  
Turning circle ..... 43.3 ft  
Suspension  
Front: **upper & lower A-arms**, coil  
springs, tube shocks,  
anti-roll bar  
Rear: **upper & lower A-arms**, dual  
coil springs, tube shocks,  
anti-roll bar

## DRIVETRAIN

Transmission ..... **5-sp manual**  
Gear Ratio Overall ratio (Rpm) Mph  
1st ..... 2.31:1 ..... 8.87:1 ..... (7500) 61  
2nd ..... 1.52:1 ..... 5.85:1 ..... (7500) 92  
3rd ..... 1.13:1 ..... 4.32:1 ..... (7500) 125  
4th ..... 0.89:1 ..... 3.41:1 ..... (7500) 159  
5th ..... 0.68:1 ..... 2.59:1 ..... est (7270) 202  
Final drive ratio x transfer ratio ..... 2.41:1 x 1.59:1  
Engine rpm @ 60 mph in 5th ..... 2160

## GENERAL DATA

Curb weight ..... **est 3620 lb**  
Test weight ..... est 3760 lb  
Weight dist (with  
driver), f/r, % ..... est 41/59  
Wheelbase ..... 104.3 in.  
Track, f/r ..... 59.4 in./64.6 in.  
Length ..... **175.6 in.**  
Width ..... **80.3 in.**  
Height ..... **43.5 in.**  
Ground clearance ..... 5.5 in.  
Trunk space ..... 6.5 cu ft

## MAINTENANCE

Oil/filter change: 7500 mi/7500 mi  
Tuneup ..... 15,000 mi  
Basic warranty ..... 24 mo/24,000 mi

## ACCOMMODATIONS

Seating capacity ..... **2**  
Head room ..... 36.0 in.  
Seat width ..... 2 x 16.5 in.  
Leg room ..... 42.0 in.  
Seatback adjustment ..... 35 deg  
Seat travel ..... 7.8 in.

## INTERIOR NOISE

Idle in neutral ..... 62 dBA  
Maximum in 1st gear ..... 89 dBA  
Constant 50 mph ..... 77 dBA  
70 mph ..... 82 dBA

## INSTRUMENTATION

220-mph speedometer, 9000-rpm  
tach, oil press., oil temp, coolant temp,  
volts, fuel level

## ACCELERATION

Time to speed	Seconds
0-30 mph	2.2
0-40 mph	3.0
0-50 mph	3.8
0-60 mph	4.5
0-70 mph	6.0
0-80 mph	7.4
0-90 mph	9.0
0-100 mph	10.8
Time to distance	
0-100 ft	3.1
0-500 ft	7.5
0-1320 ft (1/4 mi)	13.3 @ 114.0 mph

## BRAKING

Minimum stopping distance  
From 60 mph ..... 142 ft  
From 80 mph ..... 247 ft  
Control ..... very good  
Pedal effort for 0.5g stop ..... 26 lb  
Fade, effort after six 0.5g stops from  
60 mph ..... 30 lb  
Brake feel ..... excellent  
Overall brake rating ..... excellent

## HANDLING

Lateral accel (200-ft skidpad) .. 0.91g  
Balance ..... mild understeer  
Speed thru 700-ft slalom ..... na  
Balance ..... na  
Lateral seat support ..... very good

## FUEL ECONOMY

Normal driving ..... est 11.0 mpg  
EPA city/highway ..... 9/14 mpg  
Cruise range ..... 280 miles  
Fuel capacity ..... 26.4 gal.

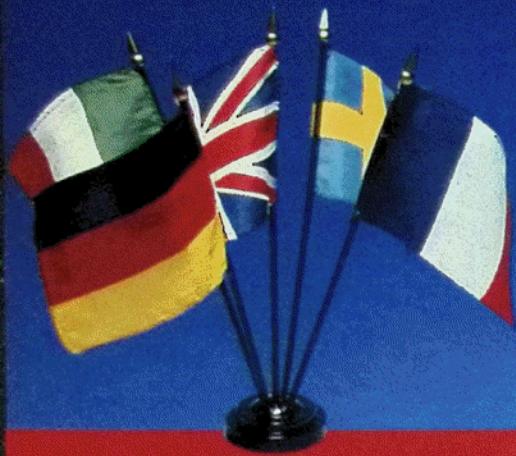
*Subjective ratings consist of excellent, very good, good, average, poor; na means information is not available.*

## Test Notes . . .

■ The Diablo's favored starting technique is to drop the clutch at about 4000 rpm as you stomp on the throttle. Use more revs and the rear wheels spin wildly.

■ Under hard braking, wheels and tires as large as the Diablo's are often difficult to modulate. However, the Lamborghini's pedal feels remarkably sensitive, despite its high effort.

■ Easier to drive than the Countach, the Diablo still demands considerable physical effort to control. Fortunately, it also offers improved interior space, ventilation and outward vision.



# EUROPEAN INFLUENCE

Eight sporting sedans  
with price tags less than \$30,000



WITH ALL THE ballyhoo from Japanese and American automakers about how their cars have come to ride and handle generally like their European competitors, it's easy to overlook the very cars that set the standards to which they aspire. To address this, we've brought together for comparison a fleet of two Swedes (Saab 9000S, Volvo 940 Turbo), three Germans (Audi 90 Quattro 20V, Mercedes-Benz 190E 2.3, Volkswagen Passat GL), an Italian (Alfa Romeo 164 L), a Frenchman (Peugeot 405 Mi 16) and a Brit, albeit one with Japanese ancestry (Sterling 827SL). And laying to rest any notion that fancy European sedans are priced out of the reach of mere mortals, all cars tested herein have base prices of less

than \$30,000—avoiding the 10-percent luxury tax levied on the amount of purchase price exceeding \$30,000.

This list is not quite all-inclusive—conspicuous by its absence is the BMW 3-Series, what with the new version being available as you read this, but unavailable to us at press time (a road test is slated for an upcoming issue). But it certainly provides a robust sampling of what's available for less than \$30,000.

Our California/Nevada evaluation loop took us through Death Valley National Monument, then north and up the gradually ascending backside of the White Mountains, with the steepness of the Sierra Nevada range as a dramatic snow-capped backdrop. The terrific twisty bits and undulations of Route 168 tested suspensions (even the bump

stops), sidewalls, brakes—and intestinal fortitude, in roughly that order. Less hectic times, tooling through the towns of Big Pine and Lone Pine on Highway 395 and back to home camp in Newport Beach, gave pause to absorb the cars' finer points. As we drove from Death Valley's Badwater Basin (at 282 ft. below sea level, the lowest point in the contiguous United States) to within 15 miles of Mount Whitney (at 14,491 ft., the highest), it was fitting to note the lows and highs of the cars, too.

After seemingly endless car swapping and note writing, we found all eight to be extraordinarily competent European sedans, each with truly distinct mannerisms and design. Without further hesitation, the cars, presented in alphabetical order:

PHOTOS BY RICHARD M. BEARON





## Alfa Romeo 164 L

TO DIE-HARD *Alfisti*, the news that the 164 was to be a *front-drive* car was absolutely earth-shattering. Unlike the Milano that preceded it, you can't pitch the 164 into a turn and then exit in your finest power-on, opposite-lock imitation of Tazio Nuvolari. But the 164 chassis is incredibly rewarding to drive. Starting with the basic platform shared with the Saab 9000, Fiat Croma and Lancia Thema, Alfa went its own way with different suspension design, chassis tuning and styling, while retaining the very best thing of the Milano, its 3.0-liter sohc V-6.

And what an engine it is. Though a little soft on torque at low rpm, the Alfa's 183-bhp V-6 climbs to its 6500-rpm redline with a vengeance, peaking at 185 lb.-ft. at 4400 rpm, making truly satisfying mechanical sounds all the way up. And the gearbox, despite its recalcitrant engagement of reverse, is a joy, with a rod-actuated gearshift linkage that manages to feel mechanically direct yet operates with a light touch.

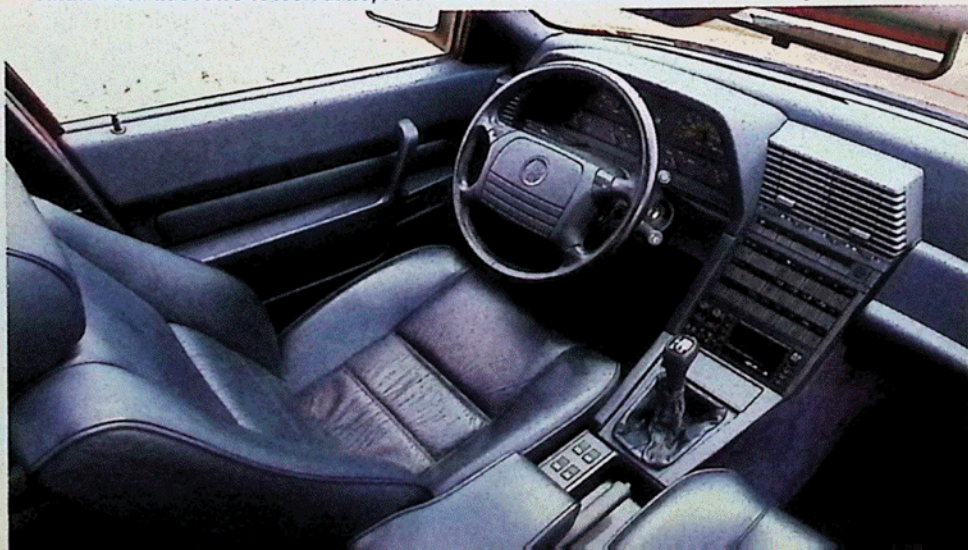
Though at 3325 lb. the Alfa is the heaviest car of the pack, it's one of the most stiffly sprung and feels as if it has the least body roll. But don't equate this firmness with a lack of suspension compliance; the 164 exhibited leechlike roadholding when negotiating the twisty parts, with near-neutral handling (no doubt helped by shifting some weight rearward with a trunk-mounted battery) and impressive grip. Nor is it so stiff that a cross-country trip would be uncomfortable. Aiding and abetting the suspension are steering and braking systems with the same enjoyable mechanical honesty that the engine and transmission exhibit.

If a sore spot exists, it's the interior

or, more precisely, the driving position. One needs an extra-long set of arms and a correspondingly stubby set of legs to deal comfortably with the steering wheel and pedal locations, seemingly a trademark of Italian cars. The steering wheel, which telescopes but doesn't tilt for adjustment, obscures a large portion of the tachometer for anyone who stands more than 6 ft. tall. But the seats are comfortable and properly bolstered, and the rear-seat passengers, in addition to enjoying a decent amount of space, have the niceties of pull-up sunshades and a storage box built into the shelf behind the seats.

And then there's the 164's subtle wedge shape, handsome from any angle, and looking like nothing else from the front with its distinctive triangular grille dipping into the bumper. Many of us were taken by the styling and handling, but turned off by little flaws in the interior—a sunroof that rattled in the vent position, the shoddy trap door that swings up when the console-mounted parking brake is set, the wobbly feel of the look-alike rows of buttons for the ventilation system on the dash, the electric seat-height adjust-

ment that refused to work. But Alfa owners have always put up with the little eccentricities to enjoy the sporting attributes of their cars, and so the tradition continues.



### Alfa Romeo 164 L

#### PRICE

Base price .....	\$28,460
Price as tested .....	\$29,810

#### SPECIFICATIONS

Curb weight .....	3325 lb
Wheelbase .....	104.7 in.
Track, f/r .....	59.6 in./58.6 in.
Length .....	179.4 in.
Width .....	69.3 in.
Height .....	54.8 in.

#### ENGINE & DRIVETRAIN

Engine .....	sohc V-6
Bore x stroke .....	93.0 x 72.6 mm
Displacement .....	2959 cc
Horsepower (SAE) .....	183 bhp @ 5800 rpm
Torque .....	185 lb.-ft @ 4400 rpm
Transmission .....	5-speed manual

#### CHASSIS & BODY

Layout .....	front engine/front drive
Brake system, f/r .....	vented discs/discs, ABS
Wheels .....	cast alloy, 15 x 6J
Tires .....	195/65VR-15
Steering type .....	rack & pinion, power assist
Suspension, f/r: MacPherson struts, lower A-arms, coil springs, tube shocks, anti-roll bar/struts, dual lower lateral links, trailing links, coil springs, tube shocks, anti-roll bar	

#### PERFORMANCE

Acceleration:	
0-60 mph .....	8.3 sec
0-1320 ft (¼ mi) .....	16.6 sec @ 86.3 mph
Braking*:	
Minimum stopping distance	
From 60 mph .....	130 ft
From 80 mph .....	242 ft
Handling*:	
Lateral acceleration .....	0.78g
Slalom (700-ft) .....	61.0 mph
Fuel economy:	
Normal driving .....	22.1 mpg

\* Figures taken from Alfa Romeo 164 S road test, June 1990

# Kickin' Dirt And Takin' Names!

\*Comparisons exclude other GM products. †K1500 4x4 with standard 4.3 V6 and 5-speed manual transmission. EPA est. MPG city 16 hwy 20. Chevrolet and the Chevrolet emblem are registered trademarks and Chevy is a trademark of the GM Corp. © 1991 GM Corp. All Rights Reserved. Let's get it together... buckle up.



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## Audi 90 Quattro 20V

NO QUESTION, THE Audi 90 Quattro 20V, with its hunkered-down sassy stance, meaty Goodyears and bold 5-spoke Speedline wheels, looks the part of a serious competitor. And if this evokes an image of Michele Mouton expertly drifting a short-wheelbase Quattro to a new class record at Pikes Peak or one of Hurley Haywood winning the Trans-Am championship the first year out in a 200 Quattro, well, it's more than simple coincidence.

The competition breeding shines through when the Audi is pushed hard. The only car in the group with all-wheel drive, the 90's chassis is unflappably stable and never seems to put a wheel wrong. But it doesn't communicate with its driver the way the Alfa does.

■ Audi's leather-wrapped steering wheel has the most smoothly integrated alrbag.



The high-set steering wheel has a skinny (though leather-wrapped) rim, and there's some looseness around the center position. As the corner tightens up and more steering is cranked in, effort increases in a nice, linear fashion, but there's no intimate sense of what the front tires are doing. The brakes show no nasty habits, but the pedal feel is slightly rubbery.

For a fairly small car (having the shortest wheelbase and second-shortest overall length), the Audi is rather heavy (at 3195 lb., only the Alfa outweighs it). This taxes the limits of the dohc 2.3-liter 20-valve inline-5 that puts out a respectable 164 bhp at 6000 rpm—the Audi feels very reluctant to move away from rest, even with moderate clutch slippage in 1st gear. There's a real sense of trying to accelerate all that mass in the drivetrain (and, of course, in the rest of the car).

Once moving, however, the engine has a strong surge of mid- and upper-range torque and is reasonably smooth as it growls its 5-cylinder song on the way to a 7200-rpm redline. Shifts have a very direct, mechanical feel about them but require a healthy tug on the polished wood shift knob, and ratios are well spaced.

Inside, the Audi is a little claustrophobic or just cozy, depending on your tolerance for these things. The high-waisted design with its consequent smaller glass area makes seeing out a mite more difficult here than in the others and gives the cabin the impression of narrowness. But there's not a finer interior in the group, in terms of nicely textured plastic, beautifully finished wood and excellent assembly fit. Gauges are superb, with all in the main cluster easily visible through the steering wheel, but dials for voltage, oil pressure and oil temperature, while appreciated, are mounted frustratingly low

## Audi 90 Quattro 20V

### PRICE

Base price .....	\$29,200
Price as tested .....	\$32,190

### SPECIFICATIONS

Curb weight .....	3195 lb
Wheelbase .....	99.9 in.
Track, f/r .....	55.6 in./56.3 in.
Length .....	176.3 in.
Width .....	66.7 in.
Height .....	54.8 in.

### ENGINE & DRIVETRAIN

Engine .....	dohc 4-valve/cyl inline-5
Bore x stroke .....	82.5 x 86.4 mm
Displacement .....	2309 cc
Horsepower (SAE) .....	164 bhp @ 6000 rpm
Torque .....	157 lb-ft @ 4500 rpm
Transmission .....	5-speed manual

### CHASSIS & BODY

Layout .....	front engine/all-wheel drive
Brake system, f/r .....	vented discs/discs, ABS
Wheels .....	cast alloy, 15 x 7J
Tires .....	205/50R-15 85V
Steering type .....	rack & pinion, power assist
Suspension, f/r: MacPherson struts, lower A-arms, coil springs, tube shocks, anti-roll bar/Chapman struts, lower A-arms, coil springs, tube shocks, anti-roll bar	

### PERFORMANCE

Acceleration:	
0-60 mph .....	9.4 sec
0-1320 ft (¼ mi) .....	16.9 sec @ 83.1 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	145 ft
From 80 mph .....	248 ft
Handling:	
Lateral acceleration .....	0.83g
Slalom (700-ft) .....	61.4 mph
Fuel economy:	
Normal driving .....	24.3 mpg

on the center console.

Seating up front is quite good, with body-hugging bolsters and electric seat controls that are nearly second nature to use. Rear accommodations are a little tighter than in most of the others, with virtually no "toe room" underneath the front seats and cramped head room for taller sorts. A ski pass-through increases utility and seems a natural offering on an awd car.

Some nuisances are the smallest trunk of the lot at 8.1 cu. ft. and lots of road noise and thumpiness from the Goodyears, which, at size 205/50R-15, are the lowest profile, most aggressive tires of any of the eight cars. But these are sacrifices in the interest of awd packaging and performance, and those not wanting the extra edge of stability and power can always save some money and still get the 90's muscular good looks in a front-drive, 130-bhp version.





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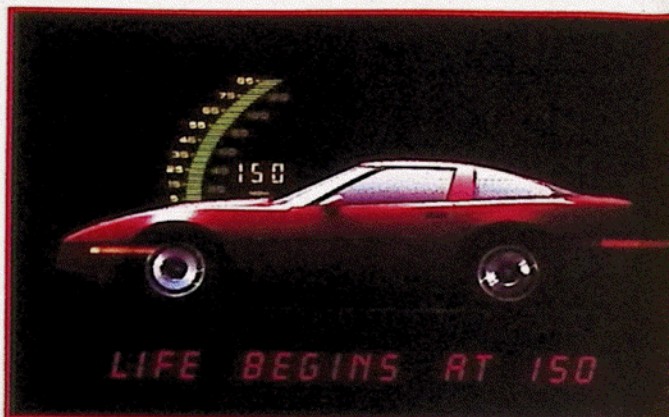
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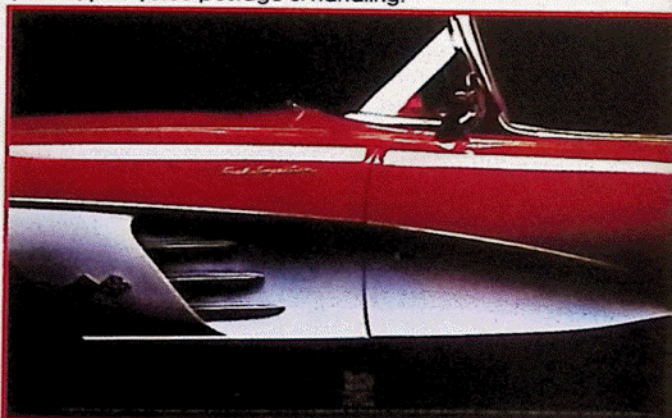
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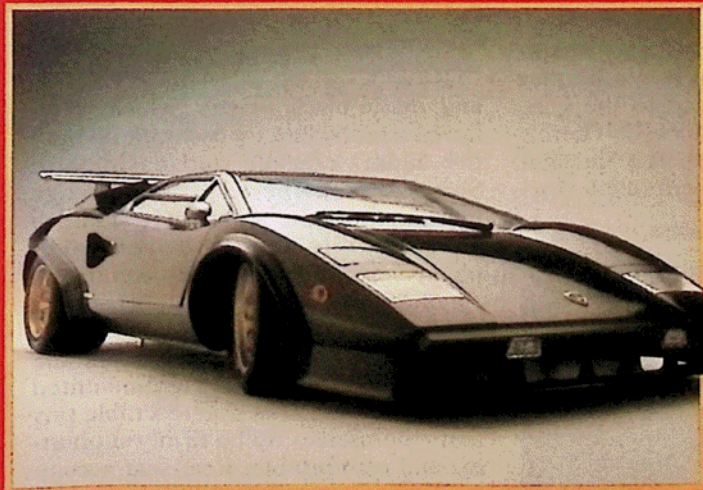
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### Mercedes-Benz 190E 2.3

#### PRICE

Base price .....	<b>\$28,350</b>
Price as tested .....	<b>\$31,355</b>

#### SPECIFICATIONS

Curb weight .....	<b>2985 lb</b>
Wheelbase .....	104.9 in.
Track, f/r .....	56.6 in./55.8 in.
Length .....	<b>175.1 in.</b>
Width .....	<b>66.1 in.</b>
Height .....	<b>56.6 in.</b>

#### ENGINE & DRIVETRAIN

Engine .....	sohc <b>inline-4</b>
Bore x stroke .....	95.5 x 80.3 mm
Displacement .....	<b>2299 cc</b>
Horsepower (SAE) .....	<b>130 bhp @ 5100 rpm</b>
Torque .....	<b>146 lb-ft @ 3500 rpm</b>
Transmission .....	<b>5-speed manual</b>

#### CHASSIS & BODY

Layout .....	<b>front engine/rear drive</b>
Brake system, f/r .....	<b>vented discs/discs</b> , ABS
Wheels .....	cast alloy, <b>15 x 6J</b>
Tires .....	<b>185/65R-15 87H</b>
Steering type ...	<b>recirculating ball</b> , power assist
Suspension, f/r: <b>modified MacPherson struts</b> ,	lower A-arms, coil springs, tube shocks, anti-roll bar/ <b>multilink</b> , coil springs, tube shocks, anti-roll bar

#### PERFORMANCE

Acceleration:	
0-60 mph .....	11.4 sec
0-1320 ft (¼ mi) .....	18.4 sec @ 76.2 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	140 ft
From 80 mph .....	247 ft
Handling:	
Lateral acceleration .....	0.80g
Slalom (700-ft) .....	59.7 mph
Fuel economy:	
Normal driving .....	25.3 mpg

## Mercedes-Benz 190E 2.3

IN A WORLD where there exist \$125,000 V-12-powered Mercedes-Benz S-class sedans, it's reassuring to know that a car wearing the three-pointed star can still be bought for roughly one-fifth of that. For the past two years, the only gasoline engine offered for the 190E was the 2.6-liter inline-6, but for 1991 an updated 130-bhp version of the 2.3-liter sohc inline-4 has returned as the standard engine, rolling back the littlest Benz's base price to less than \$30,000—\$28,350, to be exact.

But cut-rate pricing doesn't mean skimping on quality; much of what makes the S-class sedans so desirable is present in the 190E 2.3. A sophisticated 5-link rear suspension was originally designed for the 190E and has finally trickled its way up to the top-of-the-line S-class sedan. And the anvil-solid body structure that all Mercedes are famous for is apparent in the 190E every time a pothole is met or a door is closed with a solid *ker-chunk*.

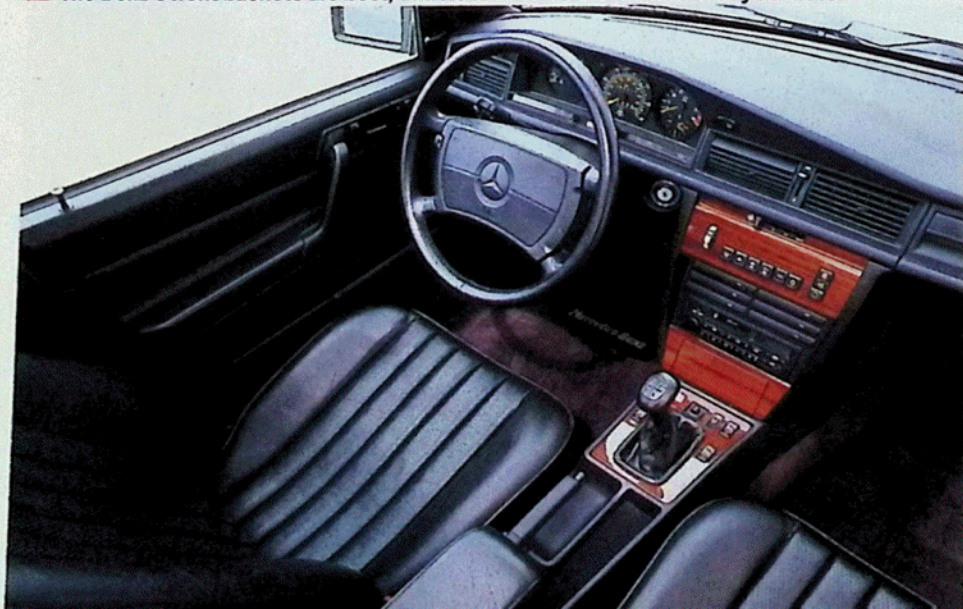
This stiff structure means the suspension can do its job just that much more precisely, and everyone marveled at the velvety suppleness of the 190E's ride—a distinct change from the firm-

ness of Mercedes-Benz cars of just a few years ago—and the solid, sure way it tracks down the Interstate. While the M-B is by no means a slouch in the twists, its roll softness, slow-reacting recirculating-ball steering and the narrowest tires of the group—185/65R-15s—made trying to keep up with the better-handling cars a challenge.

For all its solid feel, one might imagine the Mercedes to be the heaviest car of the lot, but in fact it ties for second lightest with the Volkswagen Passat (both at 2985 lb.) after the bantam-weight Peugeot, more than 250 lb. lighter at 2715 lb. This gives the 2.3-liter 8-valve inline-4 a fighting chance. Although it vibrates noticeably at idle, the 2.3 smooths out quite nicely and soldiers authoritatively up to its 6000-rpm redline, generating peak torque of 146 lb.-ft. at 3500 rpm. The 5-speed's shift linkage is reasonably precise and delicate-feeling, with a satisfying way of springing out of one gear and into the next (when you intentionally move the lever, that is).

Styling, both inside and out, is conservative and a constant reminder that the 190E was introduced to the U.S. market nearly eight years ago. There's a certain seriousness to the interior, with its businesslike perforated vinyl

■ The Benz's front buckets are best, and its level of fit and finish is nearly flawless.



and matte-black plastic, which is relieved a bit by fancy woodwork on both the center console and dashboard. Some were bothered by the orange markings on the somewhat smallish gauges, while shorter drivers complained about their knees coming in contact with the safety bolsters padding the lower dash. But most found the driving position to be excellent and the seats, with their door panel-mounted adjustment switches that resemble tiny seats themselves, to be firmly supportive and comfortable. Rear-seat accommodations are reasonable too, though we find the lack of head restraints a little strange, given Mercedes' well-advertised position on safety engineering.

The 190E has aged gracefully through the years; it's comforting that substance and understated elegance never seem to go out of style.

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The Isuzu Trooper was named *Four Wheeler's* "Best Buy" for the fourth straight year\* for a boatload of reasons. Not the least of which was its 45.5 cubic feet of cargo space behind the rear seat (the most in its class). And a fold down rear seat that clears the way for an additional 25.8 cubic feet.

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## THE ISUZU TROOPER \$13,999.†

\*Four Wheeler Magazine August, 1990. †MSRP excluding tax, license and transp. fee. Optional equipment shown at additional cost.



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## Peugeot 405 Mi 16

ONE EDITOR RAVED about its looks, pronouncing it the sexiest of the bunch. A second said if he had to pick one car out of the group to set the fastest time down an unfamiliar, twisty road, the Peugeot 405 Mi 16 would be his choice. Strong sentiments, inspired by a car that dares to be a little flamboyant.

Quick reactions are this French Flyer's strong suit. A grippy set of Michelins, quick-ratio steering and the lightest curb weight (2715 lb.) make for agile handling. Moderately soft springing allows a slight degree of body roll, but also affords very good ride comfort and allows the chassis to adroitly deal with bumps and bends at the same time. Wheelbase, at 105.1 in., falls squarely in the middle of the pack, but judging solely from the chassis' reac-

■ Peugeot has precise shifter, comfortable seats, but mediocre driving position.



tions, you'd swear it were shorter. The tradeoff here is steering that lacks the straight-line stability of, say, the Audi—the Peugeot's steering feels a bit nervous and takes suggestions from freeway rain grooves too easily.

Power is supplied by a dohc 1.9-liter 16-valve inline-4, which produces more power than the Mercedes (150 bhp at 6400 rpm versus 130 at 5100) but less peak torque (128 lb.-ft. at 5000 rpm vs. the Merc's 146 at 3500). But torque deficit aside, it's the width of the Peugeot's power band and its low curb weight that give the 405 a nice snappy feel at low rpm, a feel that continues through the rev range up to the 7500-rpm redline, where some boom and buzz intrude on otherwise stirring mechanical sounds. A perfect complement to the engine is the 5-speed transmission, with ideally chosen ratios and a precise but slightly clunky-feeling gearshift linkage that's nevertheless much better than the arrangement on our long-term 405 Mi 16 of two years ago.

If there's an area that could use improvement, it's the 405's interior. On entering, one is assaulted by what is probably the most startling, quickest-moving motorized seatbelt system in the world (the Passat and Sterling have similar, though less offensive, systems; the rest have airbags plus conventional belts). Also, the plastics have a cheap, shiny look to them, and control stalks clunk and feel hollow. Perhaps the single most irritating thing is the screeching high-low siren that sounds when the key is in the ignition and a door is open. But anyone with wire cutters and a diagram of the 405's electrical system could make short work of that.

In the Peugeot's favor, the gauges are clear and readable; control place-

### Peugeot 405 Mi 16

#### PRICE

Base price .....	\$21,990
Price as tested .....	\$22,060

#### SPECIFICATIONS

Curb weight .....	2715 lb
Wheelbase .....	105.1 in.
Track, f/r .....	56.7 in./56.4 in.
Length .....	177.7 in.
Width .....	67.5 in.
Height .....	55.2 in.

#### ENGINE & DRIVETRAIN

Engine .....	dohc 4-valve/cyl inline-4
Bore x stroke .....	83.0 x 88.0 mm
Displacement .....	1905 cc
Horsepower (SAE) .....	150 bhp @ 6400 rpm
Torque .....	128 lb-ft @ 5000 rpm
Transmission .....	5-speed manual

#### CHASSIS & BODY

Layout .....	front engine/front drive
Brake system, f/r .....	vented discs/discs, ABS
Wheels .....	cast alloy, 15 x 6J
Tires .....	195/55VR-15
Steering type .....	rack & pinion, power assist
Suspension, f/r: .....	MacPherson struts, lower A-arms, coil springs, tube shocks, anti-roll bar/trailing arms, beam axle, torsion bars, tube shocks, anti-roll bar

#### PERFORMANCE

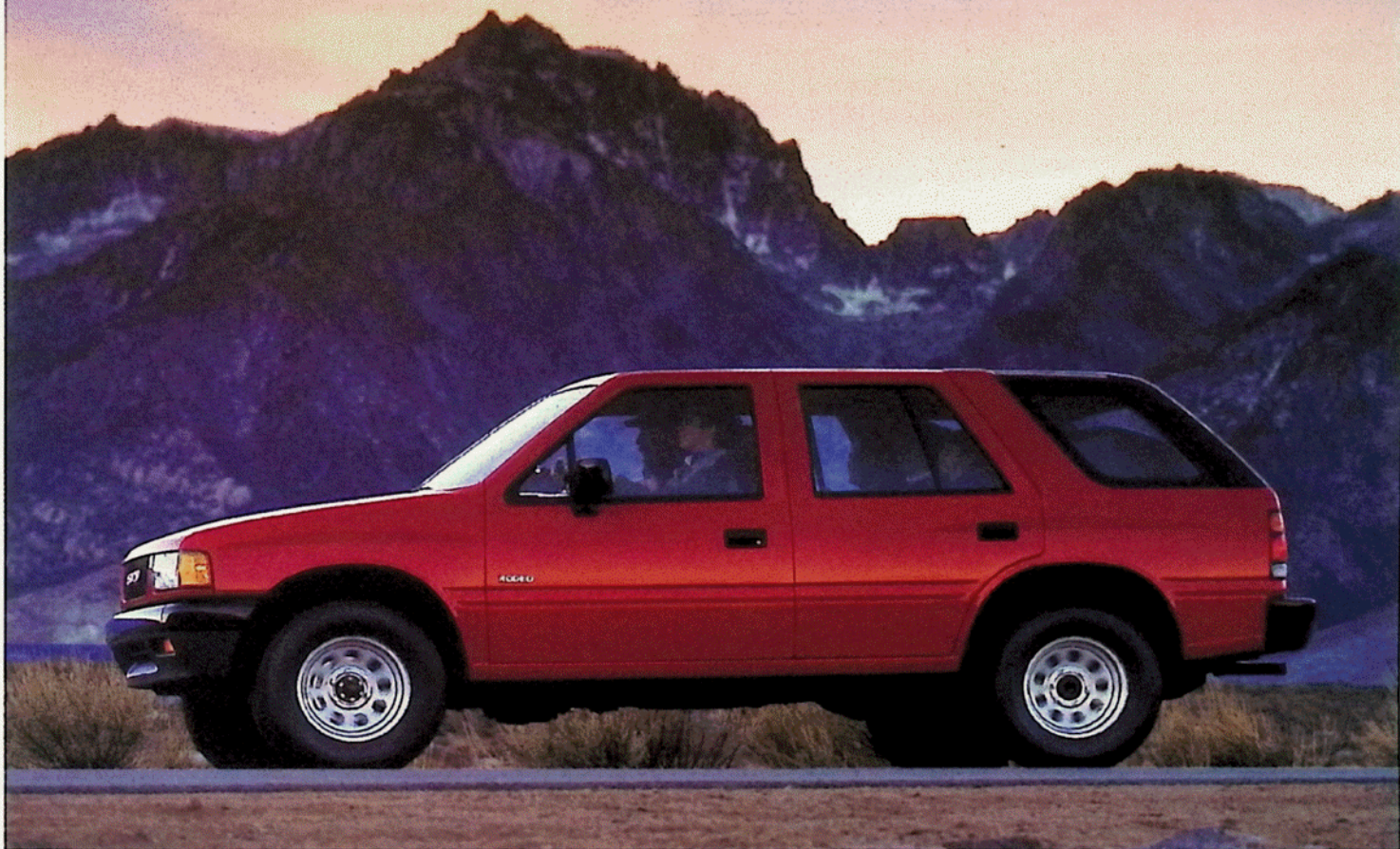
Acceleration:	
0-60 mph .....	10.9 sec
0-1320 ft (¼ mi) .....	18.0 sec @ 80.6 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	139 ft
From 80 mph .....	250 ft
Handling:	
Lateral acceleration .....	0.85g
Slalom (700-ft) .....	61.0 mph
Fuel economy:	
Normal driving .....	20.7 mpg

ment is logical and simple; and seats, in the French tradition, are superbly comfortable and supportive, though they'd be a bit better if the side bolsters extended farther up the seatbacks.

Driving position is nearly Italian, with a faraway, forward-tilted wheel. A rather bulky steering-column shroud interferes with the knees of taller drivers as they try to slide in behind the wheel. Access to the rear seats is quite good, and a ski-sack pass-through is provided for your Rossignols.

Being second-least expensive, with an as-tested price of \$22,060, eases some of the Peugeot's shortcomings. Especially if appearance and responsive handling rank high on your list of car-buying criteria. But a little finessing of the 405's interior would go a long way toward making the car more appealing to U.S. buyers and more consistent with its strengths.

# KIN SHIP.



When you compare the Isuzu Rodeo to our Trooper, you quickly realize that it's all relative. If you need to haul a lot of cargo, you may opt for a Trooper. But, if you have a large family, you may find the Rodeo is the way to go.

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**THE ISUZU RODEO \$12,499.†**

\*Comparison of 2WD base models. Optional equipment shown at additional cost. †MSRP excl. tax, license and transp. fee.

  
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## Saab 9000S

### PRICE

Base price .....	<b>\$26,995</b>
Price as tested .....	<b>\$26,995</b>

### SPECIFICATIONS

Curb weight .....	<b>3095 lb</b>
Wheelbase .....	105.2 in.
Track, f/r .....	59.9 in./58.7 in.
Length .....	<b>183.7 in.</b>
Width .....	<b>69.4 in.</b>
Height .....	<b>55.9 in.</b>

### ENGINE & DRIVETRAIN

Engine .....	dohc 4-valve/cyl inline-4
Bore x stroke .....	90.0 x 90.0 mm
Displacement .....	<b>2290 cc</b>
Horsepower (SAE) .....	<b>150 bhp @ 5500 rpm</b>
Torque .....	<b>157 lb-ft @ 3800 rpm</b>
Transmission .....	<b>5-speed manual</b>

### CHASSIS & BODY

Layout .....	<b>front engine/front drive</b>
Brake system, f/r .....	<b>vented discs/discs, ABS</b>
Wheels .....	cast alloy, <b>15 x 6</b>
Tires .....	<b>195/65TR-15</b>
Steering type .....	<b>rack &amp; pinion</b> , power assist
Suspension, f/r: .....	<b>MacPherson struts</b> , lower A-arms, coil springs, tube shocks, anti-roll bar/ <b>beam axle on trailing arms</b> , upper leading links, Panhard rod, coil springs, tube shocks, anti-roll bar

### PERFORMANCE

Acceleration:	
0-60 mph .....	10.0 sec
0-1320 ft (¼ mi) .....	17.4 sec @ 80.4 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	142 ft
From 80 mph .....	252 ft
Handling:	
Lateral acceleration .....	0.83g
Slalom (700-ft) .....	59.4 mph
Fuel economy:	
Normal driving .....	23.3 mpg

## Saab 9000S

IF OUR ROOM reservations were somehow lost at Death Valley's Furnace Creek Ranch hotel and we faced the prospect of spending the night in the cars, there'd be a fight for the Saab's keys. The Saab's interior looks more spacious than some of the rooms we've stayed in recently, and when the rear seats are folded down, there's a whopping 56.5 cu. ft. of cargo space, easily accessible thanks to a low lift-over height and a huge hatch that swings up high and out of the way. Penned one editor, under the heading of Luggage Space/Loading, "It just doesn't get any better than this."

The Saab's insides are furnished well too. The Swedes really know how to make a comfortable seat, and the 9000S's are contoured to support every nuance of one's backside. The seating position is high, and the view out of the Saab's windshield is commanding; toward the rear, though, thick pillars and large rear-seat headrests obscure vision.

Some admired the dash for its simple, classy design, but others thought the vertical expanse of dash-panel plastic looked a little cheap for a \$27,000 car. All agreed that the primary gauges, with their huge numerals and simple markings, were easy to decipher quickly and that the bar-graph instant mpg display was distracting and rather useless. And praise abounded for the tactile feel of stalks and the rotary knobs for headlights and ventilation system controls, but the button engaging the air conditioning was hidden from view by the steering wheel.

Though sharing the same basic platform with the Alfa 164, the two have distinctly different over-the-road characters largely as result of their engines.

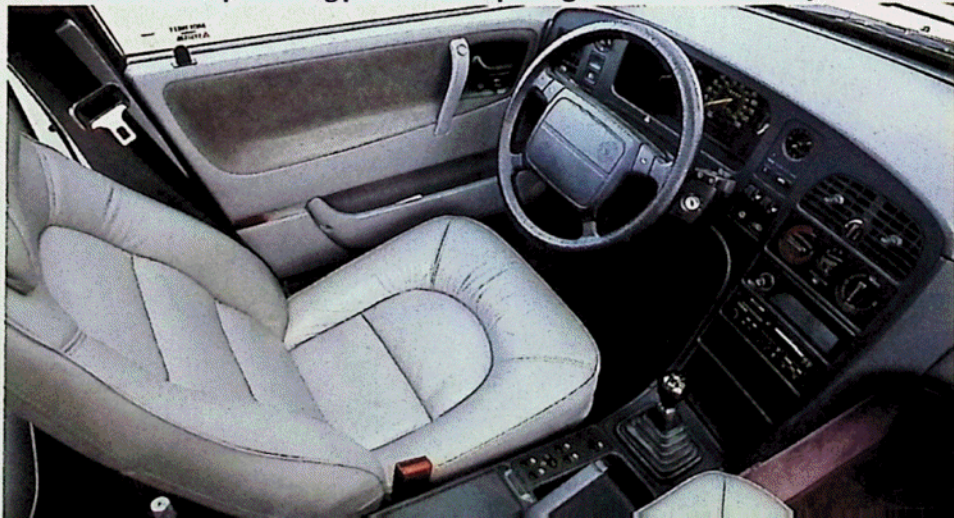
The Saab's dohc 2.3-liter 16-valve inline-4 has twin balance shafts and is a silent partner in contrast to the lusty growls of the Alfa. But 3095 lb. of car is a lot to propel with 150 bhp, and to extract enough performance to keep up with the others, the Saab's shifter needs to be rowed vigorously to keep the engine spinning above 3500 rpm or so. And that shift linkage has a rubbery, long-throw feel to it that's not especially rewarding.

What *is* rewarding is the 9000S's precise and communicative steering feel, absorbed through a fat rim that has a grippable texture. Though not nearly as aggressive at corner-carving as the Alfa (and fitted with not-very-aggressive tires), the Saab has tidy road manners that are showcased best on high-speed sweepers. Push this car hard on tight, low-speed turns and it exhibits a nose-heavy feel, punctuated by lots of body roll. On the freeway, the Saab is straight-line stable with a supple, well-controlled ride and pleasingly little wind or tire noise.

While the Saab doesn't excel in any one performance area, it's the overall competence of the package that keeps us coming back for more. We've come

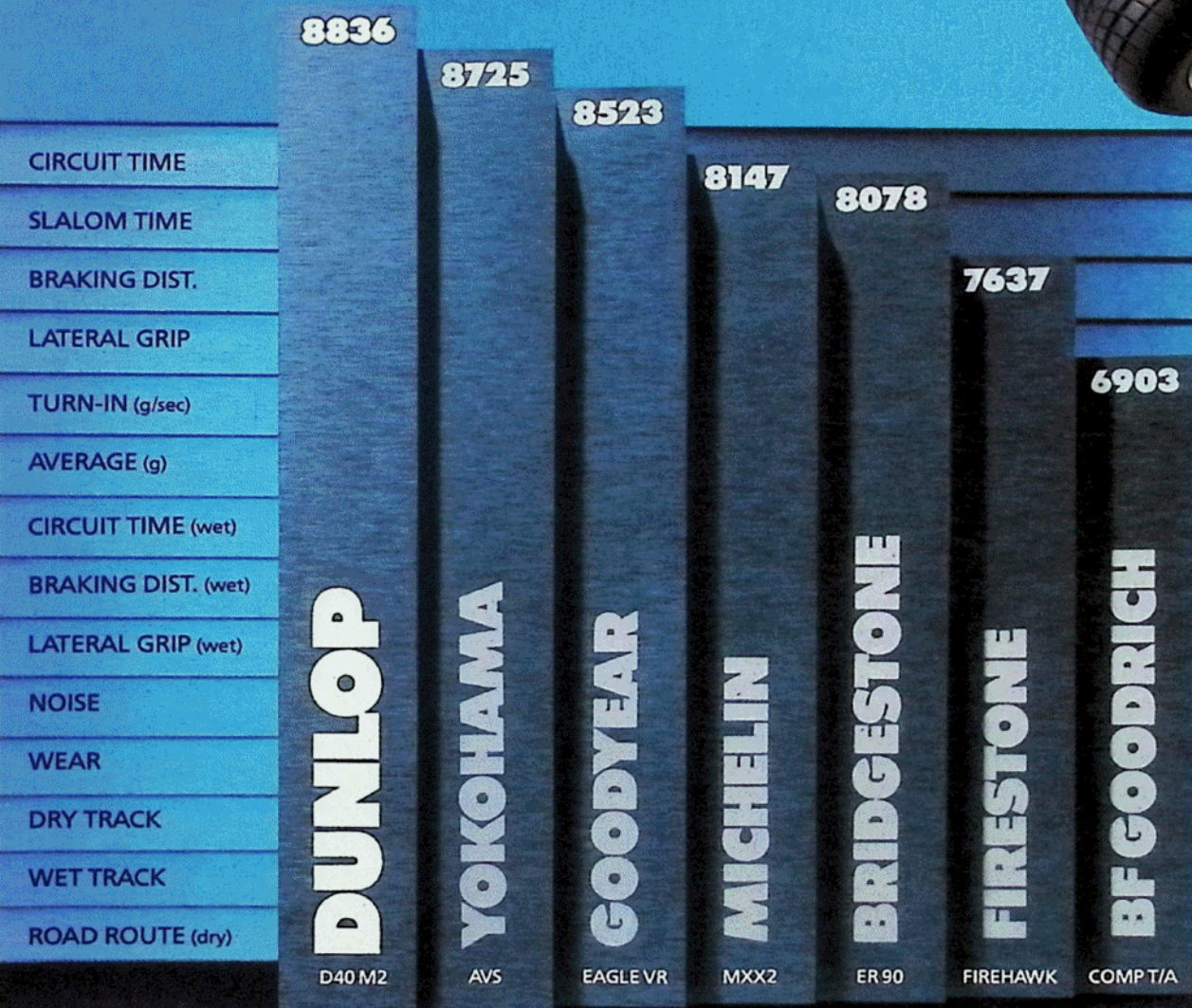
to respect its tight structure, excellent ergonomics and an exterior design that, while not drawing undue attention to itself, is handsome with interesting details. Like a well-equipped hotel room, the Saab is a comfortable place to spend time when you're away from home.

■ Great seats and superb driving position make spending time with the Saab easy.





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OUTPERFORMS

Independent, blind tire tests were conducted by Performance Car magazine at Goodyear's Mireval, France test track July 1990, and published in the November 1990 issue.



## Sterling 827SL

THE STERLING IS an interesting British/Japanese hybrid, with a Rover-designed body and interior covering what's essentially the chassis and 2.7-liter V-6 from the original Acura Legend sedan. It's a happy marriage for the most part, the 827 exhibiting largely the same strengths and weaknesses as the Legend from which it springs.

There's that engine, a marvelous sohc 24-valve 160-bhp V-6 that idles so smoothly you have to glance at the tach to see if it's still running. Torque, which peaks at 162 lb.-ft. at 4500 rpm, is rather soft off idle but builds nicely through the middle revs and shows freight-train pull from 4000 rpm up to the engine's 6000-rpm redline. The 5-speed transmission proves a willing cohort, with light effort and fairly short, precise throws, but clutch engagement feels indecisive—through pedal feel it's difficult to tell when the clutch is starting to grab. This tendency, coupled with the engine's quietness and willingness to rev, makes it easy to spin the engine embarrassingly high when starting off.

A back-road burner the Sterling is not. The chassis structure feels reasonably tight and body roll is well controlled, but nose-heaviness, floaty front shock valving and vague steering feel hobble the Sterling when pushed to its limit. Disturbing was the front suspension's tendency to bottom on Route 168's whoop-de-doo sections. Turn the wick down to 7/10ths, though, and the understeer dissipates and the chassis regains its composure.

"Composed" also describes the Sterling's behavior on the Interstate. With its whisper-quiet engine, rumble-free tires and tightly sealed windows excluding the sounds of rushing air, one can better hear music coming from the excellent standard CD player with its trunk-mounted 6-disc changer. The interior has a cozy feel to it, brought on by panels of polished wood, the closeness of the dash to the steering wheel and of knees to the padded lower dash. Comfortable leather-covered front seats have moderate bolstering, with their adjustment buttons located handily on the center console. Rear seating is equally well done, with lots of room for

■ The warmth of wood, clear gauges and quietness make the Sterling's cabin appealing.



## Sterling 827SL

### PRICE

Base price .....	<b>\$28,500</b>
Price as tested .....	<b>\$28,560</b>

### SPECIFICATIONS

Curb weight .....	<b>3185 lb</b>
Wheelbase .....	108.6 in.
Track, f/r .....	58.7 in./57.1 in.
Length .....	<b>188.8 in.</b>
Width .....	<b>68.1 in.</b>
Height .....	<b>54.8 in.</b>

### ENGINE & DRIVETRAIN

Engine .....	sohc 4-valve/cyl <b>V-6</b>
Bore x stroke .....	87.0 x 75.0 mm
Displacement .....	<b>2675 cc</b>
Horsepower (SAE) .....	<b>160 bhp @ 5900 rpm</b>
Torque .....	<b>162 lb-ft @ 4500 rpm</b>
Transmission .....	<b>5-speed manual</b>

### CHASSIS & BODY

Layout .....	<b>front engine/front drive</b>
Brake system, f/r .....	<b>vented discs/discs, ABS</b>
Wheels .....	cast alloy, <b>15 x 6J</b>
Tires .....	<b>195/65VR-15</b>
Steering type .....	<b>rack &amp; pinion</b> , speed-sensitive power assist
Suspension, f/r: <b>short upper lateral links, lower lateral links</b> , compliance struts, extended wheel carriers, coil springs, tube shocks, anti-roll bar/ <b>Chapman struts</b> , lower lateral arms, trailing arms, coil springs, tube shocks, anti-roll bar	

### PERFORMANCE

Acceleration:	
0-60 mph .....	9.4 sec
0-1320 ft (¼ mi) .....	17.1 sec @ 83.1 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	141 ft
From 80 mph .....	253 ft
Handling:	
Lateral acceleration .....	0.80g
Stalom (700-ft) .....	57.2 mph
Fuel economy:	
Normal driving .....	21.3 mpg

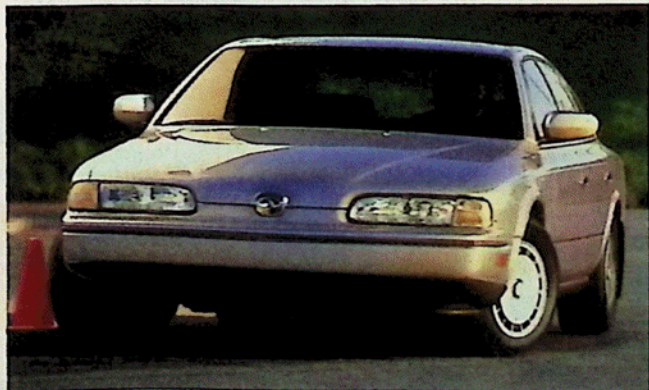
its occupants in every direction.

Gauges are excellent, carryover items from the Acura with clear white markings on black faces. The climate-control system, whose mode buttons beep and light up to verify entry, works well and is put within easy reach on one of the instrument pod's wings. Feel of stalks is fairly good, though lacking the crispness of similar Mercedes-Benz or Audi controls.

In all, we found the Sterling to be well finished, with an amazing amount of standard equipment for its price, \$28,560 as tested. What it lacks is a strong personality—its strait-laced exterior styling is handsome but innocuous, and its controls perform the functions for which they were designed, but don't transmit a wealth of information back to the driver.

# The car that deserves a bow, is the car that isn't taking one.

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The performance of the average luxury car suspension is fine if average is where you've set your standards. We didn't.

At Infiniti, we decided very early on there's no such thing as a superior car with an inferior ride.

So after seven full years in development, we arrived at a startlingly innovative solution. It's the world's first Full-Active Suspension™ system. Combined with Q45 an advanced multi-link approach, it physically counteracts the typical float, roll, dive and squat characteristics that the road continuously inflicts on cars and their passengers.

This is accomplished through the use of G-force sensors and an ingenious, self-leveling mechanism. The improvement, even over cars previously considered very good at handling, is readily apparent.

The Infiniti Q45™ with the Full-Active Suspension system was selected one of *Road & Track's* ten best cars in the world. If a ride in our car doesn't sway you to our side, believe us, one ride in the competition will.

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\*Same road, same speed as previous three photographs.

To arrange a guest drive, call 1-800-826-6500.



## Volkswagen Passat GL

LOOKING FOR THAT distinctive German feel, a good dose of sportiness, styling that's perhaps a bit off the beaten path—all at an affordable price? Then the Passat warrants an in-depth look.

Its as-tested price of \$15,665 is roughly half the tab for the most expensive car of the group, the Audi. But for that sum you get a car that's larger than the Audi in every exterior dimension, has an extremely roomy interior and comes with the 134-bhp dohc 2.0-liter inline-4 that's offered in the sportier Golf GTI and Jetta GLI.

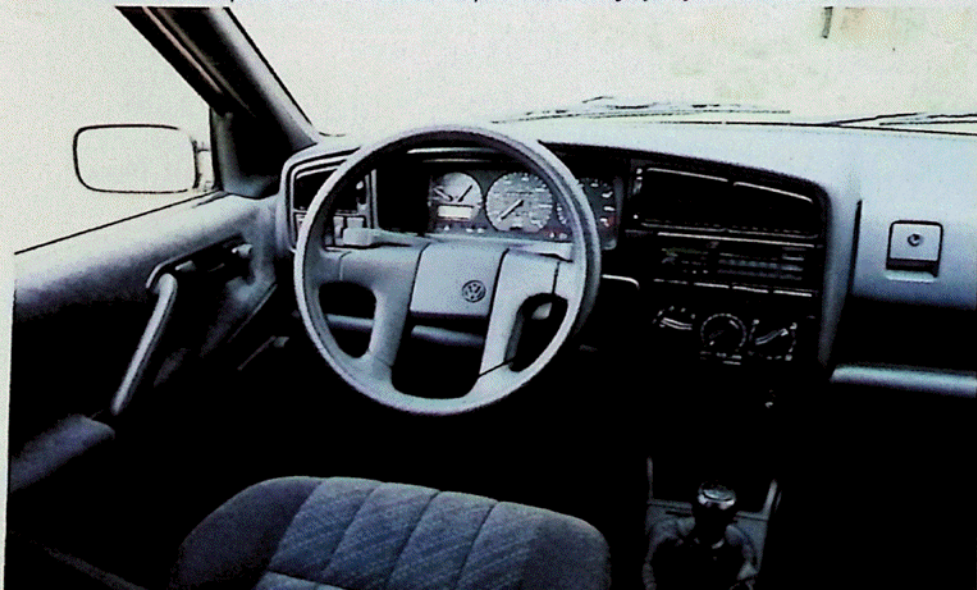
As lively as this engine is, it's saddled with the Passat's curb weight of 2985 lb., some 400 lb. more than the Golf's, so acceleration is good but fails to inspire. Clutch engagement that's a bit grabby makes for the occasional lurching start, but once underway the engine has good midrange torque and pulls cleanly, though somewhat boomily, to its redline of 6300 rpm. The Passat's cable shifter is much like the one in our long-term Corrado, operating a 5-speed

gearbox with well-chosen ratios but having a clunky, heavy feel.

Inside, there's more Corrado *déjà vu*, with a handsome instrument panel, dashboard and steering wheel that look as if they came straight from the *G-Lader*-equipped coupe. We all gave the instrument and control layout high marks for its simplicity and directness, but stalk controls felt flimsy and the dash plastic is of a texture that shows dust easily. And the radio, although located high for easy access, has buttons that are too small.

Seating is very good, with VW's typical upright chairs in front covered in a nicely muted fabric matching that on the door panels. And that fabric grips one's body well, making up for the seats' lack of aggressive side bolsters during brisk cornering. Rear-seat accommodations are really spacious, with the added bonus of lower cushion fore-aft adjustability. The seatbacks also fold down individually in a 60/40 split, allowing additional access to the generous 14.2-cu.-ft. trunk.

■ The Passat's dash, similar to the Corrado's, is handsomely sporty and functional.



### Volkswagen Passat GL

#### PRICE

Base price .....	<b>\$15,240</b>
Price as tested .....	<b>\$15,665</b>

#### SPECIFICATIONS

Curb weight .....	<b>2985 lb</b>
Wheelbase .....	103.3 in.
Track, f/r .....	58.2 in./55.9 in.
Length .....	<b>180.0 in.</b>
Width .....	<b>67.1 in.</b>
Height .....	<b>56.2 in.</b>

#### ENGINE & DRIVETRAIN

Engine .....	dohc 4-valve/cyl <b>inline-4</b>
Bore x stroke .....	82.5 x 92.8 mm
Displacement .....	<b>1984 cc</b>
Horsepower (SAE) .....	<b>134 bhp @ 5800 rpm</b>
Torque .....	<b>133 lb-ft @ 4400 rpm</b>
Transmission .....	<b>5-speed manual</b>

#### CHASSIS & BODY

Layout .....	<b>front engine/front drive</b>
Brake system, f/r .....	<b>vented discs/discs</b>
Wheels .....	cast alloy, <b>14 x 6J</b>
Tires .....	<b>195/60R-14 85H</b>
Steering type .....	<b>rack &amp; pinion</b> , power assist
Suspension, f/r: <b>MacPherson struts</b> , lower A-arms, coil springs, tube shocks, anti-roll bar/ <b>twist beam axle on trailing arms</b> , coil springs, tube shocks, anti-roll bar	

#### PERFORMANCE

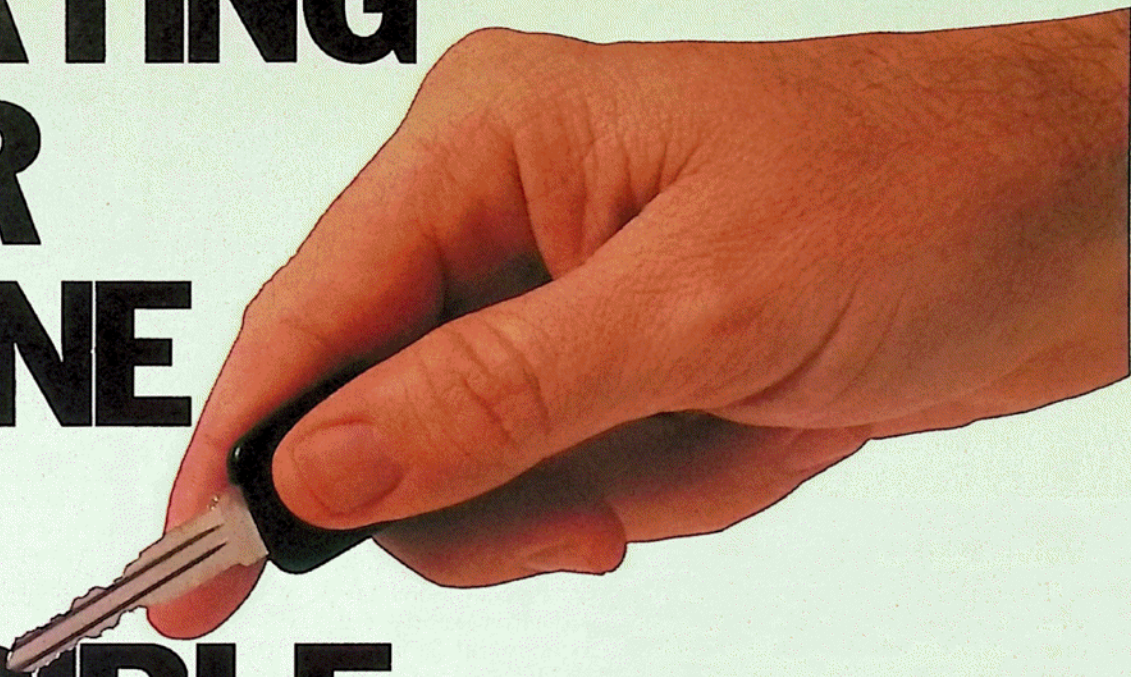
Acceleration*:	
0-60 mph .....	10.9 sec
0-1320 ft (¼ mi) .....	17.8 sec @ 78.5 mph
Braking*:	
Minimum stopping distance	
From 60 mph .....	153 ft
From 80 mph .....	273 ft
Handling*:	
Lateral acceleration .....	0.80g
Slalom (700-ft) .....	61.9 mph
Fuel economy:	
Normal driving .....	31.9 mpg

\* Figures taken from road test, March 1990.

On the twisty bits, the Passat takes a back seat to no one. Grip of its Continental tires, size 195/60R-14, is good, and the steering has a fast ratio and a great connected-to-the-road feel. Turn-in is entertainingly quick, and it's the one car of the group whose cornering line can be easily tightened by lifting the throttle. We only wish there were more engine to exercise the chassis.

But we're being greedy. We need to respect the Passat for what it is: a comfortable family sedan with more than a little competitive urge in its blood. Adept at hauling a family of four around in spacious comfort, yet willing to do a little cut-and-thrust on back roads without embarrassing itself. It's a fine value and, returning an average of 31.9 mpg on our trip, by far the most fuel-efficient of the lot.

# STARTING YOUR ENGINE IS A TERRIBLE THING TO DO.



**B**ecause at start-up, your oil's in the pan, not in the engine. So when you turn the key, parts grind together. And in those first critical seconds, 70% to 80% of all engine wear takes place.

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It protects engines at start-up. So even during dry starts when oil and additives aren't there, Slick 50 is lubricating and protecting your engine to help reduce wear.

In fact, Slick 50 was recently tested by a major EPA-recognized independent laboratory. And when the results were in, the Slick 50 treated engine had less than 50% wear compared to the test engine run with reference oil alone.

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## Volvo 940 Turbo

THE ELEMENT OF surprise; that's what this Volvo has. After completing one of the twistiest, most challenging portions of our loop, we came away with respect for this upright, rather boxy live-rear-axle sedan that could keep pace with cars of obviously more sporting intent. "It's your worst nightmare," said one of us, "to be going along at a really good clip and see this *Volvo* right on your rear bumper." A bit of an underhanded compliment, perhaps, but it mirrored the sentiments of everyone.

This is a chassis with a big, substantial feel and a lot of composure, largely because of Michelin 205/55R-16 tires

■ The Volvo's seats are extremely comfortable but offer little lateral support.



mounted on aggressive "meat-slicer" wheels. Volvo suspension engineers deserve credit too, having worked long and hard to control that live rear axle for a smooth ride as well as competent handling—they've certainly succeeded with the 940. The rear tires stay planted on the road so securely that the chassis begs to be pushed harder and harder until the mild onset of understeer is felt. All totally predictable, and enjoyable. Well-weighted steering with good road feel adds to the sense of handling security, but effort is on the high side for parking-lot maneuvers.

Look under the 940's hood and there's a sohc 2.3-liter turbocharged inline-4 that looks positively lost in the Volvo's huge engine bay. With the benefit of an air-to-air intercooler, it produces 162 bhp and 195 lb.-ft. of peak torque, quite enough to hustle the Volvo down the road at surprising velocities. Engine sounds are fairly subdued until revs climb to 5000 or so when the 2.3 takes on a harsh, hissing sound up to redline. But the turbo is so well matched to the engine and the engine to the 4-speed automatic transmission (the only gearbox offered with the 940 models) that surprising acceleration can be had without exceeding 4500.

Seating position is very high, with some drivers feeling they were too far above the steering wheel for optimum comfort; from this vantage point the view out in every direction is quite good. The seats themselves are as comfortable as those in the Saab, but the Volvo's flatter cushions don't offer very good lateral support. Dashboard design is rather blocky and formal; the instruments are easy to read, having a minimum of fussy markings; and the feel of control stalks and rotary knobs ranks high in the pack. Rear-seat accommodations are a little tight on head room

Volvo 940 Turbo	
PRICE	
Base price .....	\$29,295
Price as tested .....	\$29,433
SPECIFICATIONS	
Curb weight .....	3065 lb
Wheelbase .....	109.1 in.
Track, f/r .....	57.9 in./57.5 in.
Length .....	191.7 in.
Width .....	69.3 in.
Height .....	55.5 in.
ENGINE & DRIVETRAIN	
Engine .....	turbocharged sohc inline-4
Bore x stroke .....	96.0 x 80.0 mm
Displacement .....	2316 cc
Horsepower (SAE) .....	162 bhp @ 4800 rpm
Torque .....	195 lb-ft @ 3450 rpm
Transmission .....	4-speed automatic
CHASSIS & BODY	
Layout .....	front engine/rear drive
Brake system, f/r .....	vented discs/discs, ABS
Wheels .....	cast alloy, 16 x 6½J
Tires .....	205/55R-16V
Steering type .....	rack & pinion, power assist
Suspension, f/r: MacPherson struts, lower lateral links, compliance struts, coil springs, tube shocks, anti-roll bar/live axle on trailing arms, Panhard rod, coil springs, tube shocks, anti-roll bar	
PERFORMANCE	
Acceleration:	
0-60 mph .....	8.9 sec
0-1320 ft (¼ mi) .....	16.8 sec @ 81.8 mph
Braking:	
Minimum stopping distance	
From 60 mph .....	135 ft
From 80 mph .....	259 ft
Handling:	
Lateral acceleration .....	0.81g
Slalom (700-ft) .....	60.4 mph
Fuel economy:	
Normal driving .....	21.5 mpg

for 6-plus-footers, but otherwise spacious. A couple of nice touches in back are a big storage bin built into the flip-down center armrest and a third head restraint that's normally flush with the top of the rear seat, but can be pulled up when needed.

Though we wouldn't call it a beauty, the 940 profits from a slight stylistic redo. Corners that were previously sharp-edged are now softened. The rear window, almost vertical in the 740, now slopes gently down to meet a raised rear deck. These changes are good for a 12-percent reduction in drag and slightly increased luggage capacity (now a generous 16.8 cu. ft.). But it's unmistakably a Volvo, with all the ruggedness and safety that Volvos are noted for. Plus, at least with the Turbo version, a level of handling that may surprise the uninformed.



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## Final musings

CERTAINLY THERE ARE less expensive cars in the marketplace that can handily outperform our group of eight, in terms of cold, hard numbers. In terms of sheer *boulevardier* comfort, there are others that could outdistance our group with half of their throw-pillow upholstery cushions tied behind their backs. The Europeans, though, manage to provide an enticing blend of roadholding, nimbleness, comfort and exclusivity that makes them so desirable. A glance at the comparative ratings box shows there's not a dud in the bunch—points variances are minor, with no roller-coaster dips and crests. It's been said that variety is the mother of enjoyment, and after having spent more than 700 miles in one of the most diverse, entertaining groups of cars in recent memory, we couldn't agree more.

### CUMULATIVE RATINGS—SUBJECTIVE EVALUATIONS\*

	Alfa Romeo 164 L	Audi 90 Quattro 20V	Mercedes-Benz 190E 2.3	Peugeot 405 MI 16	Saab 9000S	Sterling 827 SL	Volkswagen Passat GL	Volvo 940 Turbo	
<b>Performance</b>									
Engine	9.4	7.0	7.6	7.7	7.1	8.6	6.9	8.3	Alfa's power and lusty exhaust note garner points.
Gearbox	8.7	7.4	8.3	8.1	7.0	7.7	7.3	8.3	Direct and mechanically honest, yet light and precise.
Steering	8.7	7.6	7.7	8.6	8.4	6.4	8.3	8.3	Great road feel with an enticing bit of kickback.
Brakes	8.3	8.3	8.4	8.0	8.1	7.9	8.3	8.3	Not a dud in the bunch, but Merc's pedal feel is superb.
Ride	8.4	8.1	9.3	8.4	8.7	8.3	8.4	8.4	Amazing composure and noise isolation on any surface.
Handling	8.7	8.3	7.3	8.9	7.4	6.9	8.0	8.1	A real slot car on the twisties—plus a supple ride.
Body structure	8.0	8.7	9.7	7.6	8.9	8.1	8.0	8.7	Carved from granite? No, but the Merc feels that way.
Average	8.6	7.9	8.3	8.2	7.9	7.7	7.9	8.3	
<b>Comfort/Controls</b>									
Driving position	7.4	8.0	8.3	7.4	8.4	7.0	8.1	7.6	Fits like the proverbial glove, even without tilt wheel.
Controls	7.7	8.3	8.4	7.3	8.4	7.9	7.9	7.9	Nothing fancy; just logical, solid-feeling and easy to use.
Instrumentation	7.7	8.6	8.1	8.0	8.4	7.9	8.4	8.3	Audi's round dials with a minimum of clutter carry the day.
Outward vision	8.0	8.0	8.6	7.9	8.1	8.0	8.1	8.3	Absence of rear-seat head restraints gives the 190E the edge.
Quietness	8.4	7.6	8.9	7.1	8.3	8.4	7.6	8.6	Hardly any wind noise or tire thump—just the radio playing.
Heat/vent/air cond.	6.7	7.9	7.7	7.7	8.1	8.3	8.4	7.7	Passat's high-mounted rotary controls are blessedly simple.
Ingress/egress	7.9	7.6	8.1	7.7	8.7	7.4	8.6	8.4	Saab's high seating and large door openings are key here.
Front seats	8.1	8.1	8.6	7.4	8.4	7.6	8.3	7.4	The Benz's buckets offer an ideal mix of comfort and support.
Rear seats	7.9	7.6	7.6	7.3	8.3	7.7	9.0	7.7	VW's offer fore-aft adjustability and room in every direction.
Luggage & loading	7.6	7.0	8.0	7.4	9.9	7.9	8.3	8.6	Most trunks in this group are large, but Saab's is a cavern.
Average	7.7	7.9	8.2	7.5	8.5	7.8	8.3	8.1	
<b>Design/Styling</b>									
Exterior styling	9.0	8.6	7.3	7.9	7.9	6.9	7.9	7.3	Alfa wins by a nose—with its distinctive triangular grille.
Exterior finish	8.3	9.1	9.3	7.3	8.3	7.6	7.9	8.3	When you hand-wash the 190E, attention to detail is evident.
Interior styling	7.9	8.7	8.3	7.7	8.4	8.0	8.0	7.3	Very sporting feel; polished wood adds warmth and class.
Interior finish	7.3	9.0	9.3	7.1	8.4	8.0	7.4	7.9	Nearly impossible to find a flaw; no squeaks or rattles.
Average	8.1	8.8	8.5	7.5	8.2	7.6	7.8	7.7	
Overall Average	8.1	8.1	8.3	7.7	8.3	7.7	8.1	8.1	
<b>Staff Preferences<sup>1</sup></b>									
Price-independent	54	37	48	24	32	16	12	28	
Price-dependent	48	13	41	31	35	16	45	24	

\*Ratings are averages of seven staff members' choices; cars are rated on a 1-10 scale, 10 being best.

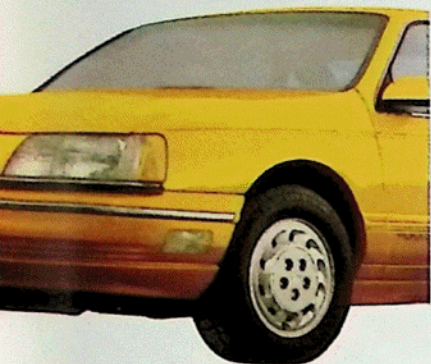
<sup>1</sup>Seven staff members' voting: 1st choice, 8 points; 2nd choice, 7 points; 3rd choice, 6 points; 4th choice, 5 points; 5th choice, 4 points; 6th choice, 3 points; 7th choice, 2 points; 8th choice, 1 point.





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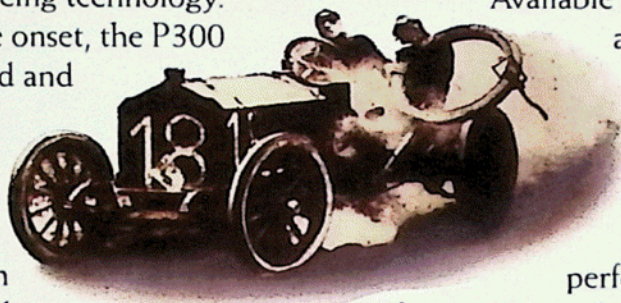
performance tires, and is the only 60,000 mile tire in America with construction features taken directly from Pirelli racing technology.

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This is a new classification which combines the better handling of a traditional performance

tire with the comfortable ride and low noise characteristics of the most popular all-season tires.

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## P500. THE ALL-SEASON RADIAL DESIGNED TO OUTPERFORM ALL OTHERS.



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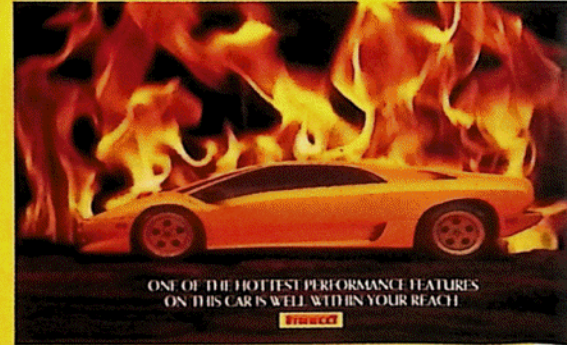


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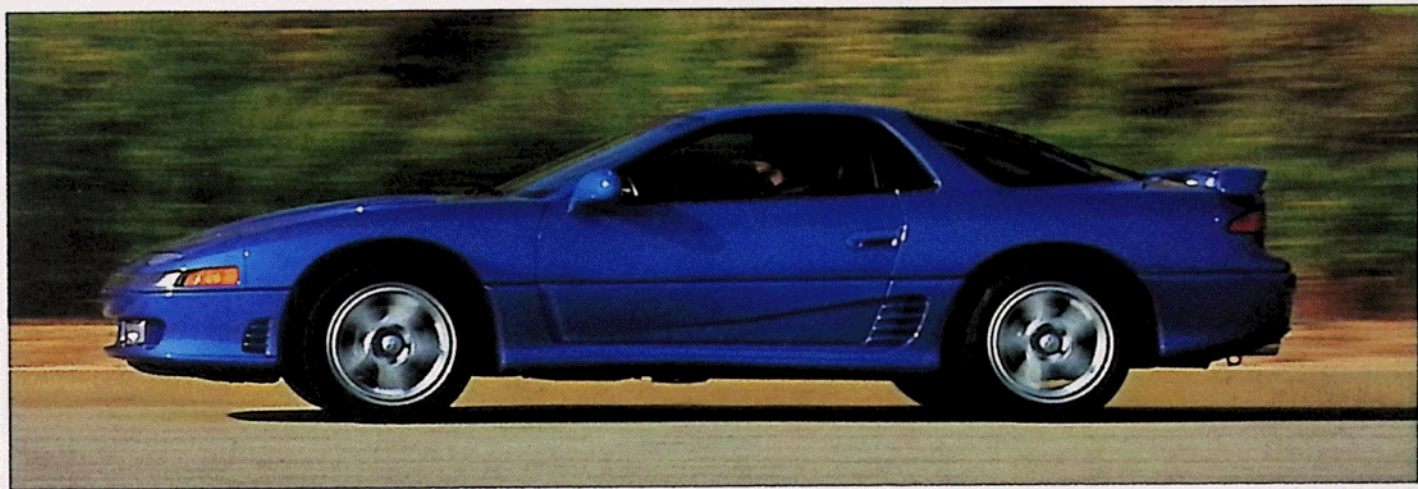
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# LONG-TERM TEST



## Mitsubishi 3000GT VR-4

Pump and circumstance

BY SAM MITANI

**W**HILE OTHER AUTOMOBILE manufacturers are feeling the sting of the recession, Mitsubishi Motor's sales are climbing. Perhaps its success can be attributed to a reestablished image best characterized by its new models—most notably the 3000GT VR-4.

The 3000GT represents the cutting edge of technology and performance: features like all-wheel drive, 4-wheel steering, ABS, muffler-loudness control and a speed-adjustable rear spoiler, not to mention a twin-turbocharged V-6 powerplant that produces 300 bhp and 307 lb.-ft. of torque. We enjoyed a brief taste of its gadgets several months ago (September 1990) and wondered if they would prove fragile or impractical or unnecessary. Now we have the opportunity to find out.

After bidding adieu to our Nissan 300ZX Turbo (June 1991), our long-term stable seemed melancholic, for we missed the whine of turbos and the music of a V-6 engine. So the recent addition of the 3000GT is a welcome one.


The 3000GT has compiled 3693 miles in less than a month, and thus far its intimidating appearance has generated the most comment. Bulky and stout, it's wider than an NSX and heavi-

er than a Corvette. Also, our 3000GT is bathed in a radiant electric-blue paint that is virtually fluorescent. The Mitsubishi turns heads everywhere—like Arnold Schwarzenegger walking on a crowded beach.

A most impressive aspect of the 3000GT is its handling. All-wheel drive and 4-wheel steering combine effectively to keep the four Michelin XGT 7s firmly planted. The 3000GT has little roll and, despite its weight, is easy to maneuver. Furthermore, power is abundant. Stomp the pedal, rouse the turbos and passing becomes surprisingly simple.

Complaints, so far, have been targeted inside the cockpit. The buttons for the sound system are too small and similar in size, making operation difficult

while driving. However, some of them (volume, AM/FM, seek and memory call) are duplicated at the bottom of the steering-wheel hub for convenience. Also, the pictogram air-conditioning/ventilation system looks attractive but is somewhat difficult to comprehend at a glance.

Overall, though, the 3000GT is great fun to drive and is rapidly establishing itself as a capable long-range tourer. 

### SPECIFICS

Total miles (first report).....	3693
Average mpg to date .....	18.6
Best mpg (avg of 3) .....	22.3
Worst mpg (avg of 3) .....	14.5
Repair costs to date.....	0
Maintenance costs to date.....	0
List price .....	\$31,400

PHOTOS BY THE AUTHOR



■ Although both the air-conditioning/ventilation system and the sound system look attractive, it proves difficult for the driver to operate them without taking his eyes off the road.

# Million-Dollar MUSCLE

Race driver Tiff Needell track-tests  
the new JaguarSport XJR-15

BY TIFF NEEDELL

**L**OADS OF POWER, not much grip, equal machinery and top Grand Prix drivers on the entry list: Those were the main attractions of the BMW Procar series. In 1979 I drove the "Young Star" works entry in Silverstone's Grand Prix supporting race. After a rather timid practice—racing a left-hand-drive car for the first time—I qualified well down. But in the race I soon discovered a vital lesson: Smoothness was out; aggression was in.

I battled up to join a fight between Carlos Reutemann and Clay Regazzoni. I passed Carlos and was sizing up scalp number two when, dreaming of all the Grand Prix contracts I'd soon be offered, I dropped the lot in a huge 360-degree spin out of Copse.

Now in 1991, a little older and much wiser, I'll be looking to make amends as one of the 16 JaguarSport XJR-15 drivers on the grid in Monaco on May 11. For months I've been trying to test one of these JaguarSport Intercontinental Challenge machines and, finally, the opportunity arose recently in Silverstone's South Circuit.

It was the day the first six customer cars were being handed over to their new owners. They looked superb: £3 million sitting there like sextuplets all dressed in regulation ICI "XJR Blue," separable only by their old-fashioned numbers—if you can remember, they're the ones you can actually read! Big black numbers in white roundels that were compulsory before the power of sponsorship took over.

It is not correct to say that the cars were being handed over. The right word is "lent" because none of them can be taken away from Tom Walkinshaw Racing's JaguarSport premises until two weeks after the Monaco race. Then they must be returned two weeks

before the next race at Silverstone so the team can check that no modifications have been made.

There are to be only three races—Monaco, Silverstone and Spa—and it is at the final round that the owners have their chance to get their money back with a cool \$1 million (U.S.) to the winner. The £500,000 price of each of the 50 XJR-15s to be built—and they are all sold—includes running the car in the three races if you so wish, although all 16 Monaco slots have been reserved.

While the racing itself hearkens back to the Procars, the cars then were basically road vehicles turned into racers, whereas the new XJR-15s are much more like a modern-day Ford GT40—racing cars that could be switched to road use.

The XJR-15 is based on the 1988 Le Mans-winning V-12-powered XJR-9 Group C sports car. The driver sits in a beautifully finished composite carbon-fiber and Kevlar monocoque with a 6.0-liter JaguarSport 60-degree V-12 bolted to its back, tuned to send 450-plus bhp to the back wheels via a TWR 6-speed gearbox.

There is a rear wing but it looks more like a spoiler; and there are some ground-effect venturi channels, but the ride height is so high that little effect can be generated. So, apart from the downforce of the car's own 1050 kg (2315 lb.), there is not a lot to help the Bridgestone slicks maintain adhesion. The result is oversteer.

I had thought the days of oversteer were gone; that glorious powerslides were a thing of the past. Across a variety of formats—4-wheel-drive rally cars, front-wheel-drive touring cars, Formula 3, Formula 3000, sports cars or Grand Prix cars—technology has evolved cars and tires that work best



Tiff Needell takes us for quite a ride around Silverstone in one of the 50 Jaguar XJR-15s built especially for a single-marque, winner-take-all series.

when maneuvered into a corner at very high speed and then simply driven out with full power and maximum traction right at the edge of adhesion.

With the XJR-15, high-tech is out. The only things the driver can change are the stiffness of the front anti-roll bar—there isn't a rear one—and brake balance front and rear. That's it. Just get in and drive.

Mind you, getting in is easier said than done. The doors swing out horizontally, as they do in a normal road car, but the opening is fairly small, which means you thread your legs in from a long way back.

My XJR-15 for the day was the team's test car, so the nicely molded carbon-fiber seat lacked the customer's upholstered covering. Nevertheless, it pinned me in a very comfortable driving position spoiled only by the proximity of the steering wheel—flat on the bottom to aid getting in and out. Leg room was excellent but the steering wheel forced an "elbows-out" style.

The V-12 burst into life as soon as the starter was engaged. I selected 1st gear and dribbled out onto the circuit; later I discovered it was a 6-speed box and I had set off in 2nd. Such is the torque of the engine it will pull from very low revs, and

there is little advantage in hanging on right up to the 6200-rpm limit.

It was my first time on Silverstone's South Circuit, so I was faced with the awkward combination of new car and new circuit and only 12 laps to get to know both. The XJR-15 has two characteristics stemming from its lack of aerodynamic downforce. The first is the expected power oversteer and the second is . . . nervous braking.

I remember stories of the XJR-9 sports-car drivers being kept alert by the feeling that the large V-12, with its high center of gravity, was going to make the car spin under braking. Ally this to a lack of downforce and softer

suspension, allowing more weight transfer to the front under braking, and you can see the problem growing.

In fact, the brakes work very well, but the steering is fairly light and transmits this feeling of nervousness to the driver when, in fact, there's nothing to be alarmed about. Having said that, the new Stowe corner demands that you turn into it while still braking, and I soon discovered that the XJR-15 is not the car for that technique.

After touching 6000 rpm in 5th—the gearing left 6th unused—it was 3rd gear for Stowe, gradually picking up the power as the long apex unwound. I then took 4th early as we left the right-hand apex and headed for the left-handed entry to Vale. I gave it full power into the dip, using all the road and a fair amount of opposite-lock, winding up to 5200 rpm in 4th before cresting the rise and braking hard for the tight left-handed entry to Club.

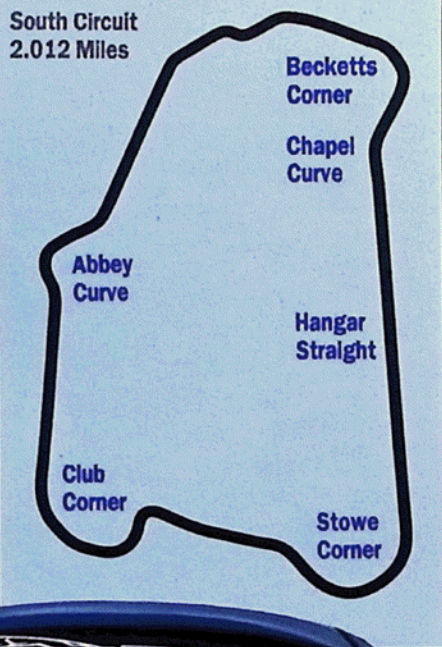
The enormous torque of the engine allowed 3rd to be used in the left and then an early shift to 4th for the long right-handed acceleration through Club. Kick the back out in the left and it would swing straight out when you turned right. Go steady through the left and even then the sheer power of the engine would turn Club into one long powerslide—wonderful!

All this exuberance was slightly spoiled by the closeness of the steering wheel and also the lightness of the steering that gave little warning of the impending breakaway. Quick applications of opposite-lock were the order of the day.

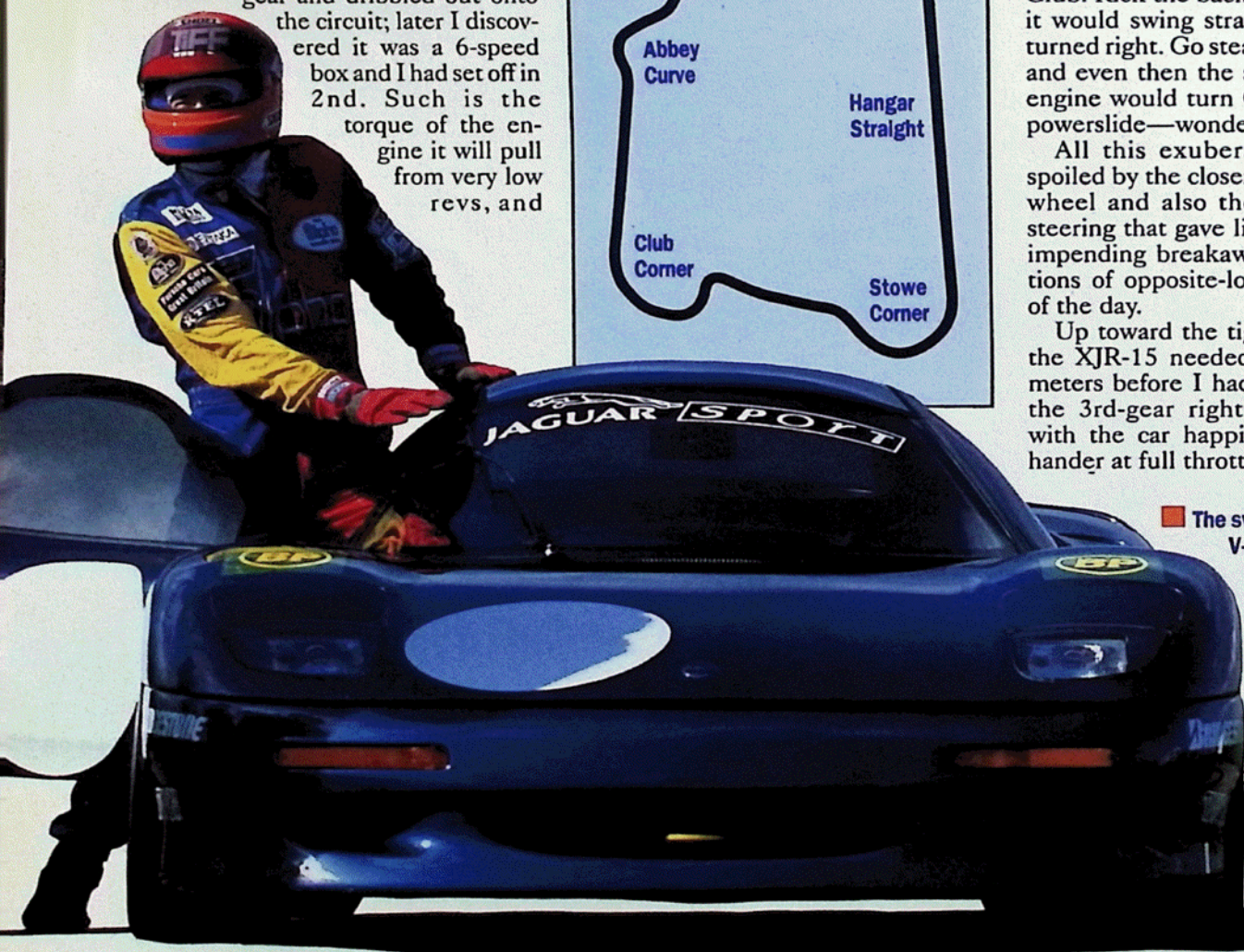
Up toward the tight right at Abbey, the XJR-15 needed 5th for only 100 meters before I had to brake hard for the 3rd-gear right/left combination, with the car happily taking the left-hander at full throttle. It's a shame the

## SILVERSTONE

South Circuit  
2.012 Miles



■ The svelte and exclusive V-12-powered Jaguar XJR-15: sort of a modern version of the Ford GT40. While the doors on this 450-bhp tall-happy machine swing out conventionally, Needell finds ingress and egress challenging.



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*Car Audio And Electronics, March '91*

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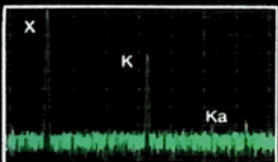
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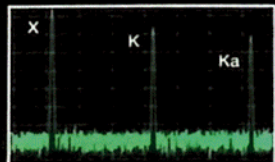
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205/60VR14	110	215/45ZR17	187
195/60VR15	104	235/45ZR17	209
205/60VR15	119	285/40ZR15	216
215/60VR15	129	255/40ZR17	224
205/55ZR16	188	345/35ZR15	248
195/50ZR15	132		



## A509

185/60HR13	\$58	225/60HR14	\$88
205/60HR13	71	195/60HR15	78
185/60HR14	65	205/60HR15	84
195/60HR14	74	205/50VR15	118
205/60HR14	82		



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215/65HR15	89	215/60HR15	95
185/60HR14	68	235/60HR15	102
195/60HR14	77		



## AVS A Plus 4

M&S rated for 4-season use

185/60VR14	\$84	215/60VR15	\$123
195/60VR14	84	235/60VR15	125
195/60VR15	99	205/55VR16	184
205/60VR15	113	225/50VR16	158

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South Circuit no longer has any high-speed corners because the car felt more at home in medium-speed turns than the slow ones where it was all too easy to break the traction of the rear wheels.


After Abbey it was the hard right leading off the Grand Prix circuit and up to 4th for the straight toward the long right-handed curve in front of the pits. As with Stowe, you really want to be on the brakes through the right-hander before dropping down to 3rd for the tight right-left-right chicane that follows. I really didn't want to crash the test car into the middle of the hospitality area, greeting the new owners, so I went back to driving school with a touch of brakes followed by a "balanced throttle" and then back on the brakes again—slower but safer.

Through the very tight chicane the XJR-15 showed excellent change of direction, and I was able to pick up the power early for the long right-handed curve leading up to Becketts and the return to Hangar Straight. This gradually became a long right-handed powerslide as my confidence increased

and I was able to admire the black marks I had left on the track from the previous lap.

Snatch 4th gear for 100 meters and then it was back to 3rd for the long right-handed Becketts. You run deep into the corner to set up a late apex and then make that increasingly confident solid application of power, with elbows cocked ready to catch any snap to oversteer as the grass apex of Chapel Curve steps out to catch you.

In my few laps I got down to 1 minute, 16 seconds, which is similar to a good Group A lap time and well short of the new Group C Jaguar's sub-1-minute lap. Depending on the final construction of the regulation Bridgestone slicks, the driver's main task will be to make the most of the traction without rooting the rubber and getting the most out of the brakes without their fading.

The XJR-15 will doubtless suit the Belgian Spa circuit more than the streets of Monaco, but I'm making space above the fireplace for the "Needell Exiting Casino Square" photo with me in full opposite-lock pose. 



When all 16 of the big Jaguar XJR-15s of the JaguarSport Intercontinental Challenge took to the tight Monaco street course, Grand Prix fans received a healthy dose of some classic single-marque racing. Former Formula 1 driver Derek Warwick, who pilots a Jaguar XJR-14 in the World Sportscar Championship, dominated the race, never relinquishing his lead after starting from the pole position. For his drive, Warwick earned a brand-new JaguarSport XJ-S. David Brabham placed 2nd.

Our man, Tiff Needell, despite getting rear-ended during practice by a hard-charging Davy Jones, qualified 5th. But a problem electronic throttle, which he actually had to kick to keep working, kept him from finishing any higher than 7th in the race. Needell, who placed 3rd overall in a private Porsche at the 1990 24 Hours of Le Mans, was up against a respectable field that included Warwick, Brabham, Jones, Bob Wollek, Juan Manuel Fangio II and John Nielsen, the only driver who made major contact with the Armco.

"You need a lot of road for those Jaguars," said Needell about the tight Monaco course. "It made for a very tough drive." —Andrew Bornhop

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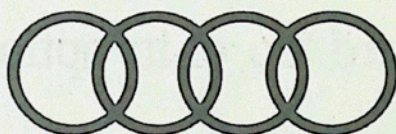
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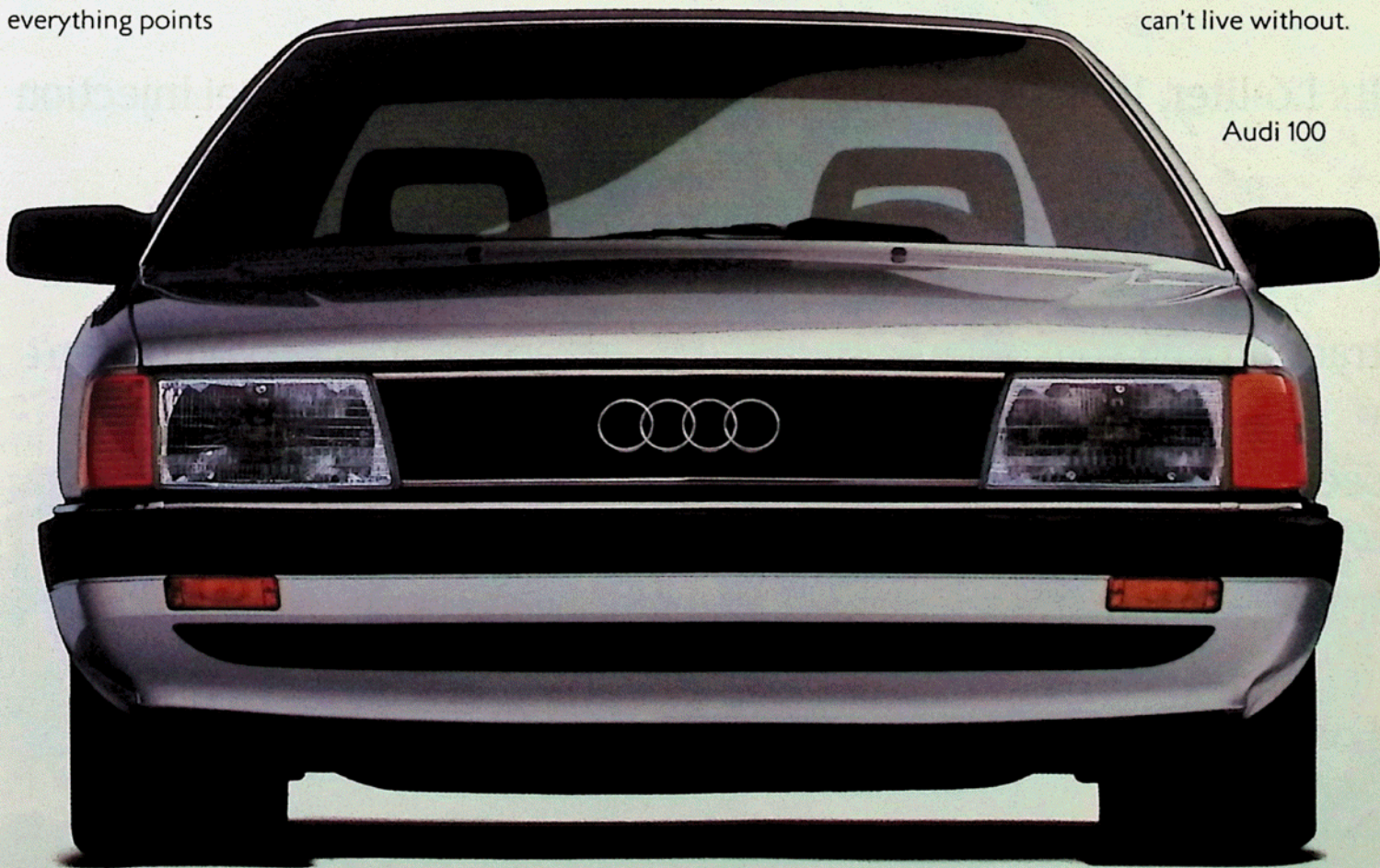
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# Straman STEALTH CONVERTIBLE

Making "Hey!" while the sun shines

BY DOUGLAS KOTT

PHOTOS BY RICHARD M. BARON

**I**N TERMS OF sheer ability to turn heads, the Dodge Stealth R/T Turbo has few equals. Paint one bright red, and this trend toward double-takes grows stronger. For the height of eye-popping effect, though, the well-heeled Stealth or Mitsubishi 3000GT owner will need a convertible conversion, performed by the R. Straman coachbuilding firm in Costa Mesa,

California. But be warned, the instant notoriety that comes with the conversion exacts a price beyond its \$14,000 cost: Future owners should be prepared to spend several minutes per fill-up answering questions from gas-station attendants and interested onlookers.

Richard Straman has a lengthy history of making coupes into convertibles, starting 16 years ago with the Fer-

rari 365 GTB/4 Daytona and moving on to Ferrari Testarossas, Honda CRXs and Nissan 300ZXs, to name three that have been featured in our pages. He has an equally lengthy reputation for doing absolutely first-cabin work, and it's evident in the Stealth we drove.

Of paramount importance in these conversions is retaining as much of the car's structural rigidity as possible. Straman concedes the Stealth has extremely good rigidity in stock, fixed-roof form, but says it felt horrible with the roof cut off. To address this, lengths of rectangular mild-steel tubing were welded to the undersides of the rocker panels. Alongside these are welded thin, wide torsion boxes, fabricated from mild sheet steel with thinner-gauge bulkheads inside, that connect the Stealth's front and rear subframes. Additionally, a box-section reinforcement is added to the windshield header. In all, the extra structure takes about one week to install, one-third of the total conversion time.

The dividends are felt during the first spin around the block. Only a small

bit of twisting and cowl shake is noticeable, far less than some factory-done convertibles in recent memory and doubly impressive considering the chassis loads inflicted by the Stealth's 300-bhp twin-turbo V-6. And with the Stealth's steeply raked windshield, buffeting in the cockpit is held to a minimum.


The top itself has a lightweight frame of thin-wall tubing and strap steel, and uses Hartz Stafast fabric, actually two layers of fabric sandwiching a layer of neoprene. A rocker switch on the console sets a single hydraulic pump into action, raising the top with two hydraulic cylinders. Two manual clasps cinch the top to the windshield header for a fit impressively free of wind noise leaks.

To put the top down, the procedure is simply reversed. It descends noiselessly into its well, with the fabric and plastic rear window folding in tidy accordion pleats. The well itself is surprisingly small and intrudes very little on luggage space (not that the Stealth has all that much to begin with). Appearance is quite good; the top nestles neatly below the level of the Stealth's sick-

le-shape spoiler and is covered by a fabric boot that fastens quickly with 11 snaps, plus two loops sewn inside that slip over the latch handles.

Esthetics aren't nearly so nice when the top is raised, the rather formal roofline contrasting markedly with the Stealth's Coke-bottle contours, but it does give the rear-seat passengers more head room than in the coupe. (And, it should be noted, the top mechanism doesn't take away any rear-seat width.) I'm sure that owners will have it stowed

at every sunny opportunity.

Straman's Stealth convertible is a blast, in more than one sense of the word. Interest in the car has been much higher than in his recent Nissan 300ZX convertible, and Straman's shop is geared to produce five cars per week. While some 300ZX conversions were sold through dealers, all Stealths and 3000GTs will be sold on a direct-buy basis. Sun-loving extroverts can contact the R. Straman Company at (714) 434-6931, rain or shine. 

■ With his Dodge Stealth convertible conversion, Richard Straman proves that stratospheric performance and open-air motoring need not be mutually exclusive.



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195/70HR-14	76	205/65VR-15	114
205/70HR-14	82	215/60HR-15	98
215/70HR-14	85	215/65HR-15	99
185/65HR-15	84	215/70VR-15	109
195/60HR-15	86	225/60VR-15	126
195/65HR-15	89	225/60VR-16	134



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205/60VR-14	133	245/50ZR-16	188
225/60VR-14	130	255/50ZR-16	196
195/50ZR-15	115	215/50ZR-17	196
195/60VR-15	115	235/45ZR-17	206
195/65ZR-15	128	245/40ZR-17	212
205/50ZR-15	140	255/40ZR-17	220
205/60VR-15	123	255/45ZR-17	215
215/60VR-15	132	275/40ZR-17	273
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185/70HR-14	57	215/65HR-15	76
195/60HR-14	69	225/60HR-15'	86
195/70HR-14	60	225/70HR-15'	83
205/70HR-14	64	235/60HR-15'	87
215/60HR-14'	77	235/70HR-15'	87
215/70HR-14'	77	255/60HR-15'	90
225/60HR-14'	57	275/60HR-15'	96
235/60HR-14'	83		
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215/60ZR-15	122
225/50ZR-15	156
225/60ZR-15	117
235/60VR-15	123
245/50ZR-15	163
205/55ZR-16	122
225/50ZR-16	159
225/55ZR-16	175
225/60VR-16	131
245/45ZR-16	173
245/50ZR-16	166
245/55ZR-16	186
255/50ZR-16	174
215/45ZR-17	171
235/45ZR-17	193
245/40ZR-17	198
255/40ZR-17	203
275/40ZR-17	205
315/35ZR-17	240
245/40ZR-18	377
275/35ZR-18	394



#1 D40 M2 on BBS RS



#3 D40 M2 on Borbet T-A



#5 D40 M2 on Executive



#7 D40 M2 on AMG Aero

**Aggressive Styling & Performance for the '90's**

- 17" tires & wheels are used as Original Equipment on BMW, Lamborghini, Ferrari & Corvette.
- 17" tires & wheels improve handling through shorter sidewalls & a wider section width.
- 17" tires & wheels improve steering response & give higher limits of adhesion.

## BORBET

**Type A 17"**  
Photo #3  
Fits: Acura, BMW, Mustang, T-Bird, Taurus, Camaro, Infiniti, Mercedes, Nissan, Porsche, Toyota.  
Finish: Silver center with polished lip.  
Sample Package: 17x8.5 wheel w/ 245/40ZR-17 D40 M2 \$2,048

## MSW/CZD

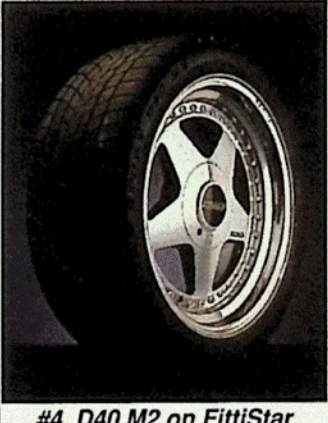
**Executive 17"**  
Photo #5  
Fits: BMW 5, 6, 7 series  
Finish: Silver center with polished lip.  
Sample Package: 17x8.5 wheel w/ 235/45ZR-17 D40 M2 \$1,680

## AMG

**Aero Dish 17"**  
Photo #7  
Fits: Mercedes  
Finish: Silver center with polished lip.  
Sample Package: 17x8 wheel w/ 235/45ZR-17 D40 M2 \$2,460



#2 D40 M2 on BBS RZ



#4 D40 M2 on FittiStar



#6 D40 M2 on RUF Carrera



#8 D40 M2 on Etoile

## BBS

### RS 17" 3 pc.

Photo #1  
Fits: Audi V8, BMW, Corvette, 3000 GT, Mercedes, 300ZX, Porsche, Supra.  
Finish: Gold or silver center with polished outer rim.  
Sample Package: 17x8.5 wheel w/ 235/45ZR-17 D40 M2 \$2,996

### RZ 17"

Photo #2  
Fits: BMW 5, 7 series  
Finish: Gold or silver center with polished lip.  
Sample Package: 17x8.5 wheel w/ 235/45ZR-17 D40 M2 \$2,512

## FITTI PALDI

### FittiStar 17" 3pc

Photo #4  
Fits: BMW, Corvette, Mercedes, Porsche.  
Finish: Polished spokes and rim.  
Sample Package: 17x7.5 wheel w/ 215/45ZR-17 D40 M2 \$1,176

## RUF

### Carrera 2/4 17"

Photo #6  
Fits: 911, 930, 951, 964.  
Finish: Silver center with polished lip.  
Sample Package: 17x8 and 17x9 wheels w/ 235/45ZR-17 and 255/40ZR-17 D40 M2 \$3,392

## ETOILE

### 3 pc. 17"

Photo #8  
Fits: BMW, Corvette, Camaro, Ferrari, Ford, Mercedes, Nissan, Porsche, Toyota, and more.  
Finish: Polished spokes and rim with gold accents.  
Sample Package: 17x10 wheel w/ 275/40ZR-17 D40 M2 \$2,332

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YOKOHAMA



Table with columns for tire models: All-Season AVS A-4, All-Season AVS U-4, A202, A403, PZERO, P6, P600, XGTV / Z, XGT H4, MXV, CH/ CV / CZ51, CZ 91.

Table with columns for tire models: AVS INTERMEDIATE, A509.

Table with columns for tire models: AVS INTERMEDIATE, 165/60VR-13, 185/60VR-14, 195/60VR-15, 205/60VR-16, 225/60VR-17, 245/60VR-18, 265/60VR-19, 285/60VR-20.

IRELLI Original Equipment on the World's Finest



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

MICHELIN



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

Continental



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

YOKOHAMA



Table with columns for tire models: A 378, A008G, A008RS (RACE), Y352, Y370, Y372, Y380, Y382, Y384, Y388, Y390, Y392, Y394, Y398, Y400, Y402, Y404, Y406, Y408, Y410, Y412, Y414, Y416, Y418, Y420, Y422, Y424, Y426, Y428, Y430, Y432, Y434, Y436, Y438, Y440, Y442, Y444, Y446, Y448, Y450, Y452, Y454, Y456, Y458, Y460, Y462, Y464, Y466, Y468, Y470, Y472, Y474, Y476, Y478, Y480, Y482, Y484, Y486, Y488, Y490, Y492, Y494, Y496, Y498, Y500.

IRELLI



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

DUNLOP



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

BRIDGESTONE



Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.

YOKOHAMA Promotion

Table with columns for tire models: A323, A320, A321, A322, A323, A324, A325, A326, A327, A328, A329, A330, A331, A332, A333, A334, A335, A336, A337, A338, A339, A340, A341, A342, A343, A344, A345, A346, A347, A348, A349, A350, A351, A352, A353, A354, A355, A356, A357, A358, A359, A360, A361, A362, A363, A364, A365, A366, A367, A368, A369, A370, A371, A372, A373, A374, A375, A376, A377, A378, A379, A380, A381, A382, A383, A384, A385, A386, A387, A388, A389, A390, A391, A392, A393, A394, A395, A396, A397, A398, A399, A400, A401, A402, A403, A404, A405, A406, A407, A408, A409, A410, A411, A412, A413, A414, A415, A416, A417, A418, A419, A420, A421, A422, A423, A424, A425, A426, A427, A428, A429, A430, A431, A432, A433, A434, A435, A436, A437, A438, A439, A440, A441, A442, A443, A444, A445, A446, A447, A448, A449, A450, A451, A452, A453, A454, A455, A456, A457, A458, A459, A460, A461, A462, A463, A464, A465, A466, A467, A468, A469, A470, A471, A472, A473, A474, A475, A476, A477, A478, A479, A480, A481, A482, A483, A484, A485, A486, A487, A488, A489, A490, A491, A492, A493, A494, A495, A496, A497, A498, A499, A500.

FALKEN



Table with columns for tire models: FX05G, FXU All Season, TIRE SPECIALS, FXU All Season.

GOODYEAR

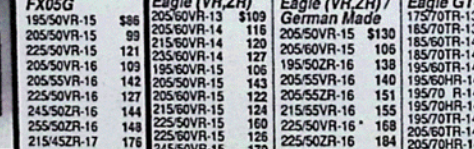


Table with columns for tire models: Eagle (VR.ZR), Eagle (VR.ZR) / German Made, Eagle GT-4, 108V, RE-92, S405, Goodyear GA, Goodyear NCT, Goodyear GS-D.

BRIDGESTONE

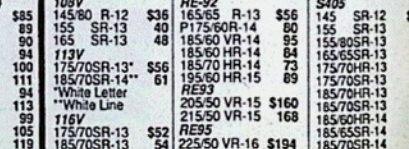
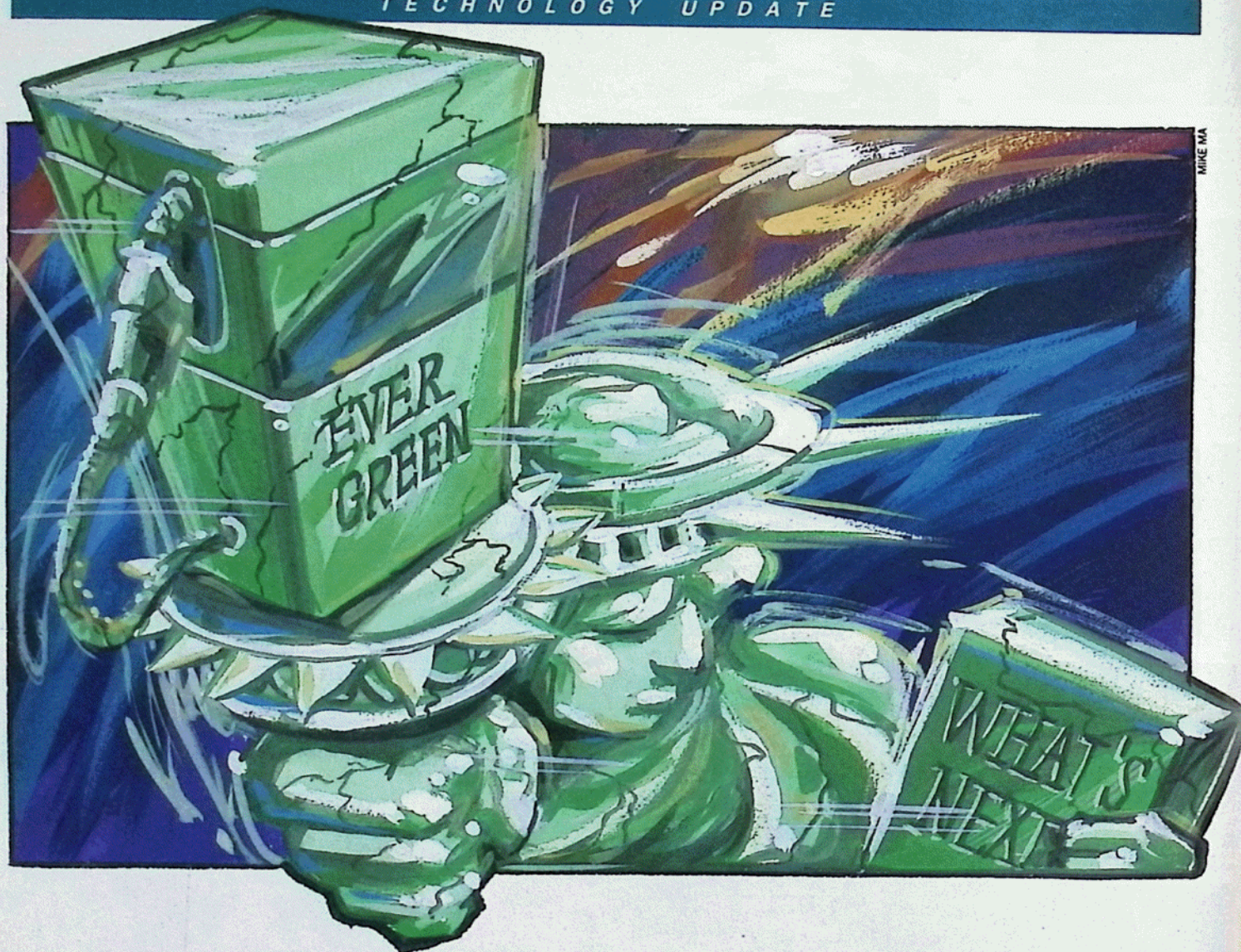


Table with columns for tire models: P7 & 7R, P500, P300 (NEW), D40 M2, D80 V4, HR4 All Season, RE71 POTENZA, HP41 POTENZA, TURANZA.







# REFORMULATED GASOLINES

Cleaner fuels for cleaner air

BY JOHN DINKEL

**E**VERYONE WANTS CLEANER air. And it's generally recognized that automobiles are a major contributor to dirty air. Automobile emissions-control regulations have had an enormous impact on reducing exhaust emissions, evaporative emissions and smog. For instance, the Los Angeles basin recorded cleaner air during the past two May–October smog seasons than in any other time periods since smog measurements have

been recorded. So we've made a start.

Far-reaching amendments to the federal Clean Air Act, which gained Congressional approval in October 1990, impose stiff new regulations on automobile emissions to help improve air quality across the nation. In many new cars starting with the 1994 model year and in all new cars by 1996, emissions of hydrocarbons (HC) and nitrogen oxides (NO<sub>x</sub>) must be reduced by 35 percent and 60 percent, respective-

ly, compared to already stringently controlled levels.

Oil companies will be required to offer new kinds of gasolines that burn more cleanly. Beginning in 1992, cleaner fuels are to be sold in cities with the worst carbon monoxide (CO) pollution problems.

In addition, car manufacturers will have to produce an experimental fleet—for sale in Southern California—that uses new technology to meet

a set of even tighter standards.

But new cars aren't the major problem. Two years ago Unocal mounted an interesting and useful experiment in the L.A. basin. The company bought 7000 1970 and older cars and trucks for \$700 each simply to scrap them. Similar campaigns by Ford, the Southern California Air Quality Management District and others brought the total of older cars and trucks scrapped to 8376.

The California Air Resources Board (CARB) tested a sample of these cars and reported the following:

They averaged 11.9 mpg, about half of what today's cars would get on the same test cycle.

Their HC emissions averaged 65 times those of a 1990 model.

CO emissions were 47 times higher than a 1990 car.

NO<sub>x</sub> emissions were 11 times those of a 1990 car.

The extremely high emissions of the cars came as something of a surprise in view of the relatively stringent inspection and maintenance program in force in the L.A. area. Unocal projected that a 60-percent reduction in HC and CO in the L.A. basin would be effected if all cars actually met the standards of the year of their manufacture. Other projections indicate a 14-percent reduction in NO<sub>x</sub> would also be achieved.

Amidst all this doom and gloom there is some good news. It comes not in the form of a breakthrough in batteries for electric cars, or in word of some enlightening new developments that will make solar-powered cars available to everyone within the next five years. Nor is it that alternative fuels such as methanol, ethanol and propane will be available at every gas pump within six months and that every car on the road today will be able to make use of these fuels. Rather, the good news comes in the form of reformulated fuels, those cleaner gasolines that have received a great deal of publicity recently.

**J**ust what is a reformulated gasoline? There are no simple answers, as everyone has his own definition of what a reformulated fuel is and at what vehicles it should be aimed. But a few generalizations will certainly help.

Typically, reformulated gasolines contain lower concentrations of benzene, aromatics and olefins, less sulfur, a lower Reid Vapor Pressure (RVP) and some percentage of an oxygenate such as methyl tertiary butyl ether (MTBE). Benzene, a naturally occur-

ring hydrocarbon, is a toxic chemical; thus reducing its concentration is clearly beneficial. Aromatics and olefins are hydrocarbons that react in the presence of sunlight to form smog, so cutting their proportions in exhaust emissions reduces smog formation. Decreasing RVP (which is a measure of a fuel's volatility) lowers evaporative emissions. Lower sulfur content results in more effective catalyst operation and reductions in HC, CO and NO<sub>x</sub> emissions. Adding an oxygenate such as MTBE (rather than extra aromatics) to boost octane reduces HC and CO emissions. MTBE "leans out" the fuel-air ratio and also increases the gasoline yield from crude oil—an important plus in times of uncertain energy supplies.

ARCO was the first oil company to produce a "cleaner" reformulated gasoline when it introduced EC-1 to the Southern California marketplace in the fall of 1989. EC-1 (EC standing for Emission Control) is unique in that it is formulated to reduce exhaust emissions from older cars and trucks that until now ran on leaded gasoline.

According to ARCO estimates, these vehicles represent about 15 percent of the 8 million on-road vehicles in Southern California and travel about 10 percent of the total vehicle miles traveled. Yet they produce approximately 30 percent of the vehicle pollution. Using EC-1 will provide a pollution reduction similar to removing 20 percent of these older vehicles from the road. Though lead-free, ARCO EC-1 is not intended for catalyst-equipped vehicles, and to prevent misfueling, it is dispensed through traditional larger-diameter leaded-fuel nozzles.

A year later, ARCO introduced EC-Premium to Southern California motorists. Unleaded high-octane EC-Premium is formulated for newer cars equipped with catalysts. Its formula also results in decreases in benzene, evaporative, HC, CO and NO<sub>x</sub> emissions. It contains less sulfur than conventional unleaded fuels and is less reactive in sunlight. In addition, it is designed to guard against deposit formation throughout the engine intake system.


ARCO is still the only company producing a reformulated gasoline for older cars and trucks, but many other oil companies have followed ARCO's example with the introduction of their own reformulated gasolines designed for catalyst-equipped engines. The list is an expanding one, but includes Amoco, Chevron, Conoco, Diamond

Shamrock, Exxon, Marathon, Phillips 66, Shell and Sun.

**A**nother fuel-sensitive issue these days is the question of vapor recovery during refueling. In most areas of the country except California, New York and a few others, gasoline vapors that escape into the atmosphere as a result of refueling are the last source of hydrocarbon emissions associated with vehicles that has yet to be controlled. Starting in model year 1996, this changes. How to control these emissions—onboard the car or at the gasoline pump—is the cause of a great deal of controversy.

To us at R&T there is no doubt as to the best approach: vapor recovery traps. If the traps are put on gas pumps, they can be installed immediately and they will trap the vapors as all cars fill up, not just new ones. Costs could be recovered by the oil companies in very small increments, say one cent per gallon of gasoline sold to all users, whether drivers of old cars or new. They would be a lot safer at gas pumps, rather than in cars. And the EPA says they reduce the risk of fire at the gas pumps.

If forced into cars, they could be put only into new cars, cars yet unbuilt, which would delay their effective use. New cars would have to be designed for them, and judging by how long old cars are being kept, it would be more than 20 years before all cars would be equipped. Unlike the pump controls, which are already in use, traps for cars would have to be devised; what's more, some experimental systems just haven't worked. They would also further burden the price of new cars by some \$50 per car. Unlike gas pump traps that incur a one-time \$1 billion cost, onboard traps would cost some \$600 million every year.

Reformulated fuels are not the complete answer to the complex problem of automotive exhaust pollution. But while we wait for the breakthrough in battery technology that is bound to come and for widespread use of alternative fuels by fleets, reformulated fuels can produce immediate air-quality benefits. They require no new infrastructure and are cost competitive with conventional gasolines. Designed for existing engines, they improve engine performance and reduce exhaust emissions and smog formation. It's worth every ounce, liter or gallon of a motorist's effort to inquire whether the fuel he or she is using is one of the latest reformulated gasolines. 

# Salon: 1959 DEVIN SUPER SPORTS

Stunning styling, timeless torque

BY DENNIS SIMANAITIS

PHOTOS BY BILL WARNER

CHARLESTON IS A kind and gentle city down along the South Carolina low country where, as they say, the Ashley River meets the Cooper River to form the Atlantic. Its lovely restored homes were once the antebellum in-town residences of those whose plantations dot the surrounding country, any one of these locales suitable for the opening scenes of *Gone With The Wind*.

An unlikely setting for raucous exhaust blatting from dual unmuffled side pipes? No, curiously enough, for it turns out that Charleston is home to five of the 12 surviving Devin Super Sports, flamboyantly potent sports racing cars from the late Fifties. Recently, Contributing Photographer Bill Warner and I visited the area with none other than Bill Devin, the man responsible for these cars.

Bill is an amiable septuagenarian these days, a wonderful raconteur of the Fifties' sports-car scene. Back then, though he doesn't dwell on the point, Bill was a well-heeled Chrysler-Plymouth dealer who managed to turn sports-car racing into more than just a hobby. His first race car was a Crosley Hotshot, taking the checkered flag first time out (under a large banner reading "Buy Road & Track") at Buchanan Field, California in August 1951. Bill was learning a lot about tweaks and his modified Hotshot did okay for itself, posting 20 wins in 22 starts.

"Then I got real serious," he says, "and moved up to Ferraris." But for the factory working on its team cars instead, Bill came close to driving his own Ferrari at Le Mans in 1953. "They couldn't finish my car in time," he recalls, "but I did meet Franco Scaglietti, whose company did Ferrari bodywork." There was an abortive deal to rebody a leftover 2.5-liter Grand Prix car converted to 2-seat configuration; but, more important, "Scaglietti and I talked about the car's styling," Bill remembers, "and I had him include reversed hood vents. I kind of liked those, even then."

Bill didn't realize it at the time, but he and Scaglietti were devising something that was to become a Devin trademark.

Bill raced Ferraris, bought and sold them, and this got him, indirectly, into the business of building cars. "I sold a 3.0 Farina coupe to a guy in Michigan and took a Panhard Deutsch-Bonnet race car in part trade," Bill recalls. "But when I drove the Ferrari there to swap them, I found the D.B. with its engine and transaxle in the cockpit." Later back in California with all the pieces, he bought out a Panhard franchise in Glendale ("It wasn't hard to do...") and found himself with plenty of spares. Bill made fiberglass copies of the D.B. bodywork, mounted them atop tube frames of his own design—and the first Devins were for sale. This magazine featured these cars in January 1955, and as an R&T-devouring

teenager I coveted the Type C competition version.

Then came an overhead-camshaft conversion for the Panhard's flat-twin powerplant. This had modified Norton Manx pistons, barrels and heads and a drive belt of notched rubber; the last, something about which Bill displays evident pride. "It was the first automotive use of rubber timing belts," he says. "People a lot smarter than me said it wouldn't work; now there are 100 million of them running around."

In 1956, Bill got into the production of fiberglass bodies for other people's specials. "Scaglietti's Monza style was popular then," Bill says, "and we had an Ermini around that was also designed by him." Some of the Ermini's lines were copied, others were accentuated, still others were modified a great deal, and Bill didn't forget his reversed hood vents. ("They're good," he says,



"because you can see when the engine's catching on fire.")

His resulting fiberglass bodies started at \$295, and in time, 27 different combinations of length, width and wheelbase covered just about any chassis one could imagine. This, in turn, led to Porsche-, Volkswagen- and Chevrolet Corvair-engined Devins as well as the project of our interest here, the Devin Super Sports.

"In 1957, two people in Belfast, Ireland wrote to buy bodies for a Jaguar-engined special they were building," Bill recalls, "so I went over and looked at the prototype. It had a tubular frame, double A-arm front suspension and De Dion rear with a Salisbury differential. And lots of other things you just couldn't get in this country at the time." Things like coil-over shock units and Girling disc brakes at all four corners, the rears inboard.

"Dunlop sold us 72-spoke wheels, with the right offset and all, and Dunlop racing tires and tubes for £10 each, about \$28. I said, 'Fine, but I don't want that rubber inner tube. It'll leak down, and back in the States I can get a butyl tube that's lighter and better for \$2.' But the guy said some influential people in Britain had rubber plantations and the government told Dunlop how much rubber they had to sell. He said, 'I don't care what you do with them, but if you want the wheels and tires, you'll take the tubes too.'"

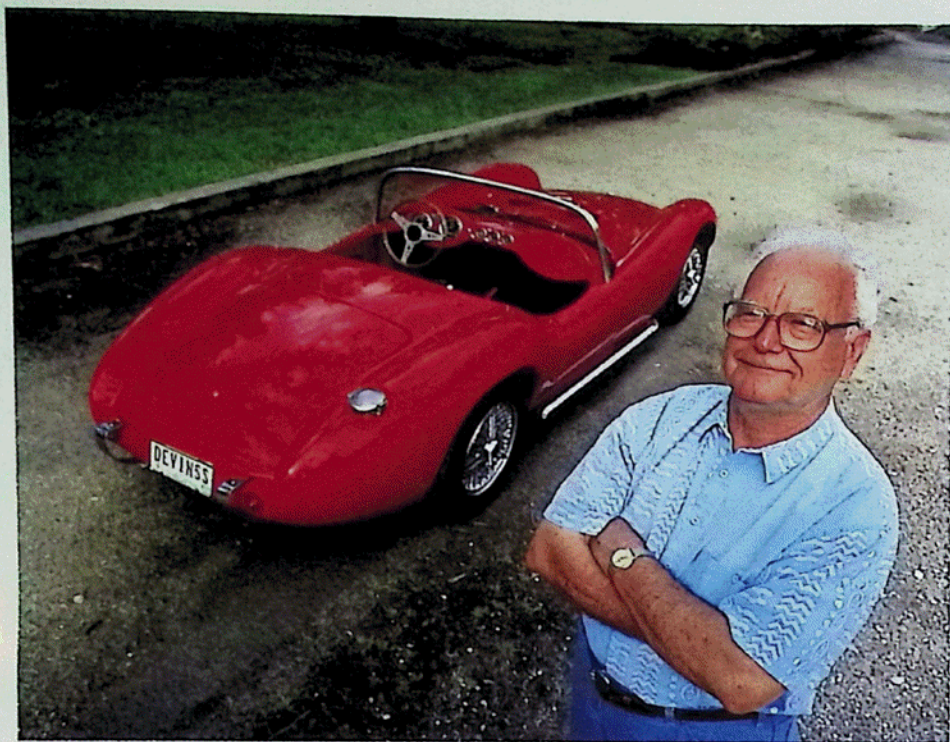
"Anyway, we changed some things on the prototype and I set up an arrangement with them to supply us with rolling chassis."

What sort of facilities existed in Belfast? "I never did see any facilities," Bill says, "and whenever I'd ask to see a frame jig or something, they'd change the subject."

Just a little cottage shop? "Either that," Bill says, "or they were buying one piece from a goat farmer and another from a turkey farmer. On the other hand, they had access to those disc brakes and coil-over shocks."

These aren't the only features setting the SS apart. Its generator, for instance, is mounted at the rear, belt-driven off the driveshaft. This aids the car's 47/53 weight distribution but, of course, implies that generator output depends on road speed, not engine rpm. Its De Dion rear suspension is unorthodox as well. The tube connecting left and right hubs is located laterally by a central roller bearing that rides on a vertical track bolted to the chassis. In all, the Devin possesses very sophisticated suspension, especially for the era of the late Fifties.

Super Sports chassis arrived at Devin Enterprises' El Monte, California shop



to be fitted with bodywork, trim and Chevrolet Corvette drivetrains. "We bought the Chevy 283, the fuelie engine, then threw away the injection," Bill says. "We fitted our own manifolding and Carter AFB 4-barrel carbs."

**It's a purposeful design, but a flashy one too, the kind that evokes hearty thumbs-up from other drivers.**

No other engine modifications were deemed necessary. And, in a test of a Devin SS in July 1959, R&T pretty much confirmed this. Encouraged by 220 bhp and 300 lb.-ft. of torque, and with a curb weight of only 2170 lb., the car reached 60 mph in a mere 5.7 seconds. This, back when we did our test-



ing with two people aboard!

I try some hard acceleration with the car today and find it astounding. Fourth gear is impressive, even though I'm just out of a borrowed Porsche Carrera 4, no slouch indeed. Third gear is mind-boggling, all the torque producing a distinct drift to the left (in preparation for that inevitable passing maneuver?). Second is a rocket-sled. And, out of respect for the 32-year-old Salisbury, my 1st-gear experiments are performed ever so gingerly.

Other Super Sports attributes are equally exemplary. Its rack-and-pinion steering feels precise; its unassisted brakes pull evenly; its handling reflects the sophistication of its suspension design. I now recognize why Devin SSs were so competitive in the era's C-Modified class (with only 15 built, they never achieved Production-class recognition). And the survivors do very well in vintage racing today.

The interior of the Super Sports is tastefully done, the seats with form-fit-

ting fiberglass inserts upholstered in the same Naugahyde that lines the doors. There's decent, if not abundant, room in the cockpit. "I set it up for myself when I was a younger man," Bill observes, "but people buying my cars today have put on a little money and a little weight over the years."

Like all of Bill's cars, the Super Sports displays fiberglass bodywork of extremely high quality, the shape carrying its Scaglietti Monza influence to a bizarre extreme. Its contours are muscular; its rear fenders terminate in the subtlest of razor edges; its snout is low and pronounced. There's unexpected elegance in the simplicity of the front bumper ("Yes, and it's useless too," Bill says). Other Super Sports details have all but become sports racing clichés: the exposed side-mounted exhaust pipes, the oversize quick-release fuel filler. It's a purposeful design, but a flashy one too, the kind that evokes hearty thumbs-up from other drivers.

The regular recipient of such goodwill gestures is Alex Quattlebaum, a Charleston businessman and avid vintage race driver who numbers among his life's accomplishments a fluency in Swahili. "It was the beginnings of what got called the Peace Corps," says Alex, who served in East Africa for two years. "We formed a group called the TARMACS, Tanganyika American Renegade Marching And Chowder Society."

He returned to Charleston and started several businesses, among them importing Yugoslavian Tomos motorcycles ("which was a really dumb thing to do..."). Later he became involved in the SVRA, Sportscar Vintage Racing Association, an avocation he continues to this day.

"Eight, 10 years ago I bought a Devin Super Sports out of New York," says Alex. "I searched Bill out, we got acquainted and I bought another one from him. That one's my vintage race car now."

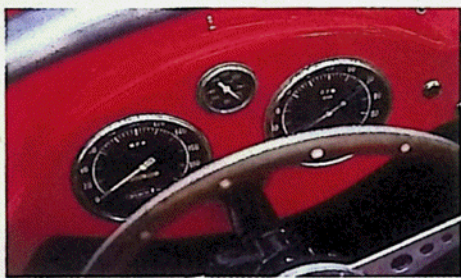
"I bought this one about six years ago from a Texan named Van Kline. Years ago, Bill wanted to buy the car, but the owner wasn't interested in selling at the time. I understand Kline bought it almost new from a Californian named Al Mayer who bought it from Bill in 1959. Kline had kept the SS in such good shape, all we've done is had it painted and changed the hoses."

"I've been mad ever since," Bill says, "that I didn't call Kline back before turning him over to Alex."

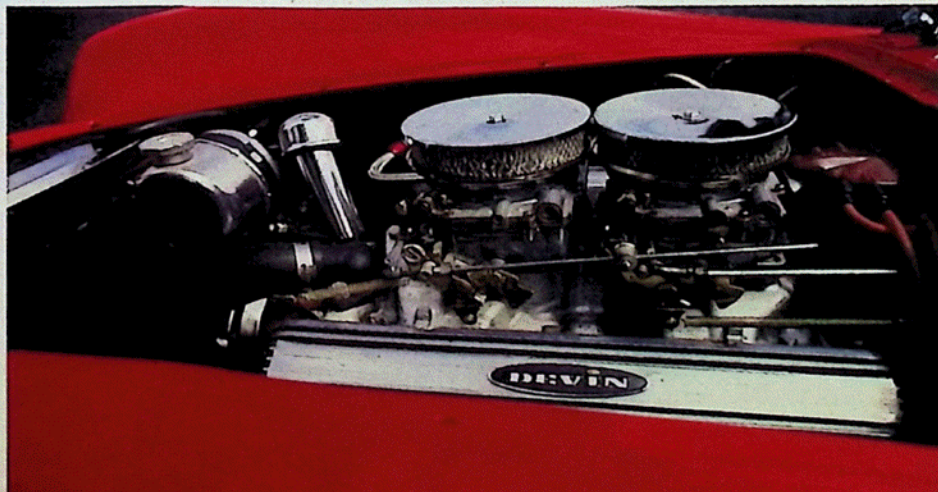
Does Bill have any Devin Super Sports of his own? "No, but I have pieces and bits..."

Could he build some up if he wanted? "Yes, I suppose so, if I had the ambition and enthusiasm."

I tell Bill that this Salon article might well put him back into the business. "Whatever," he says, with a smile and a sparkle in his eye.



Bill Devin, above left, has reason to be proud of his SS, flamboyantly potent with its reversed hood vents, custom-made instruments and Devin-modified Corvette powertrain. And, curiously, five of the 12 surviving cars reside in the charming city of Charleston, South Carolina.



#### SPECIFICATIONS

Curb weight	2170 lb
Wheelbase	92.0 in.
Track, f/r	52.0/50.0 in.
Length	164.0 in.
Width	63.0 in.
Height	44.0 in.
Fuel capacity	30.0 gal.

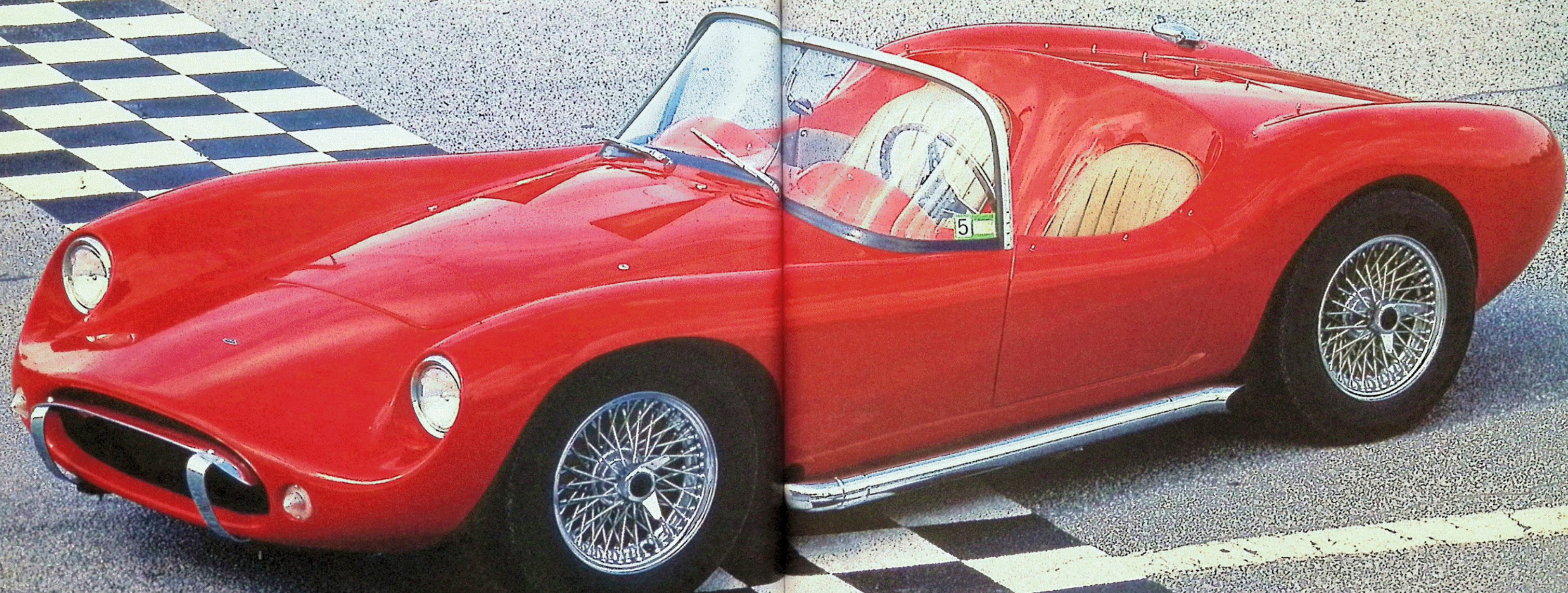
#### ENGINE & DRIVETRAIN

Engine	ohv V-8
Bore x stroke	3.88 x 3.00 in.
Displacement	283 cu. in.
Compression ratio	9.5:1
Horsepower (SAE)	220 bhp @ 4800 rpm
Torque	300 lb-ft @ 3000 rpm
Fuel delivery	two Carter (4V)
Transmission	4-speed manual

#### CHASSIS & BODY

Layout	front engine/rear drive
Brake system, f/r	discs/inboard discs
Wheels	wire, 15 x 4½ in.
Tires	6.40-15
Steering type	rack & pinion
Suspension, f/r:	double A-arms, coil springs, tube shocks/upper & lower trailing arms, De Dion axle located laterally by central bearing, coil springs, tube shocks

WE OFFER SINCERE THANKS TO BOONE HALL PLANTATION, MT. PLEASANT, SOUTH CAROLINA, WHOSE BEAUTIFUL SURROUNDINGS APPEAR IN THIS SALON.



# AYRTON AGAIN

McLaren thrives as Ferrari dives

BY ROB WALKER

IT WAS THE "cruellest month" for Ferrari, but the kindest for McLaren-Honda, as April ended on the now familiar bitter-and-sweet notes. At the San Marino Grand Prix in Imola, Italy, the third Formula 1 race of the 1991 season, Ayrton Senna continued his winning ways for the third time. For McLaren, it was sweeter still, as Gerhard Berger brought his car home in 2nd place. But for the Ferrari team, it was a big, fat zero.

For Dallara-Judd, it was a stunning 3rd-place finish and 4 points for J.J. Lehto, while Pierluigi Martini put his Minardi-Ferrari into 4th spot.

And for Lotus-Judd it was triumph over tragedy, as both drivers, Mika Hakkinen and Julian Bailey, placed in the points, 5th and 6th respectively. Team Lotus was in black armbands, still reeling from the death of David Jacques, a mechanic who had fallen through a skylight at the team's hotel the week before and been in a coma for several days.

Weather was the crucial factor throughout the week. During tire testing at Imola a week before the race, 2 ft. of snow fell, closing the aerodrome, the *autostrade* and the circuit (where the elevation is only 350 ft.). So most teams went to Paul Ricard in France to complete tire testing. The day I left Heathrow airport at 7:00 a.m. the temperature in London was 50 degrees Fahrenheit. Three hours later in Imola it was 37 degrees. The first day's practice was overcast and on the second it rained all day. On Sunday, in the morning, it reached 64 degrees and then came the thunderstorm that upset the whole race. The only good day was the day I left. But I digress...

On Thursday afternoon, the first driver I saw was Ayrton Senna, and he was good enough to give me some of his time. Among other things, he told me that he thought it would be a very competitive race as the circuit is very hard on engines, and he was hoping reliability would stand him in good stead.

Practice had a familiar ring to it. In the untimed morning session the order was Senna, Berger, then Alain Prost. In the timed period it looked as if rain might come, with a considerable chance of it on the following day, so the wise ones went out early. Prost was the first to head the list on his second run, much to the joy of the *tifosi*, the fanatical Ferrari fans. But it was short-lived, as Riccardo Patrese in the Williams took over. However, the maestro was yet to come and as usual Senna did not fail, though this time his normal large margin was down to less than 0.10 second. Jean Alesi had his Ferrari's engine catch fire and had to use the backup car.

As forecast, it rained nearly all of Saturday and no one could improve on his Friday's time, so Senna took his 55th pole, with Patrese alongside. For the race, Senna had a Spec 2 V-12 engine, of which Honda had only one, and it was given to the quicker of the two drivers. Senna said that the result of the race would depend on changing weather conditions and that he thought the Williams cars were his biggest rivals.

Hundreds of the *tifosi* were out in the pit road Saturday night cheering on the Ferrari team (who worked until 2:00 a.m.) and celebrating while Alesi waved to them and threw them his gloves, glorying in being their new hero. It was fortunate they did it then as they had nothing to celebrate later.

Benetton worked on until 4:00 a.m. and entertained onlookers by showing pit signs of "Piquet 1st." The *tifosi* spent the rest of the cold night sleeping in the grandstands.

Race morning was sunny, but 15 minutes before the start, the heavens opened with rain bouncing off the circuit, which was awash in moments. It had to be declared a "wet race" although the rain stopped and the sun was out before the start. As Senna led on the parade lap with plumes of spray following, I could see how slippery it was, particularly on the downhill sweep to Ravazza. When Prost changed from

4th gear to 3rd, there was a slight jerk and he lost control and slid backward across the grass and stalled. He could not restart the engine so he was out. Just imagine: The star Ferrari driver, whom thousands of *tifosi* had come to see and who had been telling Gianni Agnelli (the head of Fiat, Ferrari's parent company) how to run the team, was out before the start of the race! At the same time, Berger did exactly the same thing at the same place, but he kept his car going, crossed the grass and cut back to take his grid position.

Patrese made a perfect start and took the lead from Senna. Nigel Mansell found neutral instead of 2nd gear and fell back into the pack. He had selection trouble throughout the lap and at the end of it, Martin Brundle thought Nigel was going to turn into the pits, but instead he turned into Brundle. The result—Mansell out and Brundle delayed 4 laps. On lap 2 Nelson Piquet spun off, and on lap 3 Alesi tried to do a foolish pass on Stefano Modena, got one wheel in the dirt and understeered off the road. With both of the Ferraris out in the first 5 minutes, the *tifosi* started to wander home.

This left only Patrese of the front-runners against McLaren. Senna was

Through terrifying conditions at the start (right), Patrese ran ahead of Senna for 9 laps—a first for anyone this season. In time, electricians put paid to Patrese's Williams and the familiar combination of yellow, red and white prevailed.



content to go carefully, keep his 2nd place, but stay out of the spray as he knew the track was drying. Riccardo actually was more than 6 seconds ahead before Ayrton began closing. After 9 laps Senna passed the Williams, just before it went into the pits because of a misfire and to get slicks. A sensor was changed, which worked for a short time, but then Patrese stopped on the circuit with rev-limiter trouble. On lap 13 Berger came in for slicks and the following lap Senna did also, both stops being very quick. Senna came out just ahead of his teammate and they stayed like that until Berger dropped back with brake problems, never knowing which one would lock next. Modena, Roberto

Moreno and Lehto struggled on, a minute or more astern.

I decided to watch the race by signs, notably McLaren pit signs. On lap 38, when Senna headed Berger by 18.5 sec., I was dismayed to see Ayrton's board read, "Drop revs, oil," and Berger immediately closed to 16 sec., before he ran into brake problems. Ayrton confirmed the red oil light was coming on in corners, but the lower revs stabilized it. At the end I saw Senna's mechanic give the sign "+5.3 Berger," with 1 lap to go, and by this time the two had nearly lapped everyone twice. I was sure by my chart there were 2 laps to go, and so there were. Senna was horrified to find Berger only 2.5 sec. behind with

yet another lap to go, so Ayrton had to speed up to ensure victory.

The first 9 laps that Patrese led at Imola are the only laps that Senna hasn't been leading throughout the whole of this season. He is the first person ever to win the first three championship races, as in the old days Indianapolis counted and came in between. It is the first time that McLaren has come home 1-2 since Spa 1989. And Ferrari hasn't won Imola since 1983 with Patrick Tambay.

Imola, the first European race of the season, is traditionally the place where complete new models appear, and this year was no exception. The outstanding one was the long-awaited Benetton

PHOTOS BY AGENCY WANDYSTADT



John Barnard's latest, the Benetton B191, made its debut at Imola. Its highly integrated design sports a Tyrrell-like nose. Moreno's car lasted to be classified 13th; Piquet spun off in the opening thunderstorm.

## SAN MARINO GRAND PRIX

### Imola—April 28, 1991

Driver	Car	Laps	Qualifying
1 Ayrton Senna	#1 McLaren MP4/6-Honda (G)	61	(1) 1:21.877
2 Gerhard Berger	#2 McLaren MP4/6-Honda (G)	61	(5) 1:22.567
3 J.J. Lehto	#22 Dallara BMS191-Judd (P)	60	(16) 1:25.974
4 Pierluigi Martini	#23 Minardi M191-Ferrari (G)	59	(9) 1:24.807
5 Mika Hakkinen	#11 Lotus T.102B-Judd (G)	58	(25) 1:27.324
6 Julian Bailey	#12 Lotus T.102B-Judd (G)	58	(26) 1:27.976
7 Thierry Boutsen	#25 Ligier JS35-Lamborghini (G)	58	(24) 1:26.998
8 Mark Blundell	#8 Brabham BT60Y-Yamaha (P)	58	(23) 1:26.778
9 Eric van de Poele*	#35 Modena 291-Lamborghini (G)	57	(21) 1:26.550
10 Erik Comas	#26 Ligier JS35-Lamborghini (G)	57	(19) 1:26.207
11 Martin Brundle	#7 Brabham BT60Y-Yamaha (P)	57	(18) 1:26.055
12 Mauricio Gugelmin*	#15 Leyton House CG911-Ilmor (G)	55	(15) 1:25.841
13 Roberto Moreno*	#19 Benetton B191-Ford (P)	54	(13) 1:25.655
DNF Stefano Modena	#4 Tyrrell 020-Honda (P)		(6) 1:23.511
DNF Andrea de Cesaris	#33 Jordan 191-Ford (G)		(11) 1:25.491
DNF Bertrand Gachot	#32 Jordan 191-Ford (G)		(12) 1:25.531
DNF Ivan Capelli	#16 Leyton House CG911-Ilmor (G)		(22) 1:26.602
DNF Eric Bernard	#29 Larrousse/Lola 91-Ford DFR (G)		(17) 1:25.983
DNF Riccardo Patrese	#6 Williams FW14-Renault (G)		(2) 1:21.957
DNF Satoru Nakajima	#3 Tyrrell 020-Honda (P)		(10) 1:25.345
DNF Gianni Morbidelli	#24 Minardi M191-Ferrari (G)		(8) 1:24.762
DNF Jean Alesi	#28 Ferrari 642 (G)		(7) 1:23.945
DNF Aguri Suzuki	#30 Larrousse/Lola 91-Ford DFR (G)		(20) 1:26.356
DNF Nelson Piquet	#20 Benetton B191-Ford (P)		(14) 1:25.809
DNF Nigel Mansell	#5 Williams FW14-Renault (G)		(4) 1:22.366
DNS Alain Prost	#27 Ferrari 642 (G)		(3) 1:22.195
DNQ Gabriele Tarquini	#17 AGS JH25-Ford DFR (G)		1:28.175
DNQ Fabrizio Barbazza	#18 AGS JH25-Ford DFR (G)		1:29.665
DNQ Alex Caffi	#10 Footwork FA12-Porsche (G)		1:30.280
DNQ Michele Alboreto	#9 Footwork A11C-Porsche (G)		1:30.762
DNP Emanuele Pirro	#21 Dallara BMS191-Judd (P)		1:26.305
DNP Olivier Grouillard	#14 Fomet F1-Ford DFR (G)		1:26.789
DNP Nicola Larini	#34 Modena 291-Lamborghini (G)		1:26.886
DNP Pedro Chaves	#31 Coloni C4-Ford DFR (G)		1:31.239

DNF (did not finish), DNQ (did not qualify), DNP (did not pre-qualify), DNS (did not start);

(G) Goodyear tires, (P) Pirelli tires.

\*Classified, not running at finish.

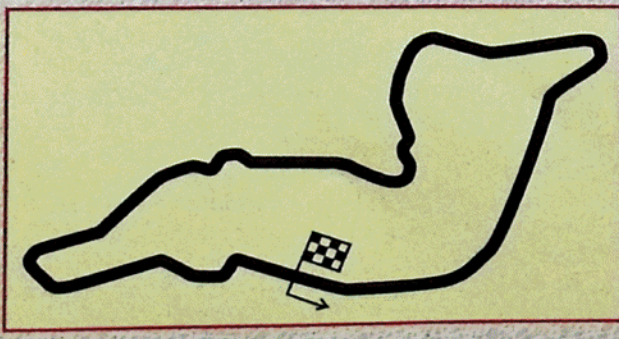
**Retirements:** Modena, transmission, 41 laps completed; De Cesaris, gear linkage, 37; Gachot, suspension, 37; Capelli, tire puncture, 24; Bernard, engine, 17; Patrese, electrics, 17; Nakajima, transmission, 15; Morbidelli, gearbox, 10; Alesi, spun, 2; Suzuki, spun, 2; Piquet, spun, 1; Mansell, accident, 0.

**Distance:** 61 laps of 3.132-mile circuit—191.052 miles.

**Average speed:** 120.344 mph. (Record, 126.061 mph, Patrese, Williams FW13B-Renault, 1990.)

**Fastest lap:** Berger, 1:26.531, 130.293 mph, new record. (Old record, 1:26.795, 129.893 mph, Prost, McLaren MP4/5-Honda, 1989.)

**Championship points:** Senna 30, Berger 10, Prost 9, Patrese, Piquet 6, Lehto 4, Martini, Modena 3, Hakkinen, Nakajima 2, Alesi, Bailey, Suzuki 1.



B191, which John Barnard started designing in November 1989. At the same time the new Series V Ford V-8 appeared, which gives 700 bhp at 13,500 revs. In fact, at Imola, they found it so powerful that they had failed to bring along a high enough top gear by 600 revs. It is John Barnard's most sophisticated chassis, featuring new building techniques that enable him to get closer to his goal of reducing the number of parts in the car, whereby he can build the monocoque, machine it, and it is finished. John said, "The business of Grand Prix car design is an ongoing process, and just because you have finished a new car, it does not mean you're totally happy with it. Even now I can see things we can improve."

John told me that during practice they had had a lot of piddling little troubles and had lost a whole day's practice because of rain. When it is properly sorted, I would say that this chassis with the extra power of the new Ford engine would put the B191 on equal terms with McLaren, Williams and Ferrari.

This year Ferrari has been in desperate trouble at Phoenix, Brazil and now Imola. Pierguido Castelli, an ex-Fiat man, changed the car's skirt as a result of aerodynamic tests in a wind tunnel but Prost hadn't tried it before Brazil, where it was a disaster. At the same time Castelli had the engine electronic management altered, which made the engine harsh but with less power, so Prost was furious. Alain went to see Gianni Agnelli and told him that crisis was a normal state of affairs with Ferrari, and as long as they operated like this, Agnelli was throwing his money away. Results were fairly immediate. First there were the accusations: Was it Castelli's fault or Team Manager Cesare Fiorio's? Journalists even suggested it was the fault of Steve Nichols, Prost's brilliant American engineer who knew nothing about the alterations at all. Niki Lauda said, "If I were Gianni Agnelli, I would tell Prost to shut up and to try to stay on the track and not make the sort of stupid mistake we saw at Imola."

And then everyone packed up and headed home, amid great anticipation of the next round at Monaco.



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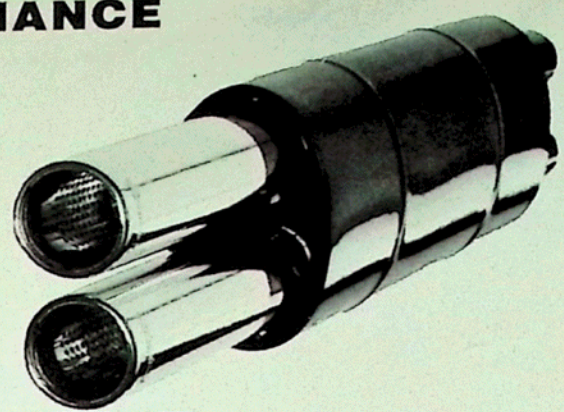
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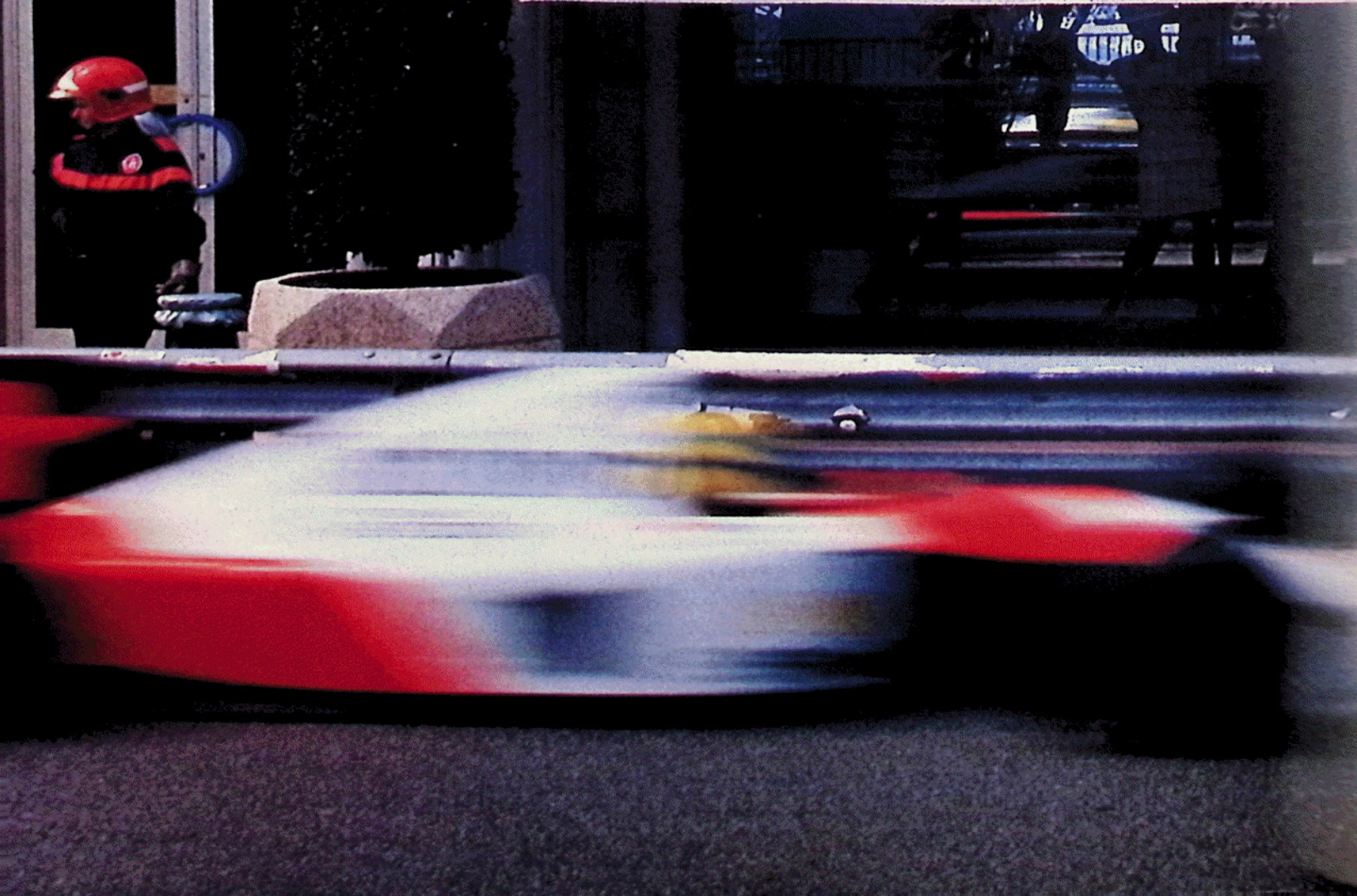
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# GUESS WHO?

**T**HE MOST SIGNIFICANT feature of the Monaco Grand Prix was not that it was another win for Ayrton Senna, but that it was his fourth of the four events held so far in 1991. It was also his fourth win through the streets of Monaco. This is a quite remarkable achievement never before equaled, which speaks volumes not only for Senna but also for every single member of the Honda Marlboro McLaren *equipe* under the brilliant directorship of Ron Dennis. It was Senna's 30th win—and from his 56th pole position, he was never anything but in the lead.

Monte Carlo itself was not in such a flamboyant mood; there were fewer—and smaller—yachts bobbing about, taxis were easier to come by and restaurateurs seemed pleased to have one's custom. The recession has had a far-reaching grip. Added to that, it was dark and dull with a constant threat of rain for the Thursday practice session, half a gale blowing to boot.

In pre-qualifying, the up-and-coming J.J. Lehto in the V-10 Judd-powered Dallara was quickest, followed by Andrea de Cesaris (Jordan-Ford), Emanuele Pirro (Dallara-Judd) and Bertrand Gachot (in the second Jordan-Ford). Given trouble-free running, I can see a pattern of the Jordans and the Dallaras being the survivors of this difficult session throughout the season.

The McLaren, Ferrari and Williams pits were all fairly close together, so it was interesting to see the tension mounting as engineers and designers sought ways to improve their setups in the hope of breaking the stranglehold Senna has had on pole position. There was a smile on Alain Prost's face as he talked with Steve Nichols, his ex-McLaren race engineer, on posting fastest time midway through the first qualifying session. It soon disappeared



**His helmet is yellow and his car is red and white**

**BY INNES IRELAND**

when Senna knocked 6/10ths off.

Looking at the final grid, I was amazed to find the Tyrrell-Honda of Stefano Modena sharing the front row with Senna. This was the first time a Tyrrell had been on the front row for many a long year. As it was going on Pirelli tires, there were glum faces in the Goodyear camp.

The start at Monaco is possibly the most important of the year because all but the leader are subject to the time-wasting bottleneck of Ste. Devote. Modena had hopes of beating Senna to the corner, but it didn't happen. In spite of that and a missed gearchange coming onto the sea front—it cost him 1.5 seconds, allowing Riccardo Patrese to get level—Modena managed to hold his advantage and 2nd place and matched Senna's lap times. After 10 laps the gap was just 2.5 sec., opening out by only 0.2 sec. by lap 36 when he came to lap Pirro who was lapping Pierluigi Martini.

It is quite extraordinary how Senna has managed to influence most other drivers. When he comes to lap them, they see the yellow helmet in the red-and-white car and practically fall over themselves to get out of his way. (Come to think of it, Stirling Moss had the same effect years ago.) Pirro and Martini both moved over for Senna but not for Modena, who climbed all over them in the corners but was unable to outrun them on the straights. In 4 laps Modena lost 12 sec. on Senna.

The marshals were showing the blue flag to Martini and Pirro, but where I was watching, it was stationary (a car is following you closely) and not waved (a car is trying to pass) so some of the blame lies with them. Initially Pirro was following Satoru Nakajima (Tyrrell-Honda), who spun at the chicane losing his engine. When a Tyrrell appeared in his mirrors, Pirro thought it was a recovered Nakajima

and, of course, the Italian was defending the 9th place he had just inherited. As soon as he realized his mistake, Pirro moved over. However, Martini was brought to the pits for a 10-sec. stop-go penalty and a warning, the first time this new regulation has been invoked.

Patrese was in 3rd place about 12 sec. down but with all the balking, he closed right up to Modena. I was just looking forward to a really good battle when Modena's engine blew up in the biggest possible way leaving oil through the tunnel and down to the chicane where he drove his car into the escape road. Patrese wasn't as lucky, slid on the oil, lost control and was out when he hit a barrier. Mark Blundell, (Brabham-Yamaha) in 15th place and having his first experience of Monaco, was next to find the oil. He skated out of the tunnel at 160-plus mph bouncing from the guardrails on one side of the track to those on the other, doing severe damage



■ No fast food at La Rascasse, just fast cars such as Senna's McLaren-Honda, en route to its fourth straight win of the season.

to his car but happily none to himself.

For all three drivers it was a great shame to be out of the race, but particularly Modena. He has long shown promise that has never been fulfilled, and here it came out to be seen by all. In keeping pace with Senna, he never put a foot wrong but for that missed gear-change early on which may have over-revved the engine.

The incidents, the missed gear and the tunnel all brought me back to my own 1961 race here. I was driving for Team Lotus, and as Colin Chapman wanted to experiment with different gearboxes to find the one most suited to the Monaco circuit, I had three cars at my disposal. There were two 4-speeds and a 5-speed. I cannot clearly remember the different gates, but of the 4-speeds, one was on the left of the cockpit, one on the right, one in the conventional H pattern, the other back-to-front with 1st where 4th should be, 2nd where 3rd should be. The 5-speed was all different again.

There was no problem during practice when I had time to think which box I was driving, but toward the end of practice when I had to put in a quick lap for the grid, the gearchange had to be a natural, automatic click of the lever.

The tunnel then, although in the same place, was different from the present one. It was narrower, shorter and darker, just a hole cut through the rock. For some time after entering the tunnel one couldn't see the exit so setting the

car up for the corner required accuracy of line, a good memory and a bit of guesswork.

I had the car set up for the corner and just as I was about to enter the tunnel, I had to change from 3rd to 4th at about 100 mph. I flicked the lever to where 4th should have been, but unfortunately, I was driving the wrong gearbox and to my considerable surprise, not to say alarm, I engaged 2nd gear.

I sensed there was something wrong as my foot was coming off the clutch, but in the fraction of a second this took, it was too late; I was unable to undo the procedure. The rear wheels locked instantly and off I went, spinning into the

darkness. The whole situation was out of control but I do remember the terrible noise as the car hit the walls. Eventually I was thrown out over the back of the car, happily when it was pointing at the tunnel exit, not the wall, for I traveled 60 to 70 yards before landing in the road well clear of the tunnel. As one photographer said, I came out of the tunnel with bits of my car "like shot from a scatter gun!"

But back to 1991: With Modena and Patrese out, Prost inherited 2nd place some 41 sec. down followed by Nigel Mansell, Jean Alesi, Roberto Moreno and the two Dallara-Judd V-10s of Lehto and Pirro.

■ Prost stayed on the track and even finished, albeit an ignominious 5th.



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SUNDAY JULY 28  
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Grand Prix of Hungary  
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Watch for more from Stefano Modena, shown here leading the always quick Patrese.

## MONACO GRAND PRIX

### Monte Carlo—May 12, 1991

Driver	Car	Laps	Qualifying
1 Ayrton Senna	#1 McLaren MP4/6-Honda (G)	78	(1) 1:20.344
2 Nigel Mansell	#5 Williams FW14-Renault (G)	78	(5) 1:21.205
3 Jean Alesi	#28 Ferrari 642 (G)	78	(9) 1:21.910
4 Roberto Moreno	#19 Benetton B191-Ford (P)	77	(8) 1:21.804
5 Alain Prost	#27 Ferrari 642 (G)	77	(7) 1:21.455
6 Emanuele Pirro	#21 Dallara BMS191-Judd (P)	77	(12) 1:23.022
7 Thierry Boutsen	#25 Ligier JS35-Lamborghini (G)	76	(16) 1:23.431
8 Bertrand Gachot*	Jordan 191-Ford (G)	76	(24) 1:24.208
9 Eric Bernard	#29 Larrousse/Lola 91-Ford DFR (G)	76	(21) 1:24.079
10 Erik Comas	Ligier JS35-Lamborghini (G)	76	(23) 1:24.151
11 J.J. Lehto	#22 Dallara BMS191-Judd (P)	75	(13) 1:23.023
12 Pierluigi Martini	#23 Minardi M191-Ferrari (G)	72	(14) 1:23.064
DNF Mika Hakkinen	#11 Lotus 102B-Judd (G)		(26) 1:24.829
DNF Gianni Morbidelli	#24 Minardi M191-Ferrari (G)		(17) 1:23.584
DNF Mauricio Gugelmin	#15 Leyton House CG911-Ilmor (G)		(15) 1:23.394
DNF Stefano Modena	#4 Tyrrell 020-Honda (P)		(2) 1:20.809
DNF Riccardo Patrese	#6 Williams FW14-Renault (G)		(3) 1:20.973
DNF Mark Blundell	#8 Brabham BT60Y-Yamaha (P)		(22) 1:24.109
DNF Michele Alboreto	#9 Footwork A11C-Porsche (G)		(25) 1:24.606
DNF Satoru Nakajima	#3 Tyrrell 020-Honda (P)		(11) 1:22.972
DNF Aguri Suzuki	#30 Larrousse/Lola 91-Ford DFR (G)		(19) 1:23.898
DNF Andrea de Cesaris	#33 Jordan 191-Ford (G)		(10) 1:22.764
DNF Ivan Capelli	#16 Leyton House CG911-Ilmor (G)		(18) 1:23.642
DNF Gabriele Tarquini	#17 AGS JH25-Ford DFR (G)		(20) 1:23.909
DNF Gerhard Berger	#2 McLaren MP4/6-Honda (G)		(6) 1:21.222
DNF Nelson Piquet	#20 Benetton B191-Ford (P)		(4) 1:21.159
DNQ Julian Bailey	#12 Lotus 102B-Judd (G)		1:26.995
DNQ Fabrizio Barbazza	#18 AGS JH25-Ford DFR (G)		1:27.079
DNQ Alex Caffi	#10 Footwork A11C-Porsche (G)		no time
DSQ Martin Brundle	#7 Brabham BT60Y-Yamaha (P)		no time
DNP Nicola Larini	#34 Modena 291-Lamborghini (G)		1:25.893
DNP Eric van de Poele	#35 Modena 291-Lamborghini (G)		1:26.282
DNP Pedro Chaves	#31 Coloni C/4-Ford DFR (G)		1:27.389
DNP Olivier Grouillard	#14 Fondmetal Fomet 1-001 Ford DFR (G)		1:27.759

(G) Goodyear tires, (P) Pirelli tires.

\*Classified, not running at finish.

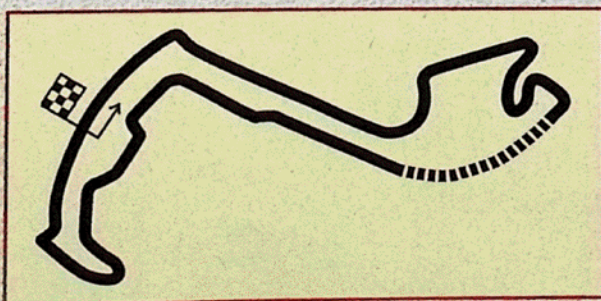
**Retirements:** Hakkinen, oil leak, 64 laps completed; Morbidelli, gearbox, 49; Gugelmin, throttle cable, 43; Modena, engine, 42; Patrese, accident, 42; Blundell, accident, 41; Alboreto, engine, 39; Nakajima, spun, 35; Suzuki, accident, 24; De Cesaris, engine, 21; Capelli, brakes, 12; Tarquini, gearbox, 9; Berger, accident, 9; Piquet, accident, 0.

**Distance:** 78 laps of 2.068-mile circuit—161.304 miles.

**Average speed:** 85.616 mph. (Record, 85.830 mph, Senna, McLaren MP4/5B-Honda, 1990.)

**Fastest lap:** Prost, 1:24.368, 88.242 mph, new record. (Old record, 1:24.468, 88.138 mph, Senna, McLaren MP4/5-Honda, 1990.)

**Championship points:** Senna 40, Prost 11, Berger 10, Mansell, Patrese, Piquet 6, Alesi 5, Lehto 4, Martini, Modena, Moreno 3, Hakkinen, Nakajima 2, Bailey, Pirro, Suzuki 1.



Mansell had reason to be so far behind, his engine cutting out periodically. Miraculously it appeared to cure itself and Mansell began to close on Prost, sometimes by as much as 1 sec. per lap. Then on lap 63 he came out of Portier quicker than Prost and had the edge all the way through the tunnel, out into the open and down to the chicane. Taking the inside line and putting his trust in Prost, Mansell got hard on the brakes to arrive a tad ahead at the chicane, his right front wheel locked. Off the brakes the car turned in beautifully and Mansell was in 2nd place.

It was an excitingly bold and daring but clean move, typical of Mansell. It was also typical of Prost to leave him the space to do it.



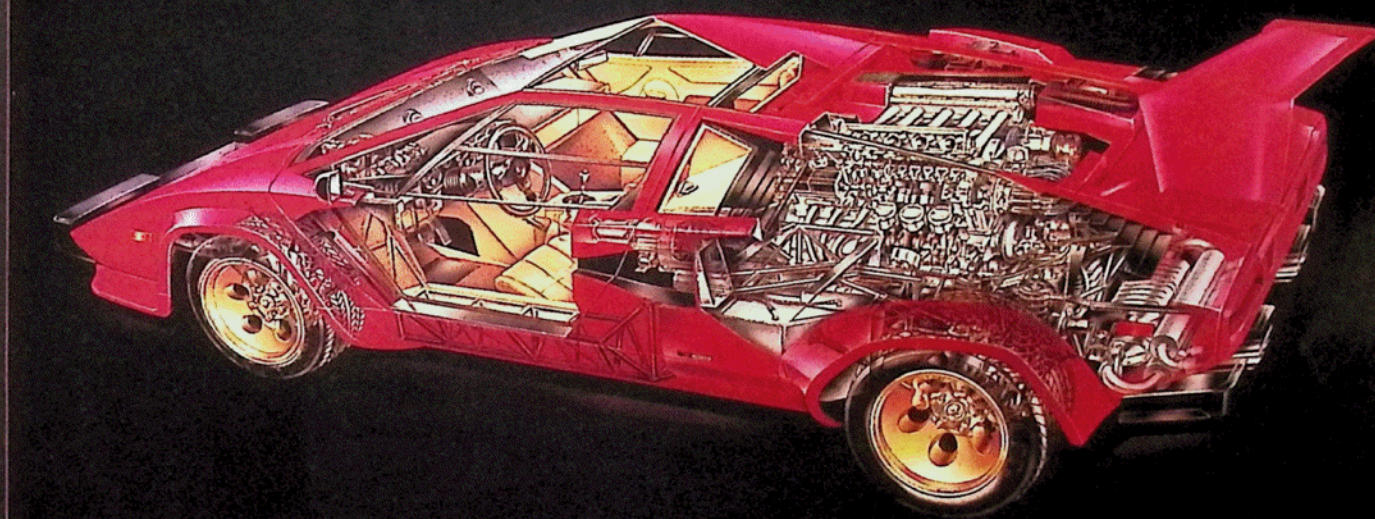
Alesi's 3rd place meant a trip to the podium and congrats from Prince Rainier.

With just 6 laps to run, Prost had a problem with a front wheel and came into the pits for a checkup when all four wheels were changed. By the time this was accomplished and he rejoined the course he had dropped to 5th place ahead of Pirro, with Alesi and Moreno taking 3rd and 4th. But on the last lap he did have the satisfaction of setting fastest lap.

Once again Senna won as he pleased, never seriously under any pressure, which is, after all, the way to win races. For him and McLaren the aim must now be to run the perfect race weekend. That would mean topping the time sheets for every practice, qualifying and warmup session. Then it would mean lapping everybody else in the race, running it in record time. Oh! One other thing. Fastest lap would also have to be included. And after that? What about a perfect season?

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# ABOUT THE SPORT

BY JOE RUSZ



PHOTO BY DEAN SIRACUSA

■ Formula 3 and F3000 experience and a top-notch ride are paying off for Eric Bachelart, Indy Lights winner at Long Beach.

## Indy Lights to shine brighter

KEEP YOUR EYE on any young driver who graduates from Indy Lights. Paul Tracy, for example, the 1990 champion of what was formerly the American Racing Series. At this year's Toyota Grand Prix of Long Beach, the boyish-looking, 22-year-old Canadian qualified 15th—in a year-old Lola whose well-worn Cosworth V-8 expired after completing only 30 laps. But while he ran, Tracy showed he has the right stuff, thanks to the two seasons spent in ARS/Indy Lights.

Because of its relatively short (98.0-in.) wheelbase, flat bottom (minimal ground effects) and generous horsepower (425 bhp), an Indy Lights car is very difficult to drive fast. Although a switch this season to 15-in.-

diameter Firestone tires with a lower profile and stiffer sidewalls has improved stability somewhat, Lights cars are still a handful. "They're quick, but they give small grip," explains Eric Bachelart, winner of the opening round at Long Beach.

Bachelart, a young Belgian who finished 3rd behind Jean Alesi and Eric Bernard in the 1987 French Formula 3 championship, says that by contrast, the Formula 3000 cars he also raced stick to the track extremely well. They have more sophisticated suspensions and employ ground effects, unlike the March-built ARS single-seaters based on the 1986 March F3000.

The latest 3000 cars are made of exotic materials because cost and durability are of little concern. But ARS cars are spec racers built to a budget

and cost \$95,000 versus \$145,000 for a rolling chassis (sans engine). Because they compete on ovals where forces are great, Indy Lights must be stronger. Thus certain components—rear wheel uprights, for example—are made of aluminum rather than mag-

nesium. This makes them pretty sturdy and a bit heavier. But ARS cars last, and even a year-old tub is still rigid enough to be competitive.

Unfortunately, the same regulations that froze ARS chassis design (to keep costs down) have put Indy Lights cars be-

## Pirelli's charity gala toasts Fangio

Just before Imola, Pirelli gave a charity gala dinner to commemorate Juan Manuel Fangio's 80th birthday in June. Fangio, arguably the greatest Formula 1 driver ever, won the championship five times and is the king of motor racing as well as its greatest ambassador.

Stirling Moss, Fangio's Mercedes teammate, was the main speaker and second person of importance. Other notables were Phil Hill, Tony Brooks, Roy Salvadori, John Surtees, John Cooper, Sir Jack Brabham, Ken Tyrrell, David Piper, Nigel Mansell, Martin Brundle and Robert Atkins, the U.K. minister for sport whom I sat next to. He is a keen fan of racing, having done a little himself. It was a glittering and memorable evening with film cuts of Fangio racing and speeches from his contemporaries. I thought a bottle of Johnnie Walker was a suitable birthday present from me. —Rob Walker



PHOTO BY STEVE MOHLENWAMP



Does Shawn Hendricks' win in the SCCA/ESCORT World Challenge season opener at Sears Point portend another championship win for Corvette? Could be. Shawn's Bakeracing Vette started from the pole and was never headed as it lapped the field—including Doc Bundy's Lotus Esprit and Peter Cunningham's Acura NSX, which finished 2nd and 3rd after a race-long battle.

hind the times, especially where aerodynamics are concerned. Even Roger Bailey, the series president, admits that Lights cars have an ungainly look. "We need to do something to spruce them up a bit," says Bailey, who hinted that the 1992 cars may be cleaner.

Reductions in cowl and rear deck height and a reshaping of the sides at the rear should make the cars swoopier. But none of this can be accomplished without increasing the wheelbase by 6 in., a delicate matter where Bailey's constituency is concerned. "We don't want to obsolete the existing cars," Roger says. He believes that the stretch job can be accomplished simply by inserting a 7.5-in.-long spacer between the Buick V-6 and its Hewland DGE gearbox.

While tidying up the car's shape, the proposed wheelbase increase could make an Indy Lights a bit more manageable. But still not easy to handle.

There's that flat bottom and an engine that could easily be tweaked to produce more than 500 bhp. A challenging combination for talented young drivers on the move. Like Paul Tracy, they would probably agree with series' boss Bailey who says, "If you can drive a Lights car, you can drive anything."



PHOTO BY DEAN SIRACUSA

Robble Groff's wins at Phoenix and Milwaukee have given the young Californian a slim lead over Bachelart in Indy Lights.

### Battle of the badges in pro showroom stock

OTHER SERIES ALLUDE to it and even build their reputations on it: the SCCA Trans-Am Championship, for example, which since its inception has considered itself the battleground for Detroit's auto manufacturers such as Buick, Chevrolet, Chrysler, Ford, Pontiac and Oldsmobile; and IMSA's Camel GT, which has expanded its arena to take in an international cadre of car makes—Audi, Jaguar, Nissan, Porsche and Toyota.

But when it comes to sheer diversity of makes, no category of auto racing comes close to professional showroom stock. Consider IMSA's Firestone Firehawk Endurance Championship in which moderately modified stock automobiles compete in 3-, 4- and 24-hour races held at 11 tracks in the United States.

### FROM MONACO'S F3 TO GRAND PRIX

Are Grand Prix drivers-to-be winners of Monaco's F3? If that's true, then we can expect to see Jörg Müller in a Formula 1 ride soon. He's the young German who drove his Reynard-Volkswagen to victory in this year's support race (to the Grand Prix) at Monte Carlo. Should he make it, Herr Müller will be in good company: Alain Prost and Ivan Capelli, winners in 1979 and 1984 respectively. What of the other winners of the last dozen years? Suffice to say, they're racing—but not in F1.

### CHEEVER'S PRIMAL SCREAM THERAPY

At his first oval-track race in Phoenix in 1990, former Formula 1 veteran Eddie Cheever lost control of his Penske PC-18-Chevrolet and prouetted down the track for 400 yards. "People said it was good driving to spin and keep your car off the walls. But that's hard to believe when your eyes are closed and you're screaming," confessed Cheever to the *Los Angeles Times*.

### INDY CARS FOR MANSELL?

Is Williams-Renault driver Nigel Mansell about to jump ship? Could be. The Formula 1 veteran recently spent \$7.25 million of his \$11 million-plus annual salary on a 17,000-sq.-ft. home and an adjoining acre of land overlooking the harbor in Clearwater, Florida. Maybe ol' Nige simply enjoys the balmy climate and golfing (with good friend and fellow Floridian Greg Norman). But rumor has it that he'll be racing Nissan's future 3.5-liter V-12 Indy car.

### PUTTING OUT THE FIORIO

In the midst of what appears to be a poor season, Cesare Fiorio, Ferrari's controversial racing director, has been relieved of his duties by Ferrari's board of directors. Piero Ferrari, son of Enzo, has assumed Fiorio's responsibility as general manager of the racing operation. Claudio Lombardi has been named technical director and Marco Piccinini will serve as team coordinator.

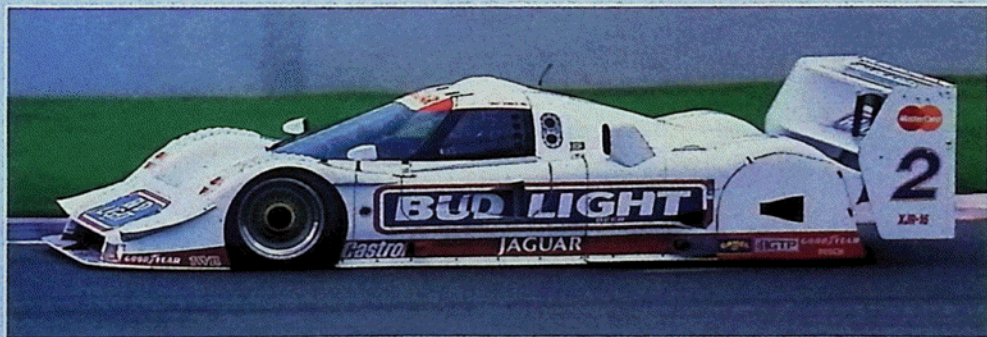


PHOTO BY RICH CHENET

Revised suspension and brakes, engine tweaks and aerodynamic improvements, including a European Jaguar XJR-14-style double-element rear wing, make Jaguar of North America's XJR-16 IMSA GTP car a winner—right out of the box. In its debut at Road Atlanta, the Jag qualified on the pole, led all but one round and nearly lapped the entire field. At Topeka, it followed much of the same scenario until overheated tires forced driver Davy Jones to spin, relinquishing the lead and victory to Chip Robinson's Nissan NPT-91.

# SPORT

## WHERE TO, U.S. GP?

If and when the United States Grand Prix leaves Phoenix, where will it go? Road Atlanta and Laguna Seca are at the top of the rumor list, as is a street course in San Diego. Here's a more realistic guess: Dallas-Fort Worth International, the new multiuse facility planned by Chris Pook and Race Circuit Management of Texas. It'll be ready for action by 1994 when the remaining two years of the existing deal with Phoenix are completed.

## "LITTLE GUYS"

Darrell Waltrip, as heard on ABC's coverage of the Monaco Grand Prix speaking about Formula 1 drivers: "They're little guys that drive little cars real fast on little tracks."

## L'AMERICAIN RAPIDE REVISITED

Richie Hearn, 1990 winner of the Winfield School's Pilote Elf competition, has taken over the reins of his Elf-backed Formula Renault. In his first race, the 20-year-old Californian (dubbed "Our Yankee" by the French) finished 8th, ahead of his Gallic teammate Jesse Bouchet who came 9th. In his most recent race at Pau, Hearn started 22nd and finished 12th, after spinning twice. If Richie does well, the next step up the ladder, after a second season in Formula Renault, takes him to an Elf-backed ride in the French F3 championship where he'll follow in the footsteps of Alain Prost, the most famous Pilote Elf graduate and French F3's 1978 champion.

## KEITH BLACK 1927-1991

Drag racing's most well-known aftermarket engine builder, Keith Black, succumbed to cancer on May 13. Black, who teamed with Don Prudhomme in the early Sixties and whose aluminum engines dominated drag racing well into the Eighties, was 64.



It's a Porsche parade in Firehawk, where race-prepped 944 S2s have won the first five rounds of the series.

Grand Sports, the division for high-performance sports and GT cars, is home to an international mix of cars that includes the Chevrolet Camaro, BMW M3, Dodge Stealth, Pontiac Firebird and Porsche 944 S2. Sports/Touring, the Firehawk's two-class category for small-bore GTs and sedans, harbors the BMW 318is, Dodge Daytona, Eagle Talon, Ford Probe and Taurus SHO, Honda CRX Si, Mitsubishi Starion, Nissan Sentra SE-R, Oldsmobile Quad 442 and Calais, Saturn SC, Toyota MR2 Turbo and Volkswagen GTI.

Then there's the SCCA's Escort World Challenge. Back for a second season under its revised format, the Escort sports an equally diverse lineup of automotive makes. In the World Challenge category where the big boys play, the lineup includes the Acura NSX, Chevrolet Corvette, Ford Mustang, Lotus Esprit Turbo, Mazda RX-7 Turbo, Nissan 300ZX Turbo and Pontiac Firebird Trans Am. In Super Production, the Escort's category for coupes, sedans and non-turbo sports and GTs, the list includes the BMW M3, Eagle Talon, Honda CRX Si and Mazda RX-7.

Manufacturer wars? The Firehawk and Escort World Challenge have them.

Which raises the question:

"What's hot?"

Porsche and Chevrolet in the Firehawk's Grand Sports Category; Oldsmobile, Toyota, Honda and Volkswagen in Sports/Touring. After years of humiliation in both IMSA and SCCA, Porsche's 944 S2 has arrived. So much so that S2s have won the first three races in the series, including a 1-2-3-4-7-9 sweep at Sebring and a 1-3-4-5-7-9 win at Road Atlanta.

In the Sports class of the Firehawk's Sports/Touring division, Oldsmobile's Quad 442 (1-2 at Topeka) is locked in a heated battle with Toyota's MR2 Turbo. In Touring, it's the Honda CRX Si that's taking on VW's GTI. But there's a dark horse, ICY Racing's Saturn SC sedans, which finished 1st and 3rd in class at Topeka.

Meanwhile, in the Escort, last season's confrontations continue. Corvette, winner of the World Challenge category in 1990, has once again locked horns with last year's runner-up, Lotus. Although the Vette beat the Esprit Turbo in the opening round at Sears Point (an Acura NSX finished 3rd), the season is far from over. The same is true in Super Production where last year's winner, the Eagle Talon, beat runner-up Honda.

Great racing? You bet. Good exposure for car companies? That too. But there are other pluses to professional showroom stock racing and they apply to drivers. Never has there been a more accessible form of professional racing (dozens of club racers now compete regularly in the Firehawk and/or Escort). Never has auto racing offered such lucrative rewards for so modest an investment. The average purse per single class at a Firehawk race is \$24,000 with \$6000 to \$10,000 going to the winner; the average purse at an Escort contest is \$27,500 with \$2500 going to the World Challenge winners.

And that doesn't include contingencies that can more than double the booty (IMSA's 24-hour, all-class endurance at Watkins Glen boasts a \$180,000 purse).

True, major league series that spotlight Formula 1, Indy cars, GTP cars and purpose-built GTs are still the jewels in auto racing's crown. But only in pro showroom stock do we see the battle of the badges in its purest form.



ICY Racing gave Saturn its first-ever racing win.

PHOTOS BY DENNIS ASHLOCK



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PHOTOS BY DEAN SIRACUSA

## 1979-1981 BMW 528i

A Bimmer beloved by *aficionados*,  
unknown by the masses and quite affordable

BY PETER BOHR

**T**HE TRUTH IS, this Used Car Classic started out to be about a different BMW model, a very popular Bimmer recognized by every yuppie and wanna-be yuppie in existence.

But when we rounded up our usual cast of characters—BMW mechanics, BMW club members and fans of the marque—a funny thing happened. Our BMW experts didn't seem too keen on our chosen subject car. Not a bad car, they said, but not an *enthusiast's* car. Now those are damning words in this publication. So we asked them to suggest another older model instead. And to a man, without hesitation, each answered "the 528i."

"It may be the best all-around car BMW ever built," says Phil Marx, one of our experts. Now that's an impressive statement coming from a fellow who has 15 BMWs in his backyard (including a 528i), who sells new BMWs for a living and who has served as presi-

dent of the 26,000-member BMW Car Club of America.

And when we perused the classifieds and found that 528is regularly sell for between \$5000 and \$6000 and often less, we knew we had hit the jackpot: a car that is at once loved by *aficionados*, relatively unknown by the masses and still inexpensive to buy.

### Evolution of the Series

EVEN IF YOU'RE a longtime R&T reader and truly worthy of your string-back driving gloves, don't worry if you have to pause and reflect on just where the 528i fits into BMW's scheme of things. The 528i had one of the briefest lives of all BMW models—from 1979 through 1981.

The 528i was, of course, one of the many variations of BMW's 5-Series sedans, introduced in Europe in 1972. The new model was smaller than the Bavaria, larger than the 2002 and sported more modern styling than either

one. The first 5-Series car, the 520, carried a 4-cylinder engine with twin carburetors or a 4-cylinder with fuel injection (the 520i). In 1973 and 1974, BMW added several variations to the lineup, including the 525 with a 2.5-liter 6-cylinder powerplant and the 528 with a 2.8-liter 6-cylinder engine. But alas, none of these was ever seen on our side of the Atlantic.

However, for model year 1975, we Yanks finally received our very own 5-Series BMW, the 530i with a fuel-injected 3.0-liter version of BMW's 6-cylinder powerplant. The mid-Seventies was a difficult time in automobiledom, when carmakers were adding ponderous bumpers and new-fangled devices called catalytic converters to their cars to meet our government's stringent regulations. Like its German archrival Mercedes-Benz, BMW slapped some particularly ungraceful protuberances on its cars to meet the U.S. bumper regulations. But when it

came to emissions rules, BMW took a different path. Unconvinced about the future of catalytic converters and unleaded gasoline, it turned to thermal reactors instead.

The thermal-reactor approach required the 530i to carry a passel of horrible stuff, including air injection, exhaust-gas recirculation and retarded spark. The reactors needed a rich mixture, which did nothing good for fuel economy. And the exhaust-gas recirculation and retarded spark did nothing good for either fuel economy or engine response. Moreover, the reactors generated tremendous heat in the engine compartment, often overtaxing the 530i's marginal cooling system, and exacerbating a weakness in the engine's cylinder head.

The 530i, then, was a vexing car. It was fitted and finished in the finest Teutonic tradition, with a silky-smooth powerplant that could take the car to 120-plus mph, and had handling and braking fully up to the task. But it also had reliability problems and dismal fuel economy.

In one fell swoop BMW engineers corrected everything that was wrong with the 530i, while retaining all that was so right. The key to their success was an item that is now commonplace on cars from all manufacturers: the 3-way catalytic converter with a Lambda oxygen sensor. The 528i of 1979 was, in fact, the first BMW model equipped with the system.


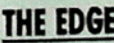
The new emissions controls meant that the lovely BMW six could now run like "God and Alex von Falkenhausen intended it to," as we said in our road test of a 528i (February 1979). Fuel economy increased by 15 percent over the 530i, to an excellent 22.0 mpg and acceleration times dropped dramatically, from 10.2 to 8.2 seconds—despite the 528i's smaller engine.

Why the smaller 2788-cc engine instead of the 2985-cc engine from the 530i? The genesis of the 528i occurred around the time of the second great Middle Eastern oil-spigot shutoff. The upshot was our government's Corporate Average Fuel Economy (CAFE) law and acute awareness of fuel economy. The 2.8-liter engine had a slight edge in this respect, and automakers everywhere, including BMW, wanted all the edge they could get.

We Americans had first seen the 2.8-liter sohc inline-6 in the 2800/Bavaria series of the late Sixties and early Seventies. Back then it had twin carburetors instead of the 528i's Bosch L-Jetronic fuel injection. BMW's big six had

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always been one of R&T's favorite engines, though staff members found the engine in the 528i a tad harsh.

Aside from the smaller engine and new emissions-control system, the 1979 528i was virtually unchanged from the 530i. The car remained the quintessential German luxury/sporting sedan, capable of carrying four or five persons in comfort and offering the convenience of four doors and a roomy trunk.

For a 4-door sedan, the car's styling is probably as handsome as any. The beltline is low, to bring down the center of gravity and to provide outstanding outward vision. In keeping with long-standing BMW practice, there's nothing cluttered about the body (except our government-required side-marker lights and those big bumpers). Subtle rounding of the body panels shows a concern for aerodynamics.

Moreover, BMW engineers paid a great deal of attention to the 5-Series' crashworthiness. They designed the hood and trunk as "crush zones," meaning they'll absorb energy as they buckle, leaving the passenger compartment intact. And the roof contains an integrated rollbar.

MacPherson struts are the basis for the front suspension, while the rear uses a semi-trailing-arm independent system. There are anti-roll bars front and rear. A limited-slip differential was an option. Of course the 528i has 4-wheel disc brakes (vented in front), and both the brakes and steering are power-assisted. A 4-speed manual transmission was standard, while a 3-speed ZF automatic was optional.

The 528i was a bona fide luxu-tourer. Every car came with plenty of luxuries, including four radio speakers, a central-locking system (including the fuel-filler cap), air conditioning, telescopic steering wheel, three-way adjustable driver's seat (including height), electric window lifts, a quartz clock and a carpeted trunk. The 528i buyer had a choice of vinyl or corduroy-like cloth upholstery at no extra cost. And finally there was that BMW *pièce de résistance*, a most handsome set of tools in a fold-down case attached neatly to the underside of the trunklid.

There were a few options too, at extra cost over the 1979 528i's base price of \$15,505. In addition to the automatic transmission and limited slip, there was leather upholstery at around \$900, an electrically operated sunroof at \$550, a rather poor Japanese-made Blaupunkt radio/cassette at \$500 and alloy wheels at \$475.

During the next two years of the

528i's brief life, nothing of importance changed, with one exception. A Getrag 5-speed overdrive unit became standard in 1980. Not only did the extra gear make highway cruising more relaxed, but also it boosted fuel economy—by a whopping 35 percent over the 530i, according to BMW. Unless you want to drive automatically, our BMW experts highly recommend buying a 1980 or 1981 528i just because of the 5-speed transmission. The previously optional radio and alloy wheels also became standard fare in 1980.

The 528i model-run ended in 1982 when the car was replaced by the 528e. Enthusiasts weren't thrilled with the 528e and its "eta" engine, a unit built more for ultimate fuel economy than ultimate performance. And that only serves to enhance the appeal of the 528i.

### Buying a 528i

"THEY JUST DON'T break," says Phil Marx of Charlottesville, Virginia about the 528i. And the rest of our BMW experts agree, including Terry Sayther of Phoenix Motor Works in Austin, Texas; Dave Wason, co-owner of Bavarian

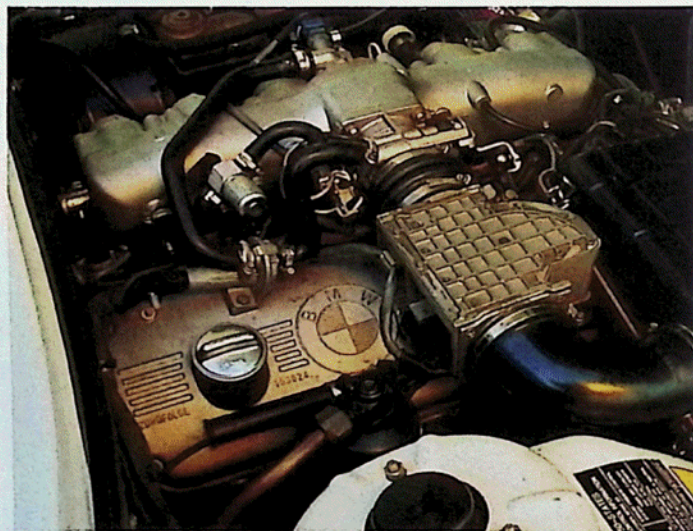
Auto Service Inc., in Newmarket, New Hampshire; Cy Franke, a mechanic with BMW of Riverside, in Riverside, California; and Frank Jacob of Prognathas Engineering in Ridgecrest, California.

"We don't see any absolute upper limit on engine life," says Sayther. "Many of our customers have 125,000 to 150,000 miles on their 528is."

Marx added, "I wouldn't be concerned about buying a high-mileage 528i."

That, of course, assumes owners—past and future—are reasonably diligent about maintenance. Sayther encourages his customers to have their engines' oil changed every 3000 miles and to carefully inspect the cooling systems at every service; overheating can mean sudden death to the BMW six with its alloy cylinder head.

However, the cooling system is not the bugaboo it was on earlier BMWs. "The 528i was the first BMW with a good cooling system," notes Sayther. If it's in proper working order, it can handle air conditioning and the sizzling summers of the Western United States. Still, leaky water pumps seem to plague



■ The 528i's sohc 2.8-liter inline-6 was a far sight better than the 3.0-liter six it replaced. The use of 3-way catalytic converters in place of cantankerous thermal reactors for emissions control cleared up a host of problems, including dismal fuel mileage and lethargic performance.



■ The 528i's interior, though a bit stark, offered good ergonomics for its day.

all BMWs—including the 528i—every 25,000 miles or so. Fortunately, at around \$70 and requiring three hours of labor to install, they're not terribly expensive to replace. And Sayther wisely suggests that a 528i buyer should immediately replace all the water hoses, whether they look bad or not.

On the subject of cool, beware of a 528i with a malfunctioning air-conditioner compressor. Sayther says a new Bosch unit costs a whopping \$1000, though it is possible to fit a Japanese rotary unit to the system instead.

Should a BMW six need a complete overhaul, BMW dealers offer an engine-exchange program. The car owner trades the old engine for a factory-rebuilt one. BMW's suggested price for the 2.8-liter is \$3000, though dealers are free to charge more. Plan on an additional labor charge of 20 hours for installation, plus the price of any ancillary components—alternator, water pump, etc.—that may need replacing.

For 1980, BMW gave the 6-cylinder engine a redesigned cylinder head to help eliminate the old cracking problems. However, the mechanics on our panel rarely see cracking, even on 1979 528is with the old head. But the rockers and shafts on all older BMW sixes are often heavily worn. "Cars used mostly at low speeds around the city are especially vulnerable," says Marx. "They don't get enough lubrication at low rpm." Listen carefully for valve noise, and if a mechanic can't silence it through adjustment, plan on a valve job. Dave Wason says that ready-to-bolt-on heads from Spain are available for \$1200.

The L-Jetronic fuel-injection system is generally as reliable as they come. But because we are dealing here with decade-old cars, Jacob thinks changing the system's lines would be a prudent preventative maintenance measure. Cost would run about \$20 plus three hours labor. And Sayther suggests a new set of injectors at the 100,000-mile mark for \$360, though it's not absolutely necessary. Catalytic converters will often last more than 100,000 miles. But if one is plugged or damaged, it can cost \$1000 to replace, according to Sayther.

Manual transmissions, whether the 4-speed or the later 5-speed unit, rarely give trouble. And clutch replacements are also surprisingly unusual on 528is. But automatic transmissions are another matter. Though the 528i's ZF units are far more reliable than the old Borg-Warner ones used in Bavarias, Marx says that the reverse gear typically gives out at around 100,000 miles. Repairs

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are costly. Our panel's mechanics say it's difficult to find local transmission repair shops competent enough to rebuild the ZF unit. But rebuilt units are available through BMW's exchange program for \$2400.

The 528i's driveshaft uses a rubber coupler or "doughnut" at the output flange of the transmission. It should be inspected periodically; if it's allowed to deteriorate too much, it can ruin the driveshaft, a \$600 item. Vibration upon acceleration is the main symptom of a badly worn doughnut, or worse, a ruined driveshaft. The 528i's rear end is generally indestructible.

The car's brake rotors need replacing more often than most cars, according to Jacob. "If they've ever been machined, they'll be especially sensitive to warping," he says. You'll feel a slight pulsating through the brake pedal when you apply the brakes if they're warped. But pads and rotors aren't too costly at \$200 for four sets. Plan on four hours of labor to install them. A new brake master cylinder, if needed, runs \$125.

The 528i's body and interior are mostly as stout as the drivetrain. According to Wason, the dreaded tinworm generally avoids the cars, and as a New Englander, he should know. "If a 528i rusts, it'll be around the outside of the rear wheel wells and around the shock towers under the hood," he says.


Sayther has also found severely corroded metal around the battery well in the engine compartment.

In our road test of the 528i, we praised the car's "flawless" metallic paint. But good as it might have been when new, it doesn't seem to stand up well. The metallics often craze and

crack; BMW's enamel paints are more durable.

The 528i's door checks—the little gizmos that stop the door from swinging too far—are notoriously weak and difficult to repair. You'll hear a click and a pop if a check is bad when you open the door.

Like BMW metallic paint, BMW seats are great when new, but they are not particularly durable. The seat bottoms break down and become as hard and flat as a park bench. Any upholsterer can restuff the seat with foam, but rarely will it regain its original shape. However, XKSS, a California mail-order firm ([800] 350-9577) can supply exact duplicates of the original horse/pig-hair seat pads for \$93 apiece. XKSS also sells "as-original" leather covers for the front seats at \$433 each and the rear seat at \$933.

Bilstein gas-pressurized shocks at \$111 each make a "night-and-day difference on the 528i," according to Wason, by eliminating much of the car's body roll. Wason's company also does a brisk business in brake-dust shields (placed behind the wheels) at \$30, sunroof wind deflectors at \$40, dashboard covers at \$50 and—of all things—trailer hitches at \$80. And, according to Marx, BMW club members tend to favor Michelin and Pirelli (P600s especially) tires for the 528i. 

## SPECIFICATIONS

### 1979 528i

Curb weight .....	3400 lb
Wheelbase .....	103.8 in.
Track, f/r .....	56.0 in./57.9 in.
Length .....	190.0 in.
Width .....	67.2 in.
Height .....	55.9 in.
Engine type .....	sohc inline-6
Bore x stroke .....	86.0 x 80.0 mm
Displacement .....	2788 cc
Horsepower (SAE) .....	169 bhp @ 5500 rpm
Torque .....	170 lb-ft @ 4500 rpm
Transmission .....	4-speed manual
Suspension, f/r .....	independent/independent
Brakes, f/r .....	discs/discs
Steering type .....	recirculating ball, pwr asst

## PERFORMANCE DATA

0-60 mph, sec .....	8.2
Standing ¼ mi, sec .....	16.7
Avg fuel use, mpg .....	22.0
Road test date .....	2-79

## TYPICAL ASKING PRICES

1979-1981 .....	\$3500-\$7500
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Some goofball in a Buick rear-ended Cy Franke's beloved 1973 Bavaria. Franke was unhurt, but he was left with just a small insurance settlement and a large need for an everyday get-to-work automobile.

So following up on an ad in the local paper, Cy bought a 1980 528i 5-speed for \$4000. And what did he get for such a modest sum? A well-running car with 77,000 miles. A California car with no rust and hardly any dings. A car that, in fact, still wore its original "Chamonix" white paint.

Of course at only four grand the BMW wasn't perfect. Indeed, there was a laundry list of niggling problems. And because buying any older used car is like opening a box of Cracker Jack—you never know what little surprises await inside—the list grew longer than Cy had anticipated.

There was a leaky water pump, bald tires, a worn-out muffler, an



inoperative sunroof, a cracked windshield, a pulsating brake pedal and a weak clutch master cylinder—all apparent when he bought the car. But Cy hadn't expected a bad cylinder-head gasket in the bargain; the gasket probably perished because the engine had once overheated, perhaps a result of the leaking water pump.

As a professional BMW mechanic, Cy has certain advantages not enjoyed by most of us when it comes to fixing his car. But had he paid the usual

prices for having everything put right, the bill might have added up to some \$2500.

Still, what a dandy car for a \$6500 investment. Inside, the 528i has all the BMW trademarks familiar to those who've owned Bavarias: the big steering wheel, the vast expanse of glass, the attractive set of instruments and the wide seats suitable for the broad bottoms of prosperous *Bürgermeisters*.

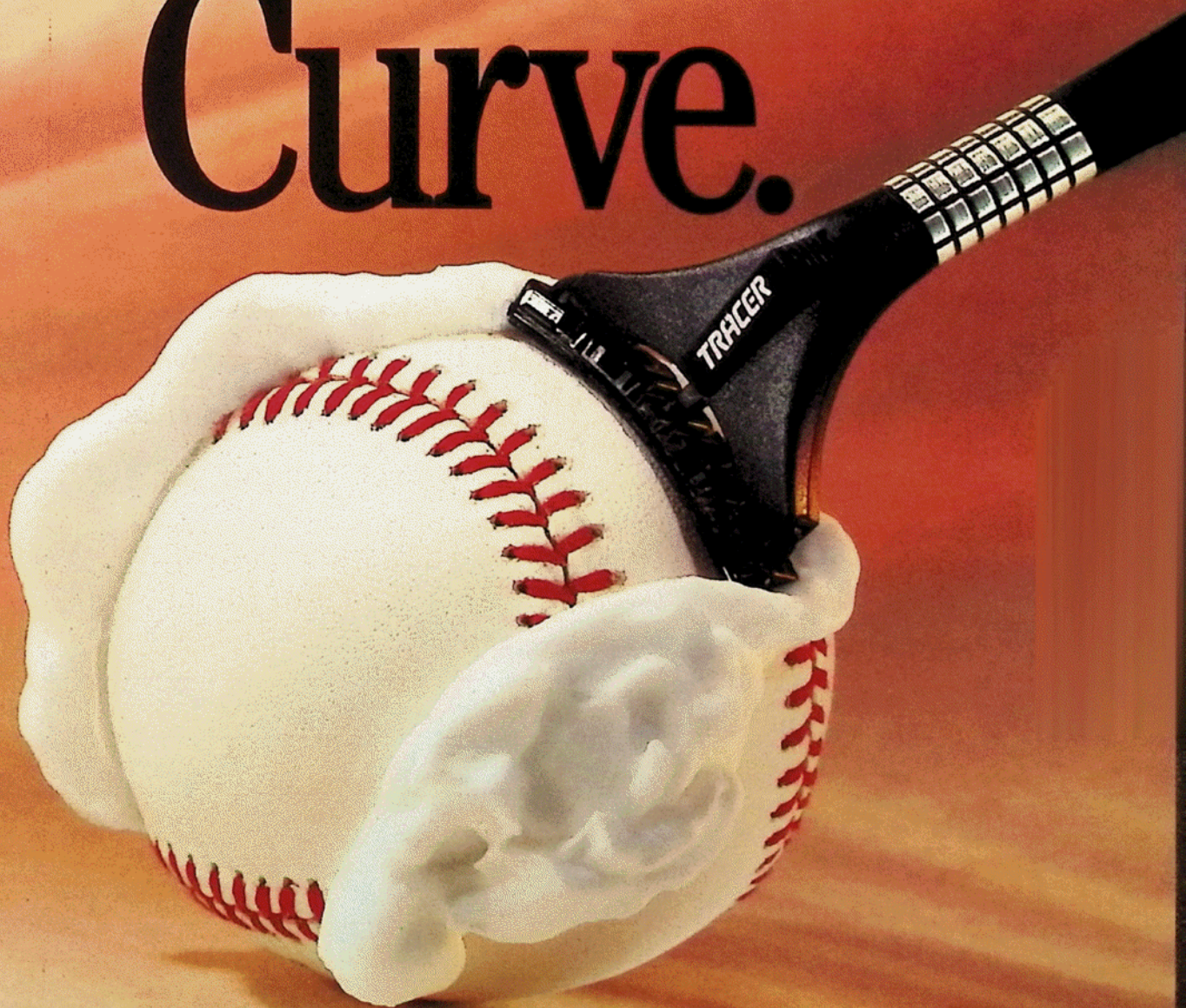
Cy's car can still hustle down the road with the best of 'em. It's a little soggy off the line, but like

most thoroughbred sporting cars, things only get better as the speed increases. The car feels in its element at 80 mph and above, when it exhibits the engine smoothness that earned the BMW 6-cylinder kudos as one of the world's outstanding powerplants.

Moreover, the power-assisted steering gives the proper feedback with just the right amount of boost. The 5-speed gearbox shifts crisply. The ride is supple over any surface short of a bombing range, and the car's body construction—still solid and rattle-free even after 10 years—imparts a feeling of quality. Cy says the 528i's handling has vastly improved over the Bavaria's, but still with traditional BMW final oversteer.

Cy may mourn the passing of his trusty sidekick, the Bavaria, but it's obvious he now has a new-and-improved friend, his 528i.—Peter Bohr

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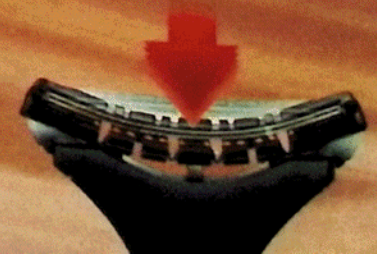


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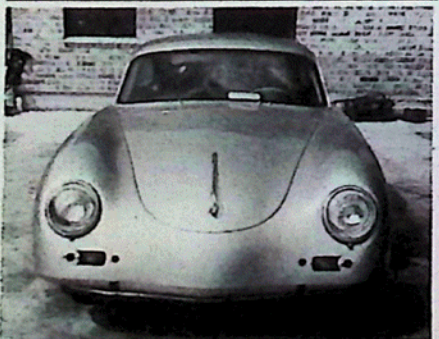
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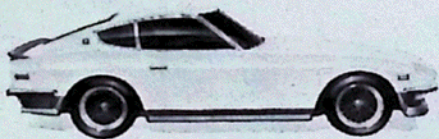
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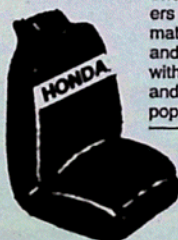


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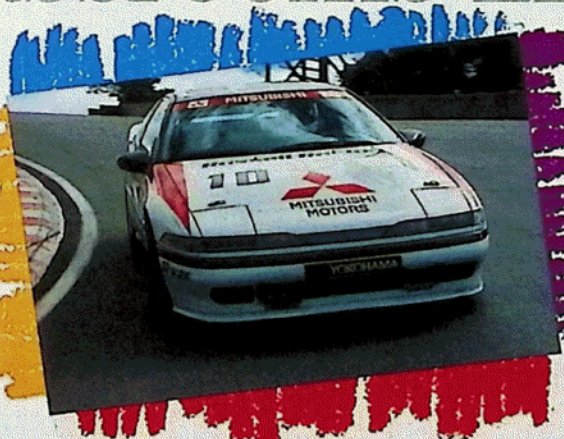
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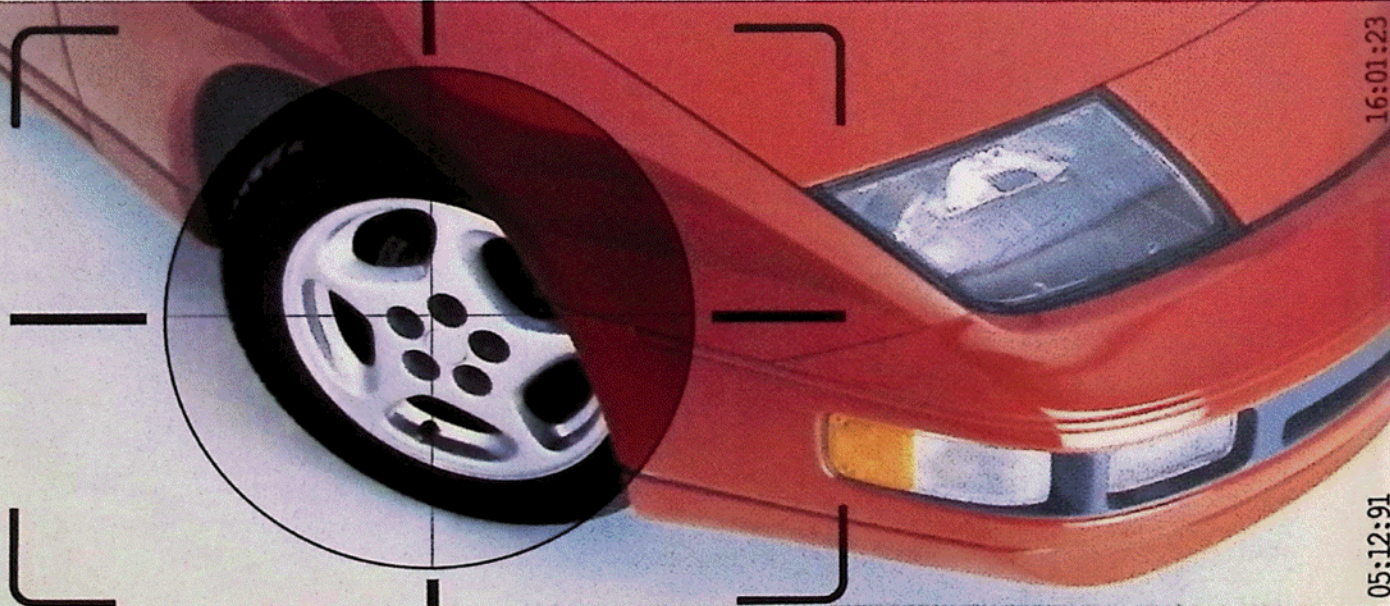
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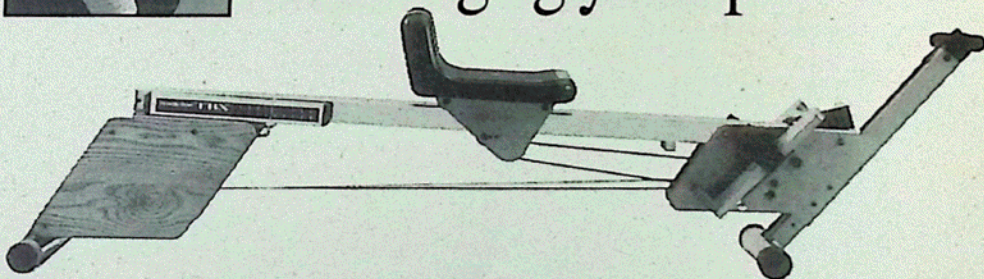
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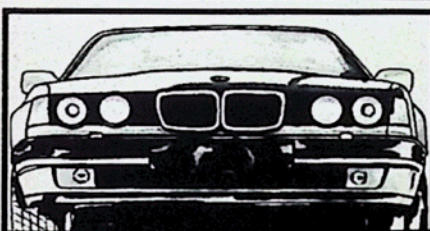
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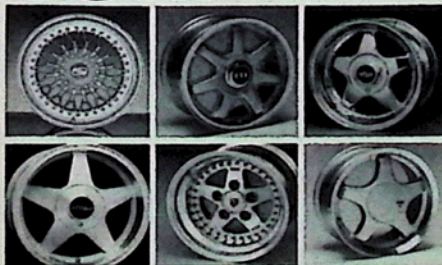
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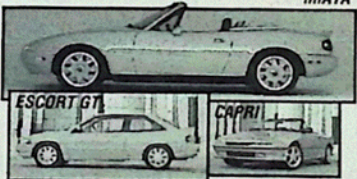
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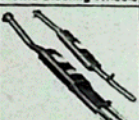
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# TECH TIDBITS

BY DENNIS SIMANAITIS

## Trabant munching

WHAT WITH DECENT cars now being rather more available in what used to be East Germany, the resale value of Trabants hasn't exactly held its own. In fact, so many of these tacky little sedans are being junked, abandoned or generally left unused, there's a genuine problem of what to do with them all.

The problem is compounded by the extremely poor recyclability of Trabant plastic surfaces, of which any given car contains quite a few. In particular, these plastics are known to give off toxic chemicals, dreaded dioxins, in fact, as they degrade.

Researchers hope to counter with biochemical means of protecting the environment, even to the point of cultivating microbes that munch away selectively on Trabant plastic and transform it into a more benign substance.

## Use it again, Sam

SERIOUSLY, FOLKS—AND how could anyone take Trabants seriously?—there's a lot of thought these days directed toward the recyclable automobile. As one example, Chrysler's Neon show car (see R&T, April 1991, page 91) is replete with such technology.

It's more than simply a matter of materials; it's the manner in which the materials are used as well.

Steel, for instance, is one of the easier materials to recycle. It's shredded up and used to make new steel. On the other hand, steel in a car is usually treated with other substances to improve its paintability, corrosion resistance or whatever. And these coatings aren't always recycler-friendly.

Zinc, lead and cadmium, for example, melt at lower temperatures than steel. And the last two are distinctly hazardous to our health. Special techniques must be applied to recover these materials early on.

Plastics make up a lot of junked cars, and their multiplicity of types complicates things even more. Thermoplastics, the ones that melt at elevated temperature, can be reused. However, they don't all melt at the same temperature, and some give off really bad stuff if overheated. Thus, thermoplastics need

classifying and sorting, polypropylenes from polyvinyls from polyurethanes, for instance. Chrysler's Neon displays a straightforward approach in this regard: Relatively few different materials are used, and each component is identified as to thermoplastic type. Also, researchers are formulating chemical agents that make thermoplastics generally more compatible to recycling.

At the other extreme, thermosets are plastic materials that don't melt with heat; rather, they may even harden. Bakelite, the classic distributor cap material, is one example of a thermoset. These present special complications for recyclers. One possible approach is a process called pyrolysis, in which heat is applied to the material in a vacuum, and it's converted to a gas that can be drawn off and used itself as a heating fuel. Other techniques are along Trabant-munching biochemical lines.

## Slowing them down

RACE-SANCTIONING ORGANIZATIONS spend a lot of effort trying to reduce speeds. By contrast, race-car designers and engineers generally exhibit even more cleverness in precisely the opposite direction, as, of course, they should.

Recently, I spent some very informative time at two oil company R&D facilities, Texaco's in Beacon, New York, and Unocal's in Brea, California. Racing entered the discussion at each place, and this matter of slowing the cars down came up. Tom Hayden, one of Texaco's fuel specialists, offered a wonderfully logical proposal: Race-sanctioning organizations could require, and if necessary furnish, absolutely street-stock unleaded fuel of, say, 92 pump octane.

Remember that this pump rating is the average of the two methods of octane measurement, Motor and Research Octane Numbers. Generally, 92 pump octane translates into around 86 MON and 96 RON. By contrast, racing fuels are blended to characteristically higher octane. NASCAR's Winston Cup, for instance, makes exclusive use of a Unocal leaded fuel of 108 pump octane, an RON of around 115. And the most exotic forms of racing use the most exotic blends. Though Formula 1

fuels are limited to 102 RON, some are reformulated to the point that they're gasoline in name only—and toxic as all get-out.

An immediate result of street-legal gasoline in racing would be a significant decrease in compression ratio, in attendant power and in speed. Eventually, of course, clever optimization of the combustion process would regain some of the losses. But these engineering advances would also have direct application to road cars, so that's okay too.

I recognize that, with multiple suppliers around the world, it would need adequate control. However, I believe such fuels would bring a new relevance to racing and, not incidentally, satisfy the organizers' desires for moderation of performance—at least for a while.

## King of E<sup>2</sup>F<sup>2</sup>, revised

SEVERAL READERS HAVE noted that I missed identifying the Suzuki Swift GTi as the car in our Road Test Summary with highest E<sup>2</sup>F<sup>2</sup>, Engineering Editor's Fun Factor (see Tech Notes, May 1991). And, with an E<sup>2</sup>F<sup>2</sup> rating of 202, the swift and nimble Swift makes them absolutely correct.

## Artificial intelligence

COMPUTERS ARE REALLY quick, really accurate and really stupid. That is, they process information incredibly well, but only when talented programmers tell them precisely how to do it. Said another way, computers rarely display intelligence, in the sense of original, creative thought.

However, researchers in artificial intelligence, AI, for short, have set out to remedy this. The challenge, as you might guess, is figuring out just how humans think. And, interestingly enough, there are two distinctly different approaches, one traditionally used in AI research, the other one relatively new and unorthodox.

The traditional approach, dating back to the mid-Fifties, is sequential. First, sensors identify the environment. Perception is followed by modeling, then planning, then task execution and motor control of actuators doing the job.

This sort of artificial intelligence is in use today. One example is a mainte-



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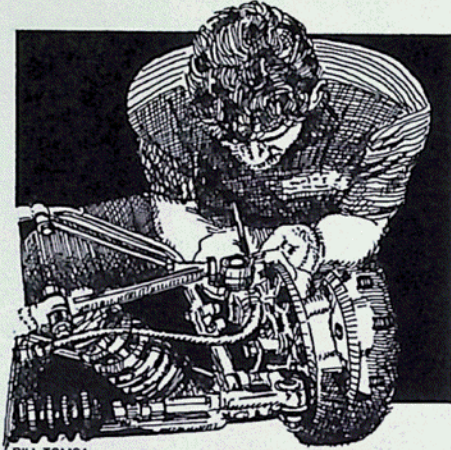
BY DOUGLAS KOTT

## Nothing up my sleeves

Some expensive contemporary cars use aluminum engine blocks with unlined cylinder bores. I know it's cheaper to leave out the iron liners, but does it make sense to save a few dollars and a few pounds on an \$85,000 car if it means the engine won't last as long?

The Porsche 928 uses silicon in the aluminum alloy to reduce wear. So did my Vega GT, and it wore out in 45,000 miles. Porsche 928s have been around for 13 years now; they must not have the same problem, so why didn't it work for Chevy? Has the Nikasil coating used on the Corvette ZR-1's cylinder bores been proven in any other car engine? Which current cars use aluminum cylinder bores, and are their engines lasting as long as iron-bore engines?

Robert Smith  
Houston, Texas



BILL TOMSA

To answer your last question first, both Porsche and Mercedes have been using sleeveless aluminum-silicon blocks for more than 10 years now, with longevity being comparable to cast-iron blocks, according to representatives of Engine Supply, a Southern California machine shop

servicing many Mercedes dealerships in the area. Advantages of aluminum are its high strength-to-weight ratio and very good heat-transfer capabilities. But the special techniques used to produce these blocks give them no price advantage over an aluminum block with cast-iron sleeves.

The material used is SAE 390/Reynolds 490 aluminum alloy, which is 17 percent silicon, 4 percent copper, 0.5 percent magnesium and most of the rest aluminum. The idea is to remove some of the relatively soft aluminum through a special chemical etching process, leaving a super-hard, long-wearing bore surface composed primarily of silicon. Typically, the pistons are plated with steel to better mate with the primarily silicon bore surface.

True, your Vega's block was cast using the same alloy, but the manufacturing processes have become more sophisticated since the mid-Seventies. Also, in retrospect the Vega's engine design invited the prob-

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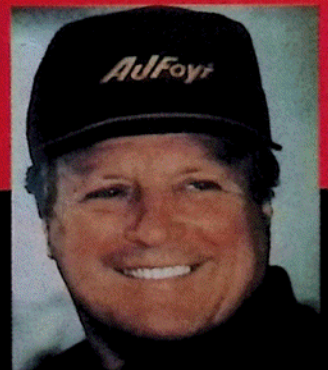
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lem of warpage and consequent short life. For instance, both Mercedes and Porsche use closed-deck block designs, which are significantly more rigid (and more expensive to cast) than the Vega's open-deck design, a configuration more susceptible to heat distortion.

Also, the German manufacturers use aluminum cylinder heads with rates of thermal expansion similar to those of the blocks. And it's important to note that many Vega engine failures were related to overheating, in a time when coolant recovery systems weren't in widespread use.

As for Nikasil, the Corvette ZR-1's engine is the only production automotive powerplant we know that uses this tough coating, applied through an electroplating process and composed of silicon carbide particles set into a matrix of nickel. In the ZR-1's case, it's applied to aluminum liners that are set into an aluminum block. Nikasil and other similar coatings are used extensively in racing applications and on some production motorcycles.

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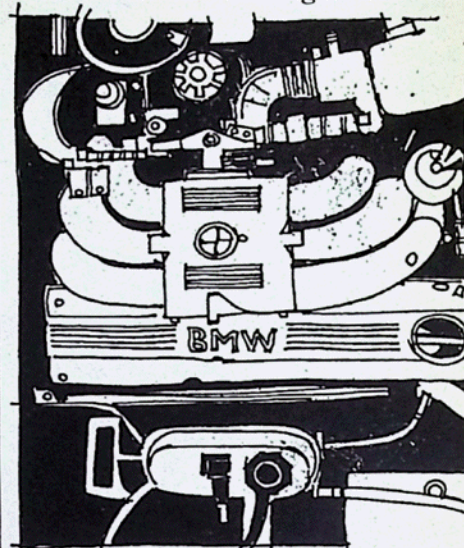
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ters—especially after warranty expiration. It is inconvenient to drop the car by these places to have the lights reset after something like an oil change; and understandably, the dealer is none too excited about doing this.

Can they be turned off uneventfully? Is the sale of the resetting instruments



restricted by BMW so that a modest garage or oil change center is unable to get one? Are they connected to a memory device like an EPROM so that a car's service history can be reconstructed? I feel I could retire by getting one and charging \$5 to other BMW owners to reset them.

J.S. Covington  
Memphis, Tennessee

*It's possible to reset the service-reminder lights yourself, but not without some risk. We talked to James Maher at Pacific Service, a Costa Mesa, California independent repair shop servicing BMWs, Saabs, Volvos, Jaguars and Rolls-Royces, and he outlined—but did not recommend—the following procedure:*

*Locate what BMW terms the "engine plug," a multi-pin black plug with a red plastic cap, in the engine compartment. It's the interface between the car and the diagnostic computer used by BMW dealers. With the engine not running and the ignition key in the On position, connect pin no. 1 with pin no. 7 with a piece of jumper wire. When this circuit is complete, the service reminder lights will be reset.*

*The danger lies in touching any of the other pins while attempting to connect pins 1 and 7. If this happens, the result could be a fried engine-management computer and a replacement-parts bill of more than \$1000. So it's a question of how careful—or lucky—you feel.*

*As for computer-chip storage of your car's service history, don't worry; the 325 has no such provision.*

## Two Isuzus to Peru

I would like to take my two cars (1988 Isuzu Impulse, 1988 Isuzu I-Mark Turbo) when I move to Peru, but I found out the country doesn't have unleaded fuel. Will I damage the engine if I use leaded fuel? What modifications can I make to have the cars run on leaded fuel without problems?

I contacted Isuzu and the person I spoke to would only say, "We do not recommend taking the car outside the U.S.," citing parts availability and warranty problems, but I'm not worried about parts and the warranty has already expired. Please tell me if the modifications would shorten engine life, the cost of the work and where I might have it done.

Aldo Duran  
Newark, New Jersey

*No damage to the engine will result from the use of leaded fuel, nor will its life be shortened. But your cars' catalytic converters will become clogged when, over time, the lead reacts with the materials in the converter, increasing exhaust backpressure and choking the engine.*

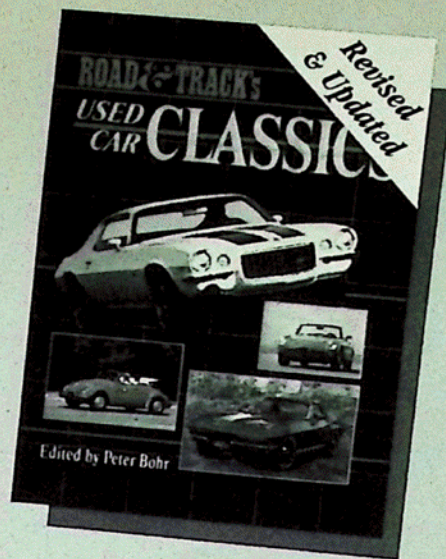
*U.S. smog laws complicate things, but you can have a straight piece of pipe welded in place of the converter. Before doing so, however, you're supposed to obtain permission from the Environmental Protection Agency, based on the car's foreign destination. Or, easier, just have this work done upon arrival in Peru. Of course, if you were to bring the cars back to the U.S. from Peru, you'd have to have converters reinstalled.*

*As for refilling the fuel tank, there's the matter of the sheet-metal restrictor that only allows insertion of the small-diameter nozzle of a gas station's unleaded pump. This could prove difficult to remove, and if a qualified shop is unable to perform the modification, you should be able to purchase a "cheater" funnel at an auto parts store, designed for emergency use to put leaded gas in an unleaded-only vehicle.*

*A couple of other things: Lead deposits will tend to shorten the life of both spark-plugs and the oxygen sensor, a critical part of the fuel-injection system. So it would be wise to stock up on these items in the States before you leave.*

## Gauging gauges

I believe your response to Drew Buckles (Technical Correspondence, April 1991), who was having high oil temperature indications on his Volkswagen GTI, overlooked one important possibility. Before spending money on an oil cooler installation, I recommend that he have the oil-temperature gauge



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calibration checked by a competent auto electrical shop.

I have a 1983 GTI with over 80,000 miles, and I never see oil temperatures over about 120 degrees Celsius, even in hot-weather freeway driving. I have had several problems with the gauges, including a wildly bad oil-temperature gauge, which was caught and rectified under warranty.

C.C. Flora  
Bellevue, Washington

## Given the boot

I own a 1989 Honda Prelude 2.0Si with a 5-speed. I have driven it for 37,000 miles and have been extremely pleased with it. During routine service, my Honda dealer informed me that the inner CV boots were "spraying" oil and needed to be refilled and resealed. Furthermore, he said the repair was necessary and, if neglected, might result in a bent axle in the near future. I was charged for more than 2 hours' labor to have this done, and I notice no difference in the way my car drives or handles. Was this a necessary repair? And what exactly are inner CV boots and what function do they serve?

Andrew Bronson  
Atlanta, Georgia



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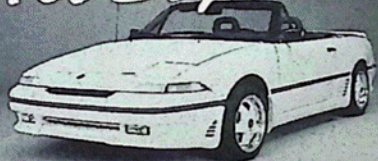
MPA The Audit Bureau

Constant-velocity (CV) joints are located at each end of the halfshafts at the front of your Honda. They allow the shafts to transfer power from the transmission output flanges to the front hubs through the fairly large angles created as the suspension moves from fully compressed to fully extended. The CV boots are simply bellowed rubber or plastic covers for the joints that exclude dirt and keep grease (packed around the joint's moving parts) inside.

We talked to Craig Schelin at the service department of Jackson Racing, a Southern California firm familiar to those who hold both Hondas and performance in high regard. He says the chances of bending an axle are very slim, but accelerated wear caused by lack of lubrication to the CV joints could ultimately cause a shimmy felt through the steering wheel that might feel as though an axle were bent. Schelin also said the boots on the 1988-1989 Preludes are prone to cracking at the flex points of the bellows, and upgraded factory replacement boots (actually the same ones used on the early CRX Si) show much better longevity.

So, yes, it's a necessary repair, and much less expensive than having to prematurely replace the rather costly joints themselves.

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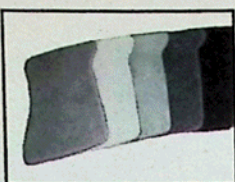
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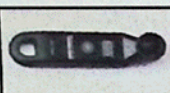
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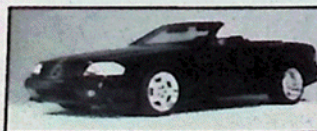


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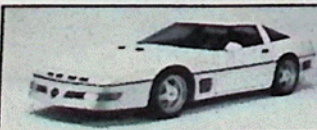
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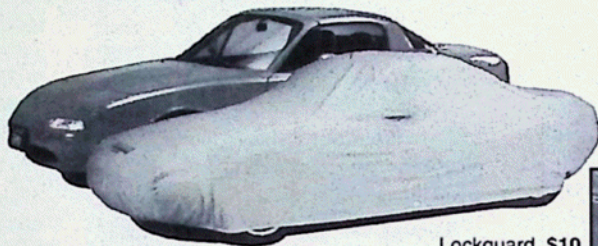


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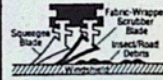
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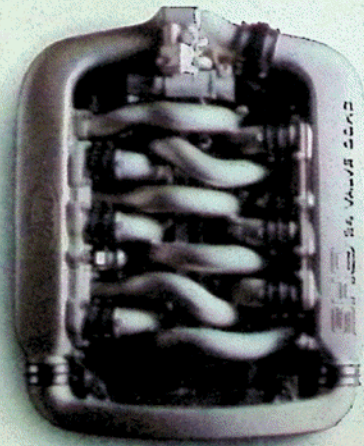


PHOTO BY MICHAEL GREEN

■ Bob swore that he would never again wash his E-Type in hot water.

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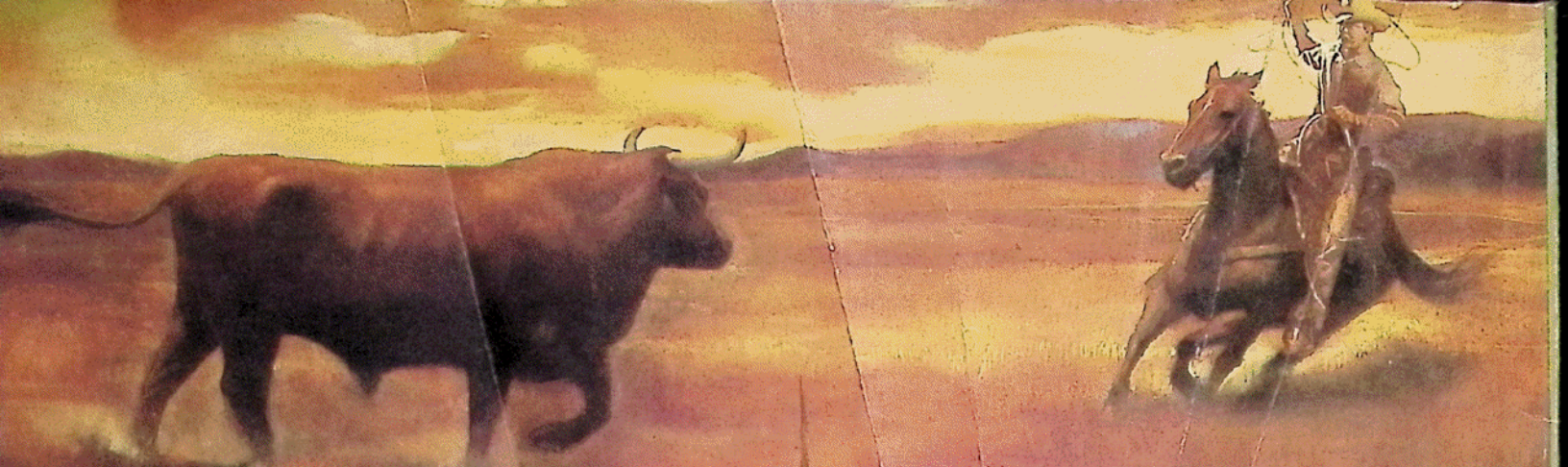
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