New Edition
All Models

Fiero

Pontiac's Potent Mid-Engine Sports Car

Gary Witzenburg

$38.95US

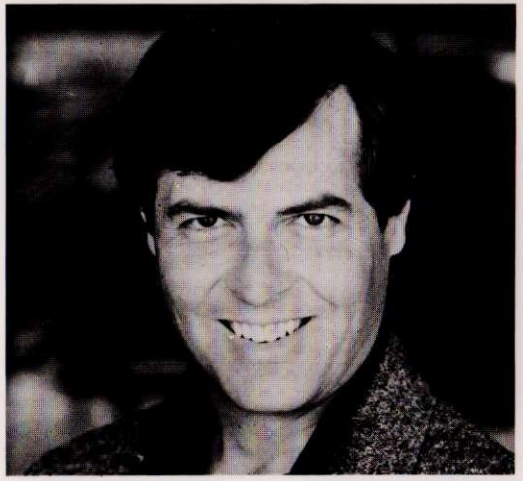
. . . standing still or zipping down the road, this sleek mid-engine two-seater elicits sighs of pleasure or crys of "wow!" The Pontiac Fiero is a modern-day success story that began quickly and gained momentum with each styling and engineering improvement. Since rolling off the assembly line in 1984, Pontiac has sold over 200,000 units in its first two years of production.

Who's responsible and what features have contributed to its success? From clay models to production, Gary Witzenburg, author of popular books on Camaros, Firebirds and Mustangs, reveals the "behind the scenes" story of this amazing little package.

Witzenburg gives details of the Fiero's development, from a four-cylinder commuter car to its present V6-powered, sports GT status. He explains how the Fiero's unit-body structure and plastic body are built and assembled. Witzenburg shows IMSA GTU race-car construction and action on the race track.

Also included in this book are engine specs, gear ratios and road-test performance details model by model. The book discusses engineering and design changes that have been made from launch to current models, and what's in the future.

This in-depth, illustrated look at the "sports car of the future" is a must for every Fiero owner and automotive enthusiast.



Gary Witzenburg, born in Denver on January 14, 1944, grew up in Cleveland. In 1965, he graduated from Duke University with a bachelor's degree in mechanical engineering. Following college, he landed a job with Chevrolet as a test engineer at GM's Milford proving ground.

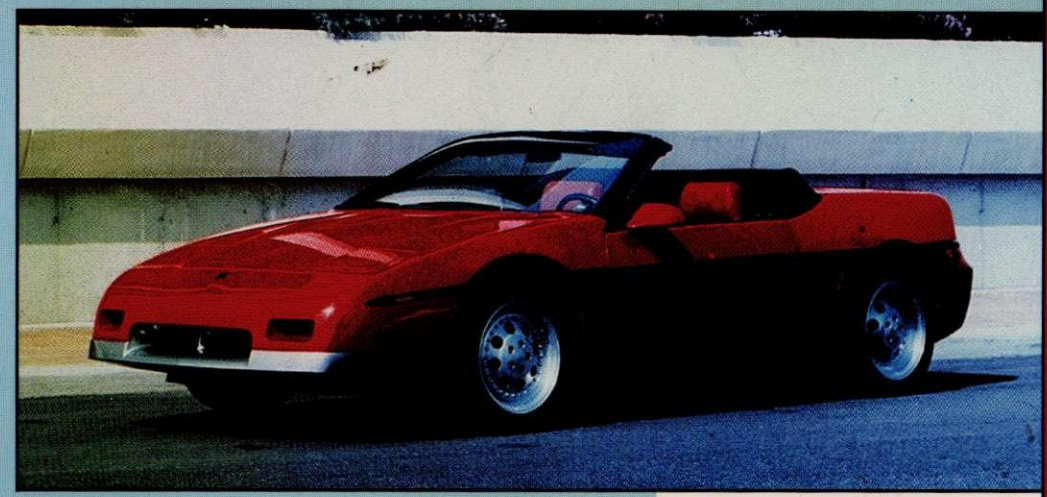
After eight years at GM and a brief stint in military service, Gary decided to write about cars, so he went to *AutoWeek* as engineering editor in 1972, then to Wards Communications. In 1975, Gary founded Troy Media Productions, through which he generated auto-related articles, speeches, radio features and columns.

Gary and his wife, the former Jill Rogers, a Pontiac PR staff member, moved to California in 1982. Gary is contributing editor for *Motor Trend, Playboy* and *Automobile Quarterly,* and also writes for a variety of magazines and newspapers. In 1985, he and Dean Batchelor formed The Car Consultants, which offers advice and information on collectible and new cars.

Gary's long and varied automotive background has given him many opportunities to drive race cars, particularly in IMSA GT, SCCA Trans-Am, Showroom Stock and amateur events. His biggest thrill, he says, came in 1979 when he won his class at the Nurburgring 24-Hour. He and his teammates also won the 1981 and '82 Nelson Ledges Longest Day 24-Hour in Porsches. This is Gary's fourth hardcover book, the previous three being about Mustangs, Camaros and Firebirds.

FIERO

A complete history—from cute four-cylinder sports car to hot V6-powered GT. The book traces styling evolution and engineering design from artist's renderings and clay models to engineering prototypes. Offers a look at Fiero's successes on the race tracks in IMSA's GTU class and peeks of Fiero show cars and possible production models of the future. Includes interviews with Pontiac's key personnel and much, much more.



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Fiero

by Gary Witzenburg

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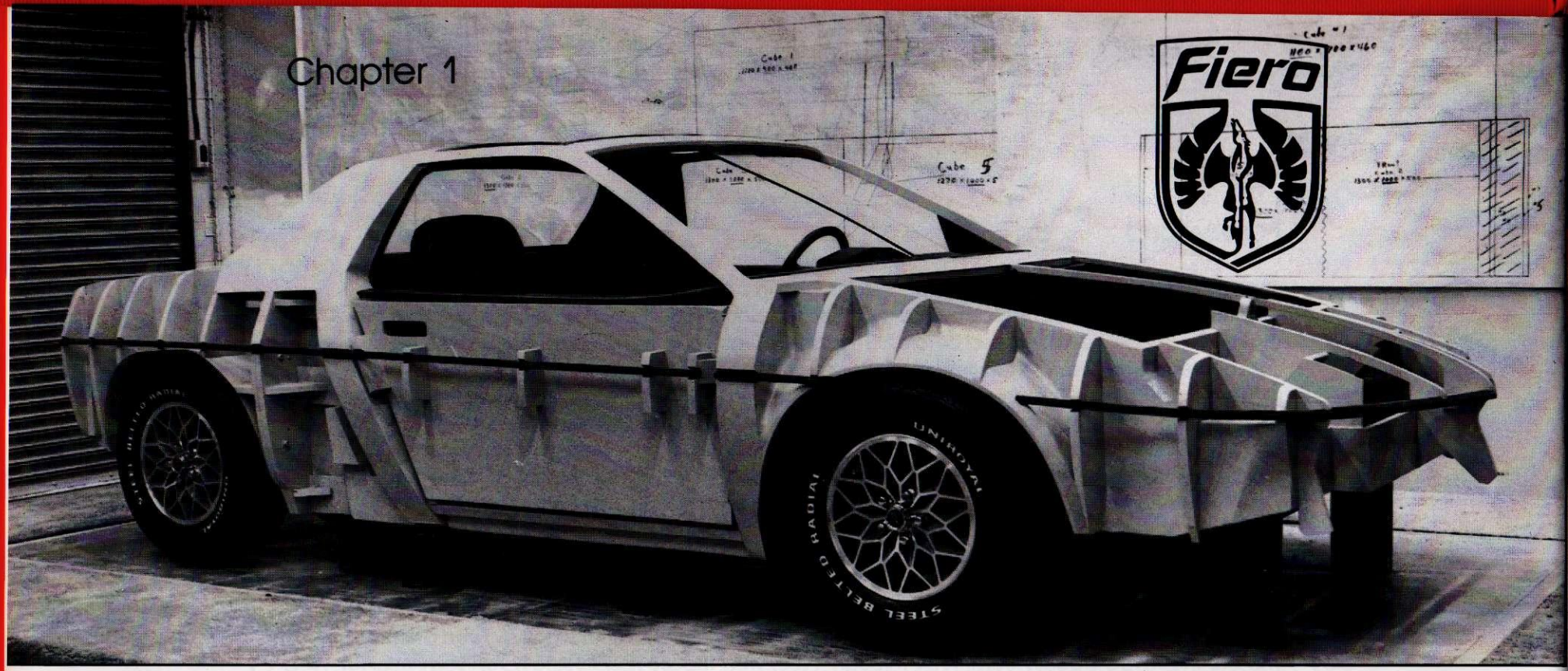
Foreword

The Fiero story might be short in years, but it's long in substance and historical significance. The many people, events, and decisions that created and shaped this car pointed toward a new direction—a road never traveled before. ☐ First there was the way the Fiero was built: plastic skins over a steel space frame. At the time of the Fiero's creation, General Motors believed that more cars would be constructed this way as the industry modernized for the Nineties. It turned out that several GM vans did adopt very similar construction. The advantages promised to be several: low tooling costs, exact panel fits, quick and inexpensive restyling, rust- and dent-resistant body panels that were easy to remove and replace if damaged. ☐ Second, important elements that made the Fiero's noble experiment work included the simultaneous engineering of the assembly process along with the car itself, the unprecedented supplier involvement, and the astonishing level of labor-management cooperation. Nor can we ignore the highly effective statistical quality-control processes brought to Pontiac by the noted manufacturing consultant, Dr. W. Edwards Deming. ☐ Third was the appeal of the car itself. Attempting at first to bridge the gap between econo-commuter and hot-blooded sportster, the Fiero arrived beautiful but a bit imperfect, like a slightly flawed diamond. The car improved steadily from 1984 through 1988, with the '88 model finally fulfilling its initial promise. Styling and affordability were the Fiero's early attractions, while performance and handling were added steadily as the car matured. Perhaps never before—and certainly not since the early Thirties—did any 2-place passenger car offer so much to so many for so little. ☐ The Fiero clearly showed not only Detroit but the entire world that a market for 2-place cars existed, *provided* all the elements were properly blended. If a sporty car is handsome, chic, and affordable; if the price/value relationship is right; if the quality, reliability, and durability are good, it *will* sell, with or without a rear seat. ☐ If you currently own a Fiero, you already know the car's many pleasures. But this book's purpose is to take you beyond the open road. We'll go behind the scenes, behind the normally closed doors of the design studios and engineering labs, the meeting and board rooms, and into the minds of the dedicated people who conceived and created this unique car. We'll hear them explain their decisions in their own words. We'll go, in fact, through the entire fascinating Fiero story, from early Pontiac 2-seater proposals of the Fifties through the design and development of this very special and original concept. ☐ In the long, long run, Pontiac's Fiero will take its place in automotive history as more than just a handsome, exciting sports car. It might ultimately prove to be the very core of the textbook for future automotive design, engineering, and production. Everyone, including the vaunted Japanese, might profitably study the Fiero and its assembly processes. ☐ I sincerely hope this book provides the information you're seeking and even a portion of the pleasure I had in researching and writing it.

Gary Witzenberg



Genesis, the Creation

WILDEST THING ABOUT THE FIERO is that it ever got built at all. Second wildest is the rare blend of Pontiac people and market conditions all coming together at one time to make the car happen. Because it very nearly didn't.

It's probably fair to say that the plastic-skinned, mid-engine, 2-passenger piece of automotive art we recognize today as the Pontiac Fiero can trace its ancestry all the way back to a pair of 2-place Pontiac GM Motorama dreamcars of the Fifties. These were the Pontiac Bonneville Special, a gullwing coupe of 1954, and the torpedo-shaped, aluminum-bodied Club de Mer roadster of 1956.

Six years later, right after Pontiac introduced the 1962 Tempest compact, the public got a glimpse of a cutdown, supercharged, *2-place* roadster called the Tempest Monte Carlo. That particular car toured the 1962 auto-show circuit and generated considerable interest and excitement in a smaller, tauter, sportier Tempest.

By this time, the Corvette finally started turning a profit, and GM's increasingly aggressive and ambitious Pontiac Div. badly wanted a 2-place car of its own. The main obstacle, though, was a handful of powerful men in oak-panelled offices on the 14th floor of Detroit's GM Building in downtown Detroit. General Motors' top echelon naturally looked at any new venture first and foremost as a bottom-line proposition.

"I'd been pushing for a 2-seater for years," says Elliott M. (Pete) Estes, who'd been Pontiac's chief engineer from 1956 to '61 and then divisional general manager from 1961 to 1965. "Every so often we'd cut a regular car in two, take 11-12 inches out of it, and make a nice little 2-seater.

"But then somebody'd take a look at the market and say, What the heck do we want to get into *that* business for? The Corvette's covering part of that segment anyway. My idea, though, was to get into a different end of the market—put together a toy for the kids in college or high school and try to keep the price way down below the Corvette's."

Estes and his chief engineer, the up-and-coming John Z. DeLorean, got really

serious about a Pontiac 2-seater in early 1963. They had Dick Denzer's advanced engineering group cobble up an experimental chassis, coded XP-833, and shipped it to GM Design Staff, where Paul Gillan's advanced design studio crafted a preliminary clay model. Completed in Aug. 1964, the XP-833 became a lovely little convertible with sweeping fenders much like those on the 1968 Corvette, which would debut three years later.

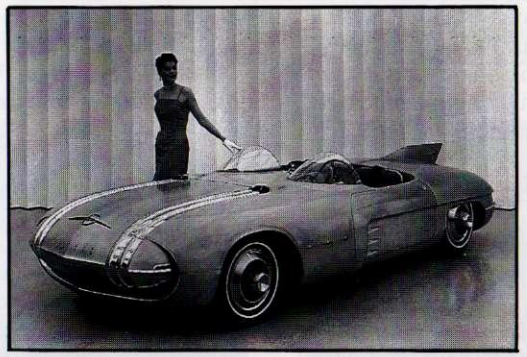
Three more test "mules" followed before two beautiful, well finished, running prototypes were built, one powered by Pontiac's soon-to-be-released 230-cid, in-line, single-overhead-cam Six and the other by a 360-cid V-8. Estes lobbied GM management for permission to put the XP-833 into production, but the higher-ups couldn't see enough profit in it. The reasons were largely historic: Ford's 2-place Thunderbird hadn't sold nearly so well in 1955-57 as the 1958 and later 4-seaters. Nor had the Corvette brought GM much profit; it actually lost money in its early years. So 2-seaters weren't high on GM management's priority list during the first three decades after World War II.

In July 1965, Estes was promoted to general manager of the much larger Chevrolet Div., and the dynamic Mr. DeLorean moved up to the Pontiac top spot plus the requisite GM vice presidency. And, as it turned out, the year 1965 also saw the runaway success of not a 2-seater but the 4-seater Mustang.

Given the Mustang's immediate and tremendous popularity, and knowing that Chevrolet was hard at work on the Camaro, DeLorean felt more strongly than ever that a fast, fun, affordable 2-seater, *exclusive* to Pontiac, was just the ticket to position his division in America's emerging youth market.

DeLorean instructed William T. Collins, the engineer who'd been spearheading the XP-833 program, to prepare an elaborate proposal for presentation to GM's 14th floor. This proposal spotlighted the XP-833, now called the Banshee, in a variety of glamorous settings and pointed out that people under 25 had bought no fewer than 400,000 new cars in 1964; further that 19% of all licensed drivers in America were under 25; also that the ranks of youthful drivers and buyers would increase dramatically in the near future as millions of postwar baby boomers came of car-purchasing age.

Collins, who went on to become chief engineer for the gullwing DeLorean automobile and later held the same post at American Motors, put his very soul into the Banshee proposal. The car would have a fiberglass outer skin over a structural steel underbody (!) and would use 80% standard production Tempest parts, straight from the shelf. Based on successful testing and development of



Early Pontiac 2-seaters included two Motorama showcars, the 1954 Bonneville Special and 1956 Club de Mer (top and center). Compact 1962 Tempest formed basis of shortened Monte Carlo, while DeLorean commissioned XP-833 in 1965 and, for '67, the cutdown Firebird T/T.

existing XP-833 prototypes, one of which Collins later acquired and still owns, the Banshee could be ready as a 1967 model. It would sell for around $2500, roughly the same as the Mustang and $500 less than the most popular British sports cars of that era—MGB, Triumph TR-4, and Austin Healey 3000.

But the corporation had other plans and again wouldn't buy the idea. As a last resort, early in 1966 DeLorean had Pontiac's clay modelers sculpt a "Banshee" body on the new 1968 Corvette that was, at that time, still under development. DeLorean, in essence, aggressively tried to *share* the Corvette body. To Chevrolet, this went over like a 400-pound pole vaulter. Nor did it get anywhere with GM management.

Finally, fed up with DeLorean's persistence, the GM chiefs struck a compromise. Let Pontiac do its own version of the Camaro: the Firebird. The Firebird ended up, in some measure, as DeLorean's consolation prize. And at one point in *that* program, DeLorean even commissioned a short-wheelbase, 2-place Banshee T/T roadster version of the 1967 Firebird modeled in clay. No one ever accused John Z. of giving up easily.

We now fast-forward to the autumn of 1978. Pontiac's strategic planning manager, Dennis J. (Denny) O'Donnell, and his 2-man staff, Donald H. (Parky) Parkinson and Thomas J. Kalush (pronounced Kah-*loosh*), are brainstorming future product ideas. They're preparing for the quarterly FPC, GM's Future Product Conference, where Pete Estes, who's now president of General Motors, has asked each car division to propose long-range plans to meet the federal government's accelerating CAFE (Corporate Average Fuel Economy) standards.

O'Donnell comes under some pressure from his new boss, product planning manager Courtney F. Jones, to think up something really special and different. Jones has just moved over here from Pontiac's financial staff, where he worked closely with division comptroller William E. Hoglund. Hoglund, of course, will later become Pontiac's general manager.

Denny O'Donnell remembers it this way. "Courtney wanted to make a splash and, to his credit, he wasn't a linear thinker. He wanted to turn left when everybody expected him to turn right. So he was pushing us to come up with something that would spark everyone's interest and sort of poke the establishment. We were toying with ideas like, Oh, let's do an F-Special notchback or roadster version of the 1980 Firebird.

"Well, we were coming down to the wire. FPC was one week away. We were still fooling around with this F-Special idea, and it wasn't going very well, because the investment was unbelievably high, and it wouldn't really do anything for CAFE. Finally, late one night, the three of us were in a little backroom at Product Planning, trying to figure out what we could write into this pitch for Courtney that would meet his requirements."

At this point Tom Kalush takes up the narrative. "We wanted to put together a very competitive, aggressive product lineup that would also hit our CAFE targets. Suddenly Denny says, Hey, we ought to dust off the old 2-passenger sports-car idea! A light little car like that would give us good fuel economy in what we thought would be a very marketable product."

O'Donnell chimes back in: "In desperation, I suggest we propose the 2-passenger car, and everybody else says, Awww, yeah, well, but how do we do that? I say, I don't know, but nobody else is proposing it. If we make it small, it could get very good fuel mileage, and Lord knows we need the CAFE credits. A 2-seater would also be very nifty for Pontiac and, you know, I've heard that Pete Estes has been a longtime advocate of 2-seaters and thinks we ought to have more of them.

"We decide this might be a way for Courtney to propose something *sort* of radical," continues O'Donnell, "but something that still makes some sense. It would also play on the boss's personal feelings for the market. So we start to write this presentation, and we do a calculation of the impact on CAFE if we sold, say, 150,000 little cars that got 50 mpg. And lo and behold, it turns out that the fuel economy impact is about equal to that of one module [350-400,000 units, the annual output of one transmission plant] of the 4-speed automatic transmission that was then being considered.

"So we're thinking, hmmm, this *does* make sense. We could go to FPC and say, Look, boss, rather than doing a module of automatic transmissions, which would cost $250 million and would have relatively little return on investment, let's take that $250 million and do a little 2-passenger car. We could get some good effect on CAFE and make a profit selling the car. So we fiddle around with this idea, trying to paste it all together and make a story out of it. The more we work on it, the better it gets.

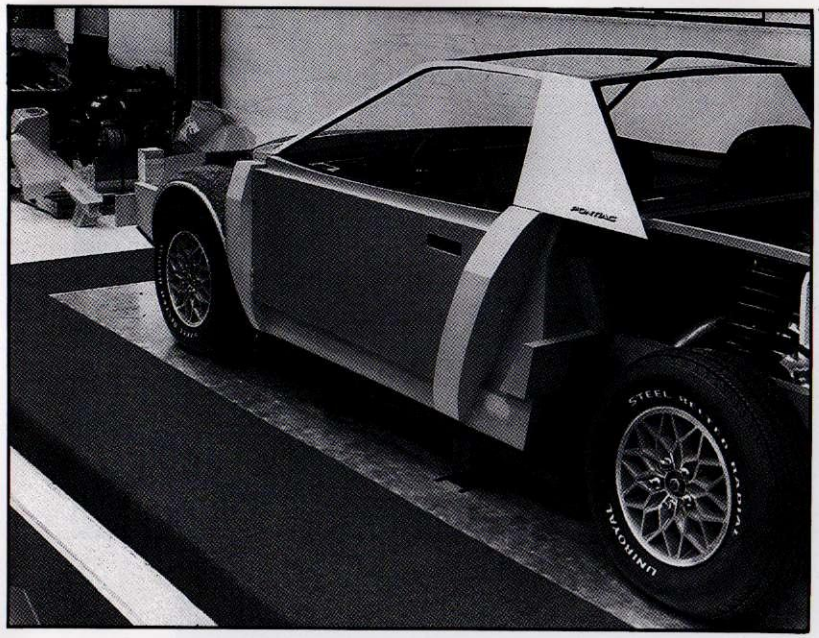
"Now Parky was on this kick with 'new values' people, the beginning of the 'identification of self' as the most important thing; small family sizes, stuff like that. And he starts feeding all that into the hopper.

"Another idea we put in there was the so-called commuter car. People have to commute, but a lot of them don't want to drive a potato on wheels. It seemed to us that there were plenty of commuters who wanted to be proud of their cars. These cars didn't have to be the fastest things in the world, but they needed to get good gas mileage, because everyone assumed the price of gasoline was going to $5 a gallon shortly. So we got this idea of a small, sporty, 2-place commuter car, and we wrote the thing that way."

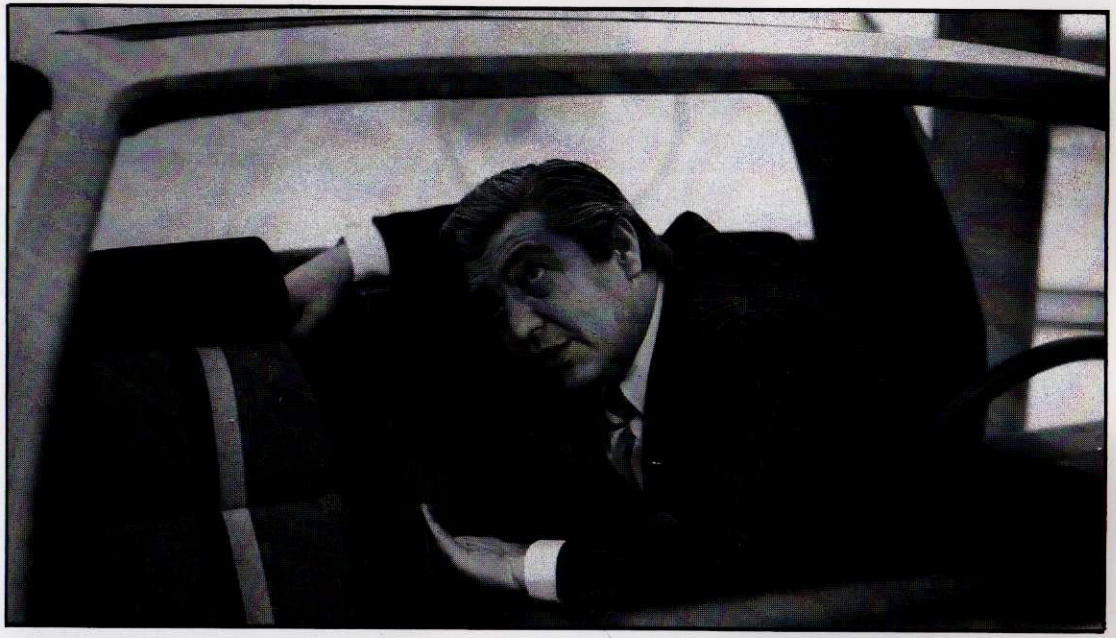
Adds Parky Parkinson: "There was a more-or-less consensus at Pontiac that this made a lot of sense. Courtney Jones supported it, and without his support we probably wouldn't have gotten to first base. For one thing, a car like this would really differentiate Pontiac. Yeah, we could do an F-Special—a convertible or notchback or something—but Chevrolet would get into it, too. Maybe if we could execute a little 2-seater, we could hold it off to ourselves."

So it happened that Pontiac once *again* pitched a 2-place sports car at the corporation's Future Product Conference in Oct. 1978. A lot of transporters had rolled under the overpass since 1966, market conditions were very different now, and a totally changed management group sat at the head of GM's corporate table. More important, GM president Pete Estes, *their* boss, had spent time at the other end of that same table, pitching virtually the same idea.

This pitch now came not from a flamboyant general manager—not from DeLorean—but from Courtney Jones, a self-described dyed-in-the-wool finance man now serving as Pontiac's product planning chief. He presented the Fiero proposal as part of the division's 10-year plan aimed at meeting the tough CAFE goals of the mid-Eighties. And he described the still-unnamed Fiero not

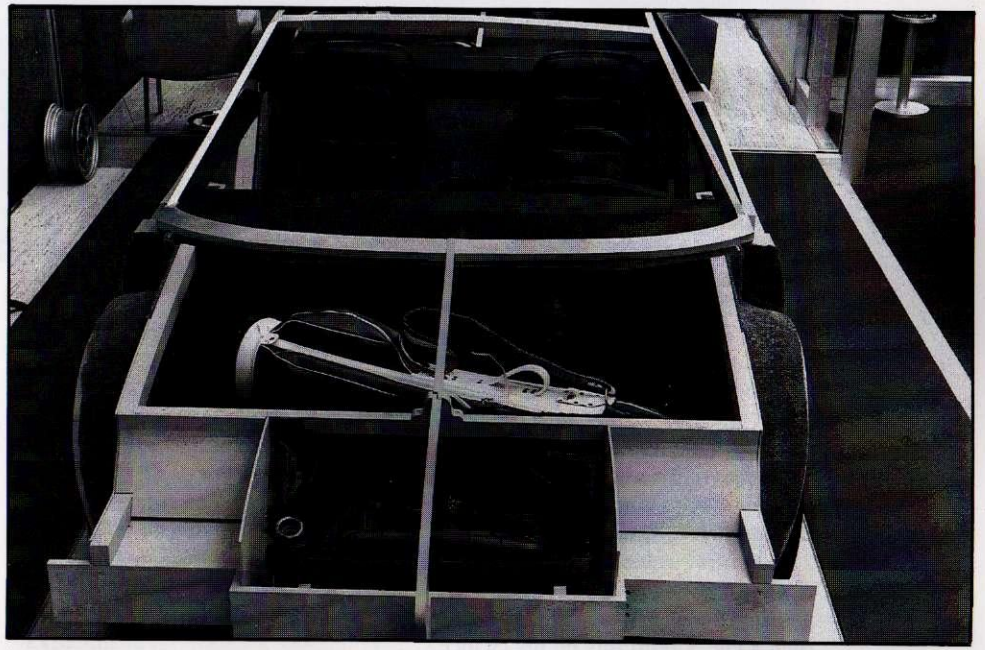


Hulki Aldikacti used his first concept buck, his "stick car," to sell Pontiac management on Fiero's feasibility.



Aldikacti, who became the Fiero's prime mover, had worked with DeLorean on the XP-833. He later spent time in the areas of chassis development and advanced engineering.

Because the J-Car's cowl stood too high, Hulki got the idea of putting a running version of Pontiac's 2.5-liter Iron Duke into his stick car.



In the first stick car, Aldikacti made the front luggage compartment big enough to hold a bag of golf clubs, with a little room to spare.

as a sports car but as a small, sporty, 2-passenger *commuter*.

Afterward, O'Donnell recalls, "...Estes's first reaction was, I see you've got my 2-passenger car in there. Not so dumb. Score one."

Kalush adds that the proposal was well received. "My recollection is that Estes said something like, That sounds like a pretty good idea. Why don't you build a concept car and demonstrate it to the corporate Product Policy Group, the PPG?"

Parkinson, a research and marketing expert, was handed the job of pulling together a definition of the car and selling it to whoever needed to be sold to get it produced.

"I drew in all the players at Pontiac," he explains, "from Finance to Manufacturing, Engineering, Marketing, and Sales. And we put together a lengthy presentation that dealt with identification of the target market—a vehicle description that would meet the needs of the largest number of people; where it fit into Pontiac's lineup; also how and where it might be built.

"I then marched around the corporation trying to get people interested. We showed that presentation at not only at Worldwide Product Planning but at Design Staff and at a lot of corporate staffs. There seemed to be a growing interest. People said, Yeah, looks like you could really do something.... Keep studying it."

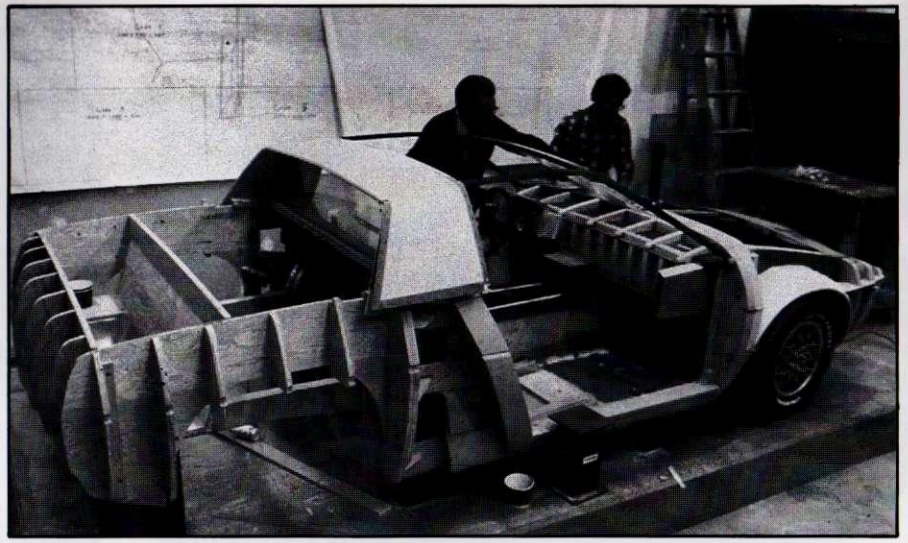
The original plan was to graft a sporty 2-place body onto the then-aborning front-wheel-drive (fwd) J-Car, which became the 1982 Cavalier/Sunbird/Firenza/Skyhawk/Cimarron quintuplets. This technique was the same Ford had used in deriving its EXP and LN-7 2-seaters from the Escort and Lynx. But those two cars would soon show that that wasn't the way to go.

Enter Hulki Aldikacti (pronounced Alda-*kotch*-tee). Born and educated in Istanbul, Turkey, Hulki earned his M.S. in mechanical engineering from U/Michigan in 1955. He worked briefly under chief engineer John DeLorean at Packard before following his boss to Pontiac the next year. As a senior project engineer in GM's advanced design engineering facility and (later) in chassis design and development, Aldikacti had worked on a number of exciting Pontiac sports-car concepts, including the XP-833, only to see the fruits of his labors end up in the dumpster for lack of corporate zeal.

After earning still another degree—an M.B.A. from Michigan State Univ. in 1968—and rising to experimental engineer in 1969, Hulki spent seven more years in chassis design and development before moving to the corporate Design Staff (previously known as GM Styling) in 1976. Now, two years later, his assignment there complete, he'd just been moved back to Pontiac to head a small advanced vehicle engineering group.

There, along with his handpicked assistant, a brilliant design engineer named Edward I. Falardeau (Fal-*are*-doe), Hulki was hard at work on two projects: 1) the Camaro/Firebird F-Car and 2) a program that would soon become GM's first large fwd B/C-Cars. It was here that Aldikacti got wind of the 2-seater O'Donnell's group was investigating. Hulki had dreamed for years of engineering just such a car. Could this be his chance?

"As soon as Hulki heard about what we'd proposed," remembers O'Donnell, "his eyes lit up. He told us, Hey, I'd like to work with you on that! So we formed



Out of the stick car grew this correctly dimensioned wooden package mockup, destined in 1980 to give rise to the first running prototype.

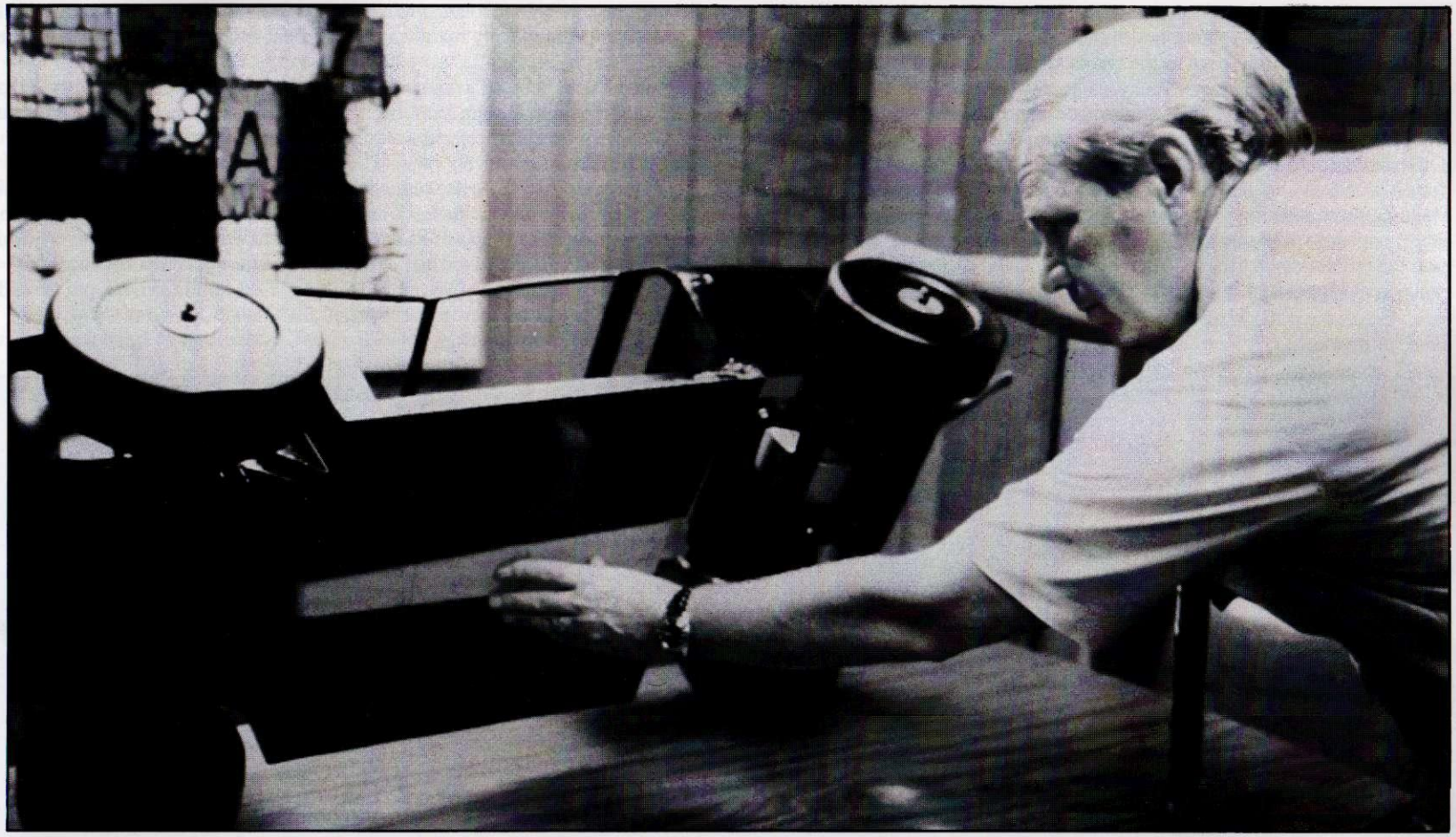
a liaison between Strategic Planning and Advanced Vehicle Engineering, and these guys went off and started working on it.

"It wasn't long before Parky came to me and said, They've been working on this 2-seater, and they've got a crazy idea. They want to take the engine and the powertrain cradle from an X-Car [GM's first small fwd sedan, the Citation/-Phoenix/Omega/Skylark], slide them back, and build a mid-engine car. My reaction as a nice, conservative GM guy was, Another damned wild idea! Why don't they just work on what we have? Take the J-Car.... But Parky told me, No, they don't want to do that, because the J-Car cowl sits up too high. The new car won't be aerodynamically slippery; it won't be good-looking.

"What was going on...Hulki, who'd just come back from Design Staff, had some buddies down there, and as soon as he found out about this 2-seater project, he went over and asked them to start working on a shape. They came up with this really slippery shape that accommodated a midship engine and had a cowl, you know, *this high*—about knee level. And then Hulki said, We can't use a front-engine setup because the cowl's too high. And looking at the Ford EXP, I'm glad we didn't do it that way."

Aldikacti had indeed asked Ronald C. Hill, GM's corporate advanced design studio chief, to explore a "look" for his little 2-seater. Although there was still no official program and therefore no budget, Hill agreed to take on the assignment. And it wasn't long before everyone involved concurred that the fwd J-Car idea wouldn't cut it. Not only was the J's cowl too tall at the base of the windshield, but its transverse engine and MacPherson-strut front suspension also brought up problems, both aesthetic and aerodynamic.

"You put a tall hood on a short car," Aldikacti explains, "and it looks like a midget truck. Shorten a front-engine car, it looks ugly. It became very obvious during the sketching period that we had to find a different combination to make



Hulki's assistant, engineer Ed Falardeau, checks chassis of windtunnel scale model before shipment to Cal Tech.

the car look right. When you do that, it's just as obvious that you have to do a mid-engine design. Then the question becomes, Do you have components for it?

"Well, if you take a fwd engine/transaxle and put it back into the rear of the car, it doesn't mind. The power unit doesn't care which end of the car it's in. It's an obvious engineering solution. Nor were we the first to do this. The Fiat Xl/9 was done the same way. It took different geometry for handling, and the rear-positioned fwd powertrain doesn't steer. But it doesn't need new components."

O'Donnell amplifies, "That's when the whole thing really started to pick up steam. Hulki and Ed threw some plywood on the floor and got the guys in the shop to start building a mockup of this idea. They took an X-Car engine and powerplant cradle, plunked them on the back end of this chassis plate, and started building a stick car around them. And I'm telling you, within about eight days, *poof,* there's this thing sitting there. You walk up to it and look at it and, son of a gun, it works! Damn, this is really something!"

What did Pontiac general manager Robert C. Stempel and chief engineer Stephen (Steve) Malone think of all this? Malone was aware of the project but hadn't paid much attention to it. It hadn't become much more than a paper car at that point: part of a long-range plan presented at the FPC; another Aldikacti experiment.

For his part, Pontiac general manager Bob Stempel was new to the job. He'd moved over from being Chevrolet's chief engineer to replace Alex C. Mair when

Mair got bumped up into corporate management in Nov. 1978. Luckily for the program, Stempel was a strong auto enthusiast and a first-rate product man—the type who all too rarely rises to the top in GM's sales- and finance-dominated managerial heirarchy.

When Hulki brought Malone over to see the mockup, Malone was impressed. They decided to show it to Stempel. "It was a late-afternoon sort of thing," O'Donnell recalls. "Stempel's calendar was full that day, but he could get over for a look at 5:30. So there's Hulki, Parky, Ed Falardeau, Steve Malone, and me, standing there, waiting. Stempel comes walking through the door, takes a few steps, and stops. He's going, Look! Look at this! He walks up and stares down into the engine compartment. Then he starts walking around the mockup. His smile gets bigger and bigger until finally, by the time he's gone all the way around, he's grinning from ear to ear. I thought to myself, This is good; this is good! Stempel obviously felt it was a nifty idea, and he encouraged the hell out of it."

Stempel then decided to show the mockup to Pete Estes, so they shipped the stick model over to Design Staff, brought Ron Hill's clay up from the basement, and set up a makeshift projection booth in the office of Pontiac design chief John R. Schinella.

O'Donnell describes what happened next. "Parky and I had put together this great big presentation with full glossy photographs, color slides, everything about the 'new values' people and every argument we could think of on why this was a great idea. It addressed marketing, manufacturing, component sourcing—tried to cover all the bases. We moved Schinella's furniture around, put the slide

Meanwhile, at GM Design Staff, the first full-sized clay model was taking shape in Ron Hill's advanced concepts studio.

projector on his desk so it showed on the window, and placed chairs outside the window for Estes to sit on.

"So we're waiting for Pete to come in. The model's sitting there. Hulki's walking around kind of nervous. Stempel's pacing back and forth, looking the thing over.

"Then all of a sudden, I see Stempel motioning for Hulki to come over to where he's standing. Hulki runs over, and they huddle around back of the car. Mumble, mumble, mumble. I'm wondering what the hell's going on.

"Pretty soon this little conference breaks up, and a couple of minutes later Hulki comes over to me and says, Boy, that Stempel's sharp! Stempel had looked into the mechanicals and noticed that there was no emergency brake. Where's the emergency brake?

"Well," continues O'Donnell, "the body parts were made out of sticks, but the running gear came from a real car. Stempel looked in there and had immediately noticed that no one had figured out how to put an emergency brake on this configuration. The brake has to be on the rear wheels, and we're using the front wheels and everything off a fwd X-Car. Stempel noticed right away that you couldn't use the front brakes off the X-Car because there's no way to include an emergency brake.

"Anyway, Estes comes in, and we go through the pitch. Estes looks at the mockup. He looks at the clay, and he says, What do you want from me?

"Stempel says, Well, we want to build a prototype.

"Estes says, How much is that going to cost?

"Stempel says, We figure about $1 million.

"Estes says, I think you ought to do it.

"Stempel says, Are you going to give us some money?

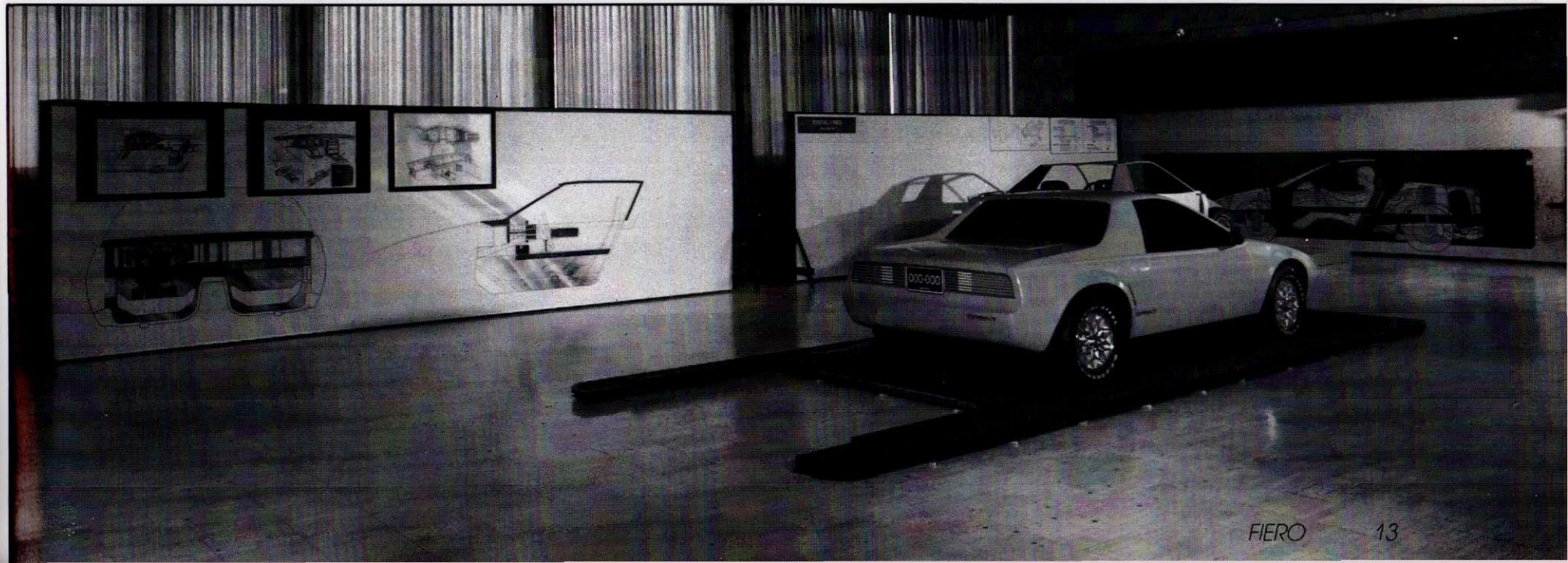
"Estes says, Oh, I think any creative general manager and chief engineer can find $1 million in their budget somewhere!

"What he was saying was, Just go ahead and do it. Quit asking! That's what we took him to mean anyway. He was sort of saying, Look, if we make a big deal out of it and get 14 levels of approval, we might never get it done. So why don't you guys just go ahead and do it? And that was all Hulki needed. He went off like a firecracker, hell bent for election."

People would later refer to this as the P-Car project. Over the next four years, Aldikacti and Falardeau would engineer the P-Car and invent a whole new way to produce it. Meanwhile, Hill's advanced designers would shape it; John Schinella's production studio would eventually fine-tune its appearance; Stempel would protect, nurture, and champion it through early development; Parky Parkinson would sell and resell it almost continuously until final production.

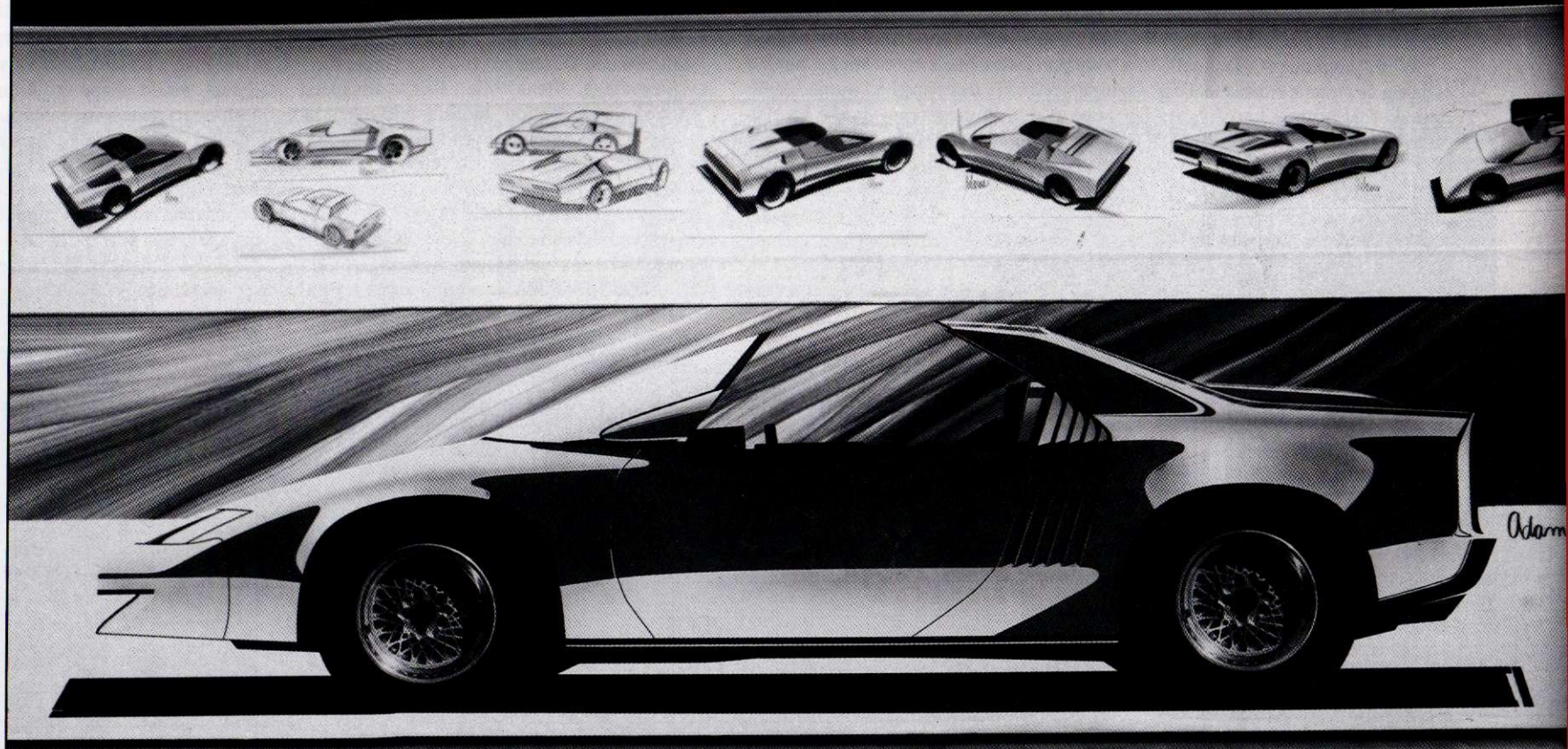
And despite a deep economic recession in the early Eighties, tough market conditions, GM's first red-ink year in modern times, a nerve-wracking string of delays and cancellations, a new Pontiac general manager, two new chief engineers, and a new vehicle chief engineer, the P-Car *would* come to market in the fall of 1983. But that's another story; several stories, in fact; all of them wild. □

With dimension and interior drawings on walls and seating buck visible behind clay, Hill's studio became a focal center for Fiero's progress.



Chapter 2

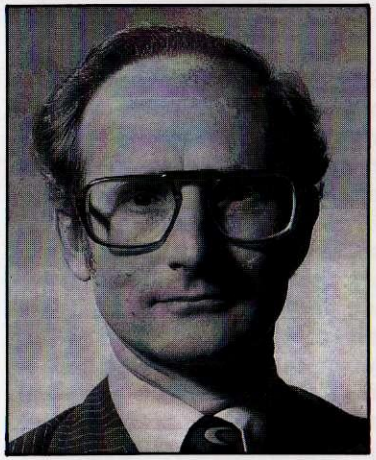
The Design Process

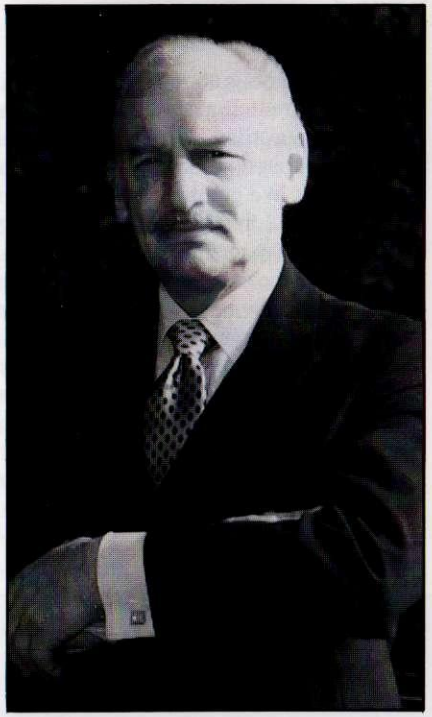


ANY MODERN AUTOMOBILE DESIGN takes a team effort. No single person styles any one car anymore. But since the production studio chief has the main responsibility for styling a car and sees the design through from concept to completion, he usually gets most of the credit. Thus by convention, it's generally agreed that John Schinella, chief of GM Design Staff's Pontiac Exerior II studio, "did" the Fiero's exterior; and William D. Scott, Pontiac's interior studio head, "did" the Fiero's interior.

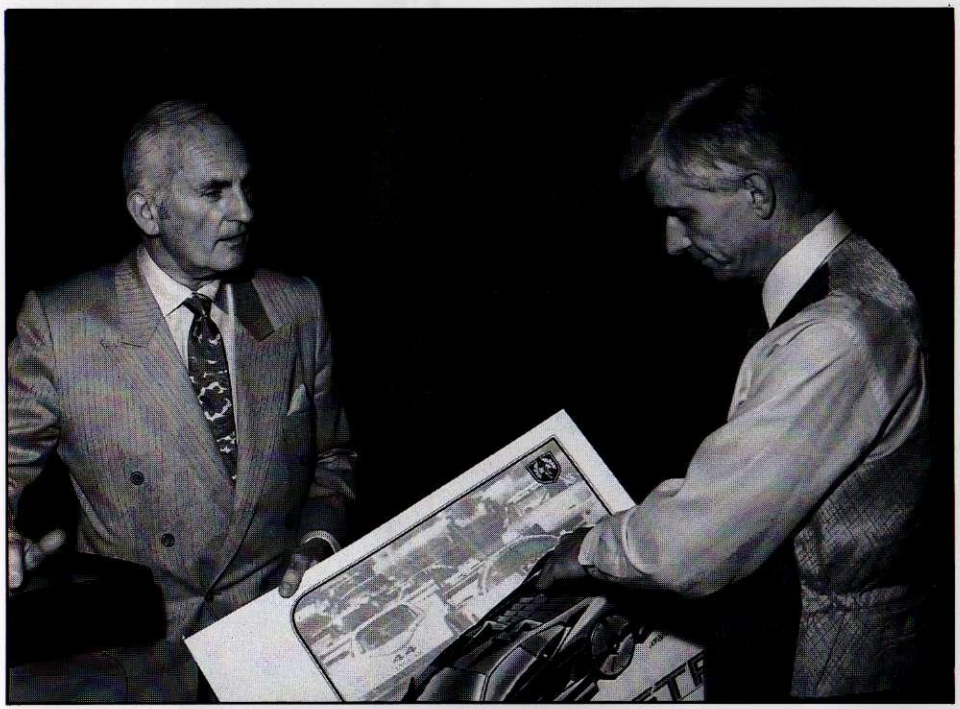
Actually, the car's initial concepts and themes were well established in GM Design Staff's advanced studios: Advanced Exteriors under Ron Hill and Advanced Interiors under John A. Shettler. These themes preceded Schinella's and Scott's involvement by several months.

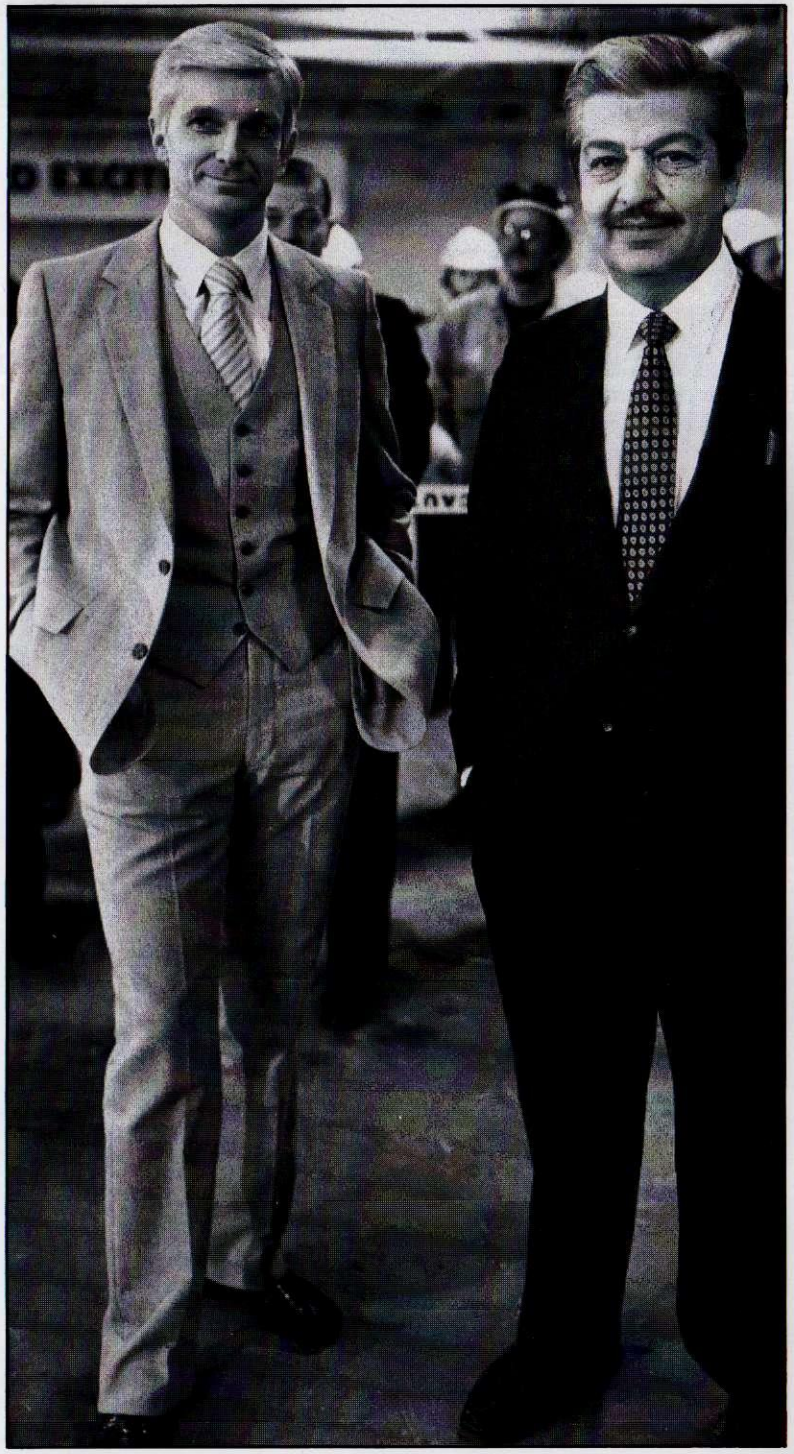
Each of these studio chiefs is supported by a team of sculptors, engineers, and designers who do a lot of the creating themselves—plus most of the manual labor. And every studio's efforts are closely guided by the men at the top, in this





Basic to Fiero's design were Ron Hill (above), Irv Rybicki (right) and Chuck Jordan (below, left). After project approval, John Schinella took over, shown at far right with Hulki and below with Jordan.





case by GM design vice president Irvin W. (Irv) Rybicki and GM design director Charles M. (Chuck) Jordan.

It was just before Chistmas 1978 when Pontiac's chief of advanced engineering, Hulki Aldikacti, hustled through Design Staff's front doors carrying an armload of drawings. These were package plans for a small, 2-place, mid-engine automobile that would eventually end up as the Fiero.

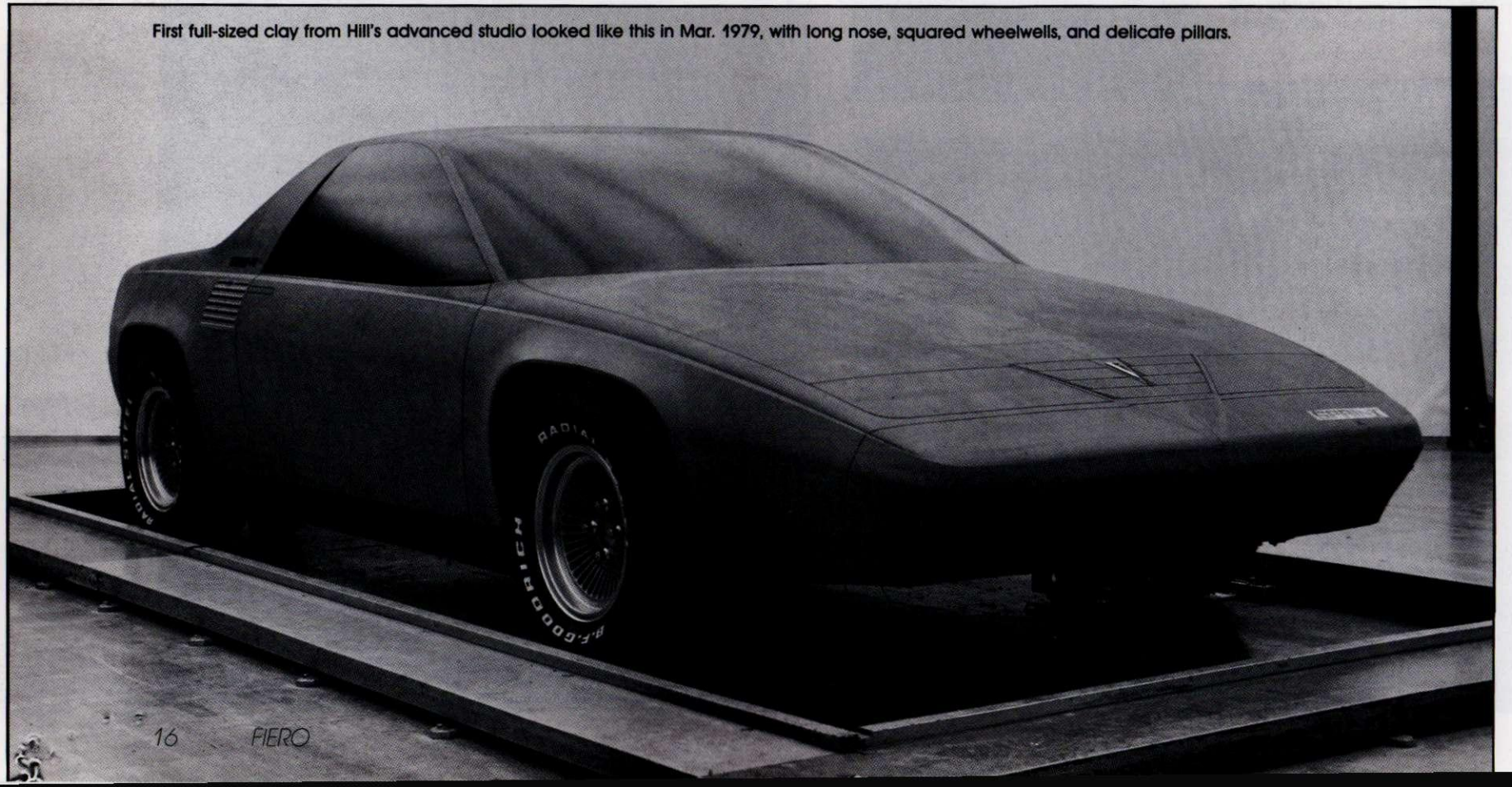
At that point, though, the Fiero-to-be was little more than a gleam in Pontiac's eye: a proposed commuter car; part of the division's 10-year plan to meet future federal CAFE requirements.

As mentioned, Hulki and Ed Falardeau were finishing details of the forthcoming F-Car (Camaro and Firebird) plus packaging GM's first round of full-sized fwd sedans—the B/C-Cars—which arrived as the 1985 Olds 98, Buick Electra, and Cadillac Sedan de Ville and, for 1986, encompassed the Olds Delta 88 Royale and Buick LeSabre.

"We still had six months to go on the fwd C-Car," recalls Falardeau, "so we couldn't get serious about the 2-seater until just before Christmas. When we did, we tried a front-engine, fwd J-Car drivetrain, but that wouldn't give us a low-enough profile. Then our guys said they weren't opposed to a mid-engine vehicle, so I put together the present package. It was on a 93.4-inch wheelbase, and it still is. We got the package down to Ron Hill right before Christmas, and then Ron had something to drive his clay."

Hill, chief designer of the 10-member Advanced Design III studio at that time, relates: "Hulki came to us and said, All right, this is what we want to do. He was very interested in making sure that customer satisfaction, fit, finish, and quality were the highest possible. And the way he and his people hoped to get that was to do a totally different body build; a completely new way to put together the body so it would be hands-off in terms of panel fits: no leaded seams, no exposed bonding joints, no Monday morning slip-ups.

"But how do you do that? Well, you try to design panels so that all fits will be the best possible in terms of quality and any misalignments can be easily hidden."



First full-sized clay from Hill's advanced studio looked like this in Mar. 1979, with long nose, squared wheelwells, and delicate pillars.

Overseen by David R. Holls, executive in charge of advanced and experimental design, Hill's crew went to work soon after the 1979 New Year and, by February, had come up with a series of sketches, drawings, and scale models for presentation to Design Staff management, Jordan and Rybicki in particular.

"There must have been four or five different tries in full-sized illustrations and in clay that didn't make it," Irv Rybicki remembers. "Then one of the designers did this silhouette where the upper deck—the nose—was diving. And we looked at that and said, Now that's the one we ought to model!"

The first full-sized clay stood finished by mid-March. Dubbed the *Sprint*, it was massaged and painted cherry red in preparation for a June corporate review. Initially, this car had a low grille opening, tri-color louvered tail lamps, and vertical side air intakes. By early May, though, the hood was longer, and the grille had disappeared, replaced with a hidden air intake under the nose, with outlet louvers atop the hood. Hill briefly investigated wrapping the park and sidemarker lights up over the fenders into these louvers. He also tried various tail-lamp and side-scoop combinations.

"We thought the car looked pretty good at that point," Ron continues, "but some realities began to intrude, and we had to soften the lines a little." It did look good, no question, but too much like a future Firebird than the 50-mpg commuter car the corporation was expecting.

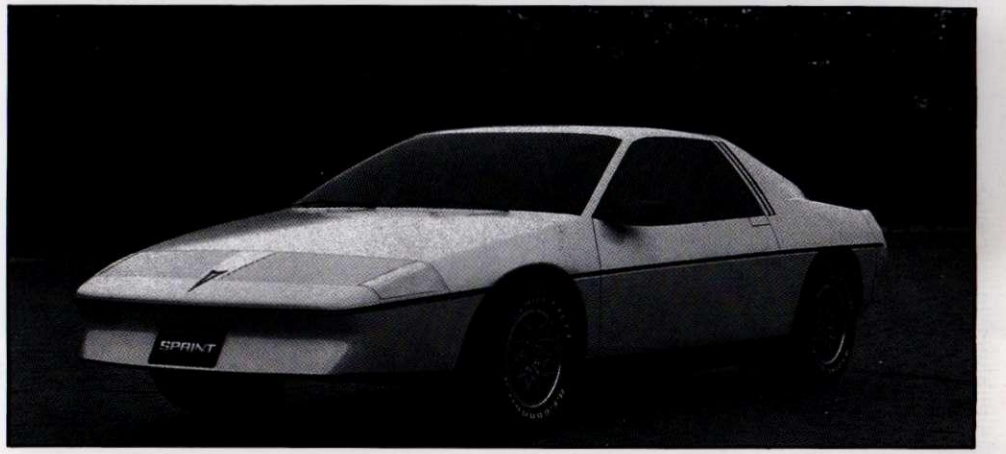
"I had some problems with it," Rybicki adds, "because I thought the fellows were making it a lot longer than it should be. At two steps during its development, I had them cut it back in length." The car also got a little less aggressive in character, and the revision must have worked: at the June review, it earned the corporate nod for further development.

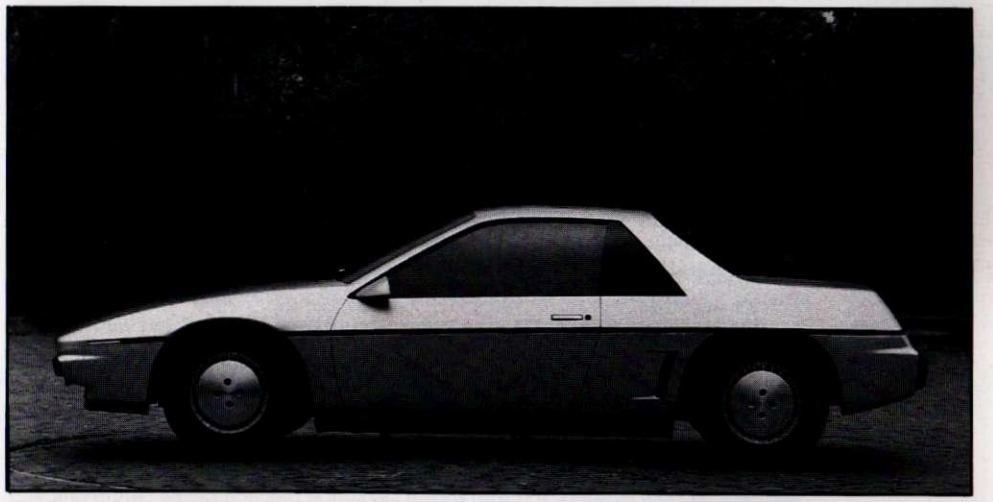
By that time, Aldikacti and Falardeau had come up with a revolutionary idea in vehicle construction. They decided to borrow from race-car practice and make their car with a full space frame, its structure completely independent of its outer body panels. The inner metal frame would carry the exterior plastic panels, and the skins would be fastened with a quick-mount system that controlled surface seams and held alignments to within thousandths of an inch.

This decision had significant impact on Ron Hill's evolving exterior design. For one thing, it caused Hill to rethink the locations of body seams between panels. He had to blend and disguise them in non-conventional ways. For another, the space frame required a wide structural rollbar up, over, and behind the occupants' heads, right where the rear quarter windows would normally be.

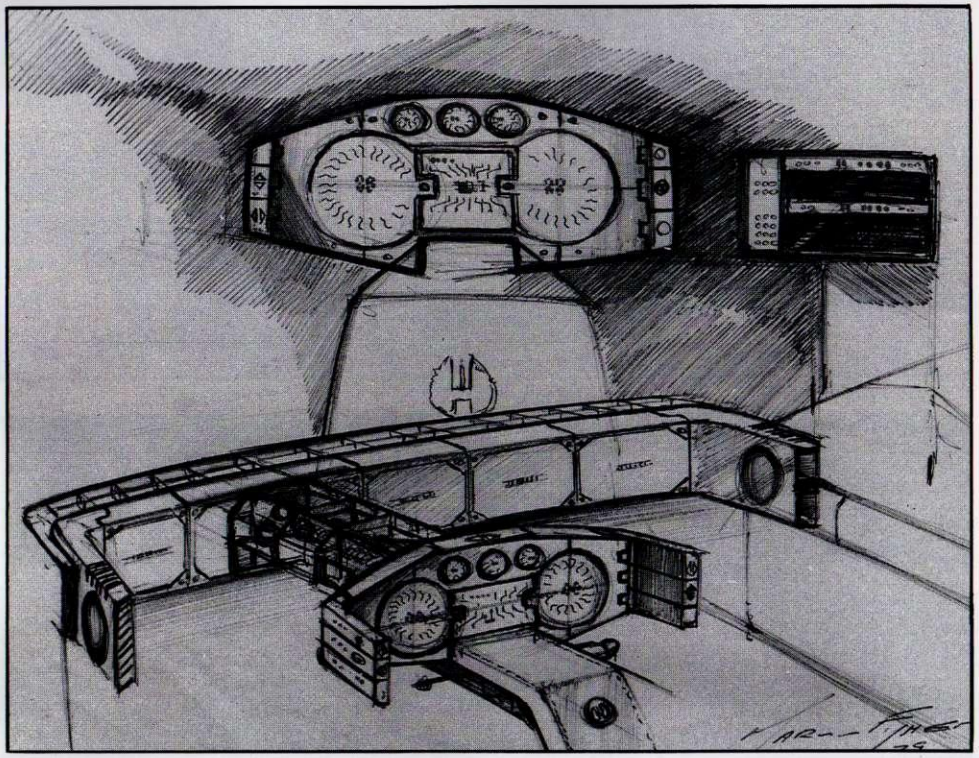
"The major consideration," Hill explains, "was that by running the rollbar up there, we could eliminate structure underneath the car and thus get rid of a lot of weight. *Sure, we'd rather have had a see-through quarter!* But when it became apparent that we had to have that type of construction, we tried to make sure that people saw that area as a continuous window line rather than a heavy rear quarter. We didn't want just a thick pillar." In other words, better a *simulated* quarter window than a fat sail panel.

Another concern was the less-than-aerodynamic shape of a short car with a notchback roof line. "The reality of doing a mid-engine car," Hill goes on, "is that, in nearly every case, it dictates basically notchback or tunnelback con-

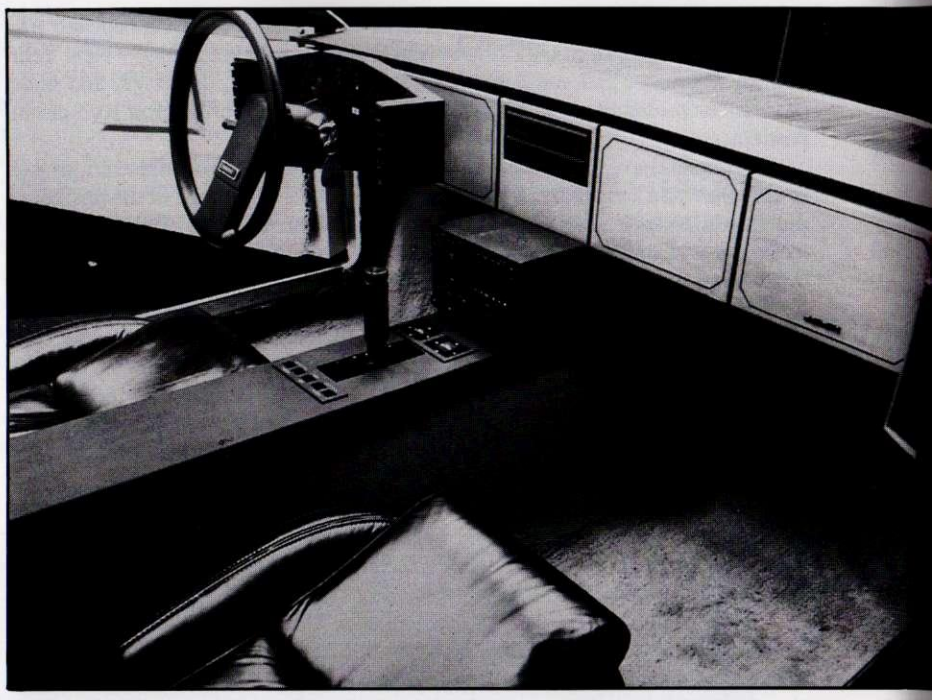




It soon became necessary to widen B-pillar to accommodate space frame's rollbar as Hill's group explored variations on their original theme.



Marvin Fisher, also in advanced design, sketched Fiero's original podular instrument panel, with fingertip wings and drop-in ducting.



From that concept sketch, advanced interior designers Fisher, Hanson, and Corwin built a Fome-Cor buck for demonstration purposes.

figurations. Aerodynamically these are both very poor. But the over-riding considerations are heat rejection, lightness, and ease of manufacture. All those factors come into play a lot more strongly than aerodynamics. We know how to make a car a lot lower in drag, but it means covering up that rear panel.

"When we aero-tested the first scale model at the Cal Tech windtunnel in Pasadena in late Aug. 1979, we hurriedly put on a fastback, and we were able to reduce drag significantly—on the order of 50 or 60 counts, which is a heckuva lot. The standard car with narrow tires had a Cd around .37 or .38. We were able to get this down around .31-.32 with the fastback. But are you going to pay the money; are you going to take the weight penalty and all the heat problems? Even Ferrari doesn't."

All this time, of course, chief designer John Shettler's interior concepts studio, under the direction of executive designer George E. Moon and assistant executive designer George R. Angersbach, was working on a suitable interior. Their instructions were to use as many existing parts from other GM cars as possible; e.g. J-Car seats, Camaro instruments and switches, etc. The idea was to cut costs and complexity.

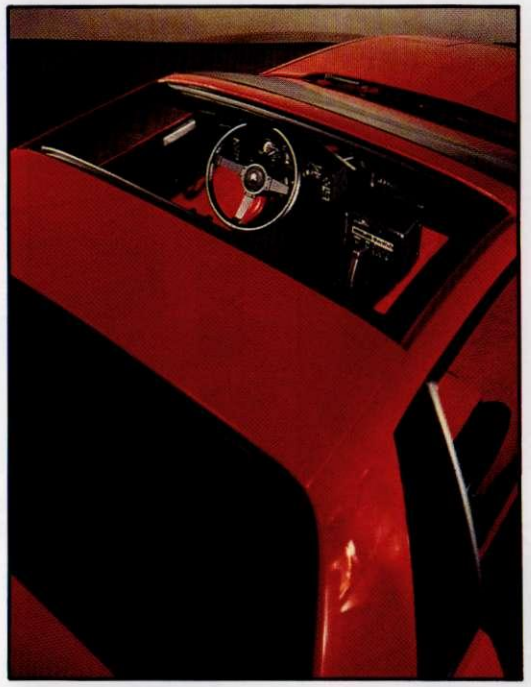
Chief designer Corwin C. Hanson, assistant chief designer Marvin J. Fisher, and designer Daniel Nelson built an interior mockup, called a *buck*, based on an original concept sketch by Fisher. This design's major elements incorporated a freestanding instrument pod flanked by fingertip switches, with a separate, full-length, modular climate-control duct that ran from edge to edge. Hanson, Fisher, and Nelson built this buck mostly of Fome-Cor, Fome-Cor being a sandwich of styrofoam between sheets of heavy paper.

To save time, the interior stayed in Fome-Cor, which can be covered and finished to look highly realistic. Traditionally, the design process goes from sketches to tape drawings to templates to sculpted clay over a wooden or styrofoam armature. But not this time. Marv Fisher explains: "You're usually directing a clay modeller to define your forms for you. In this case, though, the designer was actually sculpting the interior himself, but in a different material: Fome-Cor."

John Shettler elaborates: "One thing that worked out well was doing these Fome-Cor bucks. By the time Ron did the clay model, we had a sit-in buck with this interior. So when Irv and Chuck wanted to look at the exterior of the car, they could also come in and sit in the buck. We finally did a second buck in Ron's exterior studio so people could get in and out of it and look at the model at the same time."

"The philosophy of that interior was very utilitarian, very ergonomic and businesslike," Shettler continues, "because originally the Fiero had been

Interior production studio chief Bill Scott took over from Hill's advanced group.



Hulki's running pre-prototype had an interior very much like the eventual car's.

Another early buck, this one from Sept. 1979, used modified Camaro gauges in a black fascia.

thought of as a commuter, not as a sports car. We tried to make it driver-oriented, with lots of space inside. We had to work around the high tunnel, though, because that's where the fuel tank had to go, and we also had orders to use some carryover components, like gauges, from other cars.

"What we did was to push the right side of the i.p. [instrument panel] as far forward as we could to give a lot of passenger room and have all the controls near the driver. Also, we'd worked on the 1982 Camaro by that time, and we were just beginning the 1984 Corvette interior, so we were heading toward an aircraft panel look."

Marv Fisher adds, "Basically it was form follows function. We looked at what Citroen did about that time with the pod and hand controls, and we looked at the SST aircraft cockpit. It was a very functional, non-decorative approach. When we were concepting the thing out, we thought maybe the air-conditioning ducting could be a separate, functional module. Later, as we got into the engineering, the packaging, and the cost of it, the ductwork had to be different.

"One important design element is the break across the panel that separates the upper and lower areas. It gave us service access to the upper panel and a place to dress the top surface. Another is the modular build, so you can have the radio, heater, instrument cluster, and everything in position without their covers on. The production Fiero lets you remove just four screws, for instance, and the back of the instrument pod comes off."

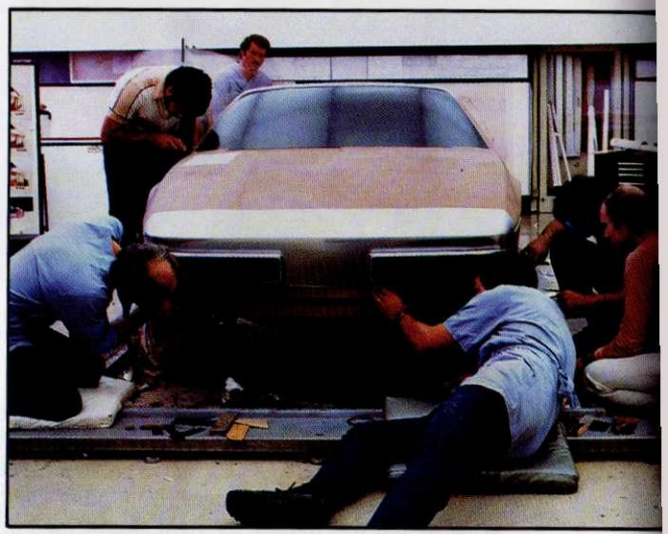
John Shettler continues: "We did an interior buck in a couple of weeks. Hulki liked the proposal, and so did Chuck Jordan and Dave Holls. Then Hulki built this components and packaging buck [the wooden stick model] at Pontiac Engineering. We sent Corwin Hanson and Dan Nelson over there, and they took the design and put it into this buck. It was done as a group project."

As summer approached, the interior evolved along with the exterior: instruments, switches, pedals, shifter, steering wheel, radio, heater, air conditioner, door panels, console, seats. Designers also tried different colors and fabrics. And by the fall of 1979, there were 3-dimensional exterior, interior, and engineering/packaging proposals ready for management review. That's usually enough, but not for *this* car. Hulki felt strongly that the only way to sell his 2-seater to the corporate bosses was to have a real, running prototype that they could see, feel, and drive.

In mid-October, as soon as both exterior and interior models were nearly finished, Aldikacti took their shapes, dimensions, and surfaces to Milford Fabricating Co. in Detroit to tool up and build the first P-Car prototype. Working day and night, weekends and holidays, it took just five months to get a roadable prototype ready—a remarkable feat by any standard!

By 10 Mar. 1980, Hulki was proudly driving this car around the GM

Pontiac's designers and modelers discuss possibilities for Fiero convertibles. From left to right: John Folden, Bruce Penberthy, John Schinella, and Mike Pitera.



Clay modelers could and did change aesthetic Fiero-to-be's details in amazingly short order.

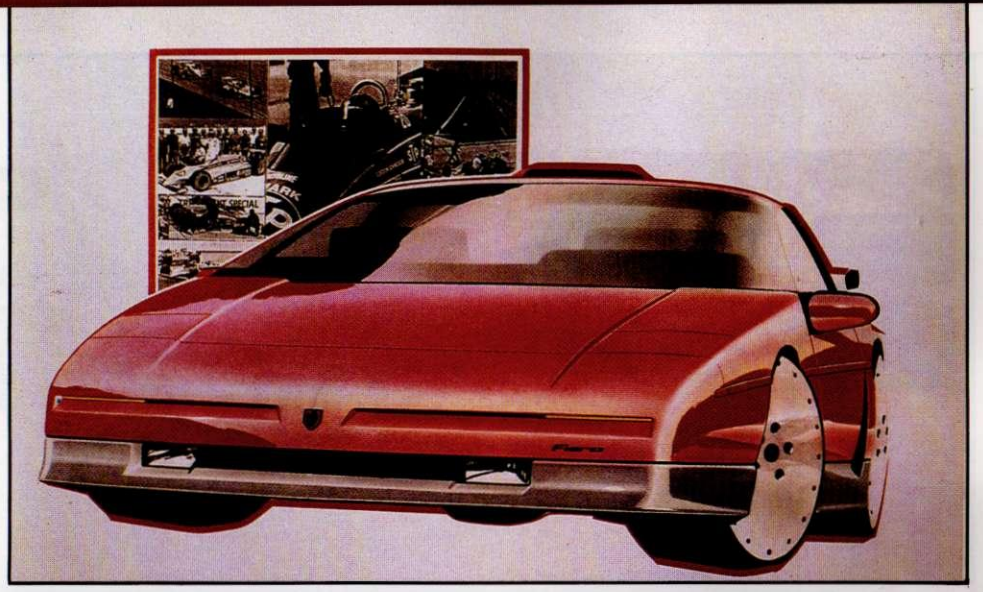
Technical Center, showing it to everyone he could. One of the first places he took it, of course, was to Design Staff. "We do a lot of abstract or what you might call stillborn designs in the advanced area," confesses Ron Hill. "Most of the projects we work on eventually get shelved. But this was the first one where we actually got to the point of a running car. We could jump in, turn the key, and drive it around—tremendously exciting and gratifying. That's only happened to me this once!"

Another major milestone passed on 16 Apr. when GM management reviewed the program and, favorably impressed, gave its blessing for production development. At that point, the P-Car became a formal corporate program and, in keeping with Design Staff custom, quietly changed hands.

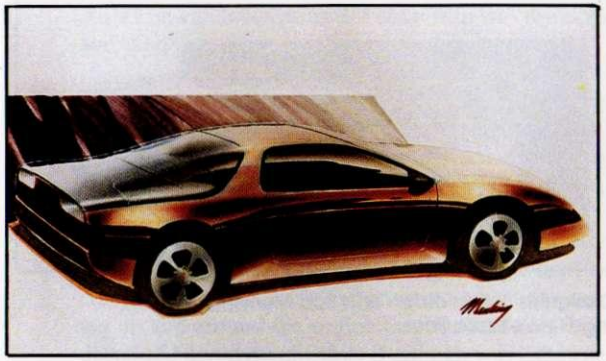
"It hadn't been an official program when we did it," says Hill, not without a touch of regret. "We were kind of working in the back. And when it became official—a sanctioned product—it was clearly out of our hands. Rybicki said, Okay, it's a corporate project now. It's got to go to the production studio."

So on 24 Apr. 1980, the future Fiero's exterior was placed in the capable hands of John Schinella, chief of Pontiac Exteriors II. Likewise, the interior moved to the Pontiac interior studio, then run by Patrick W. Furey. And assistant chief Marv Fisher moved with it, giving him a rare opportunity to stay with a design from first sketch to final production form. Overseeing the exterior work would be executive designers Henry (Hank) Haga and Jack N. Humbert. George

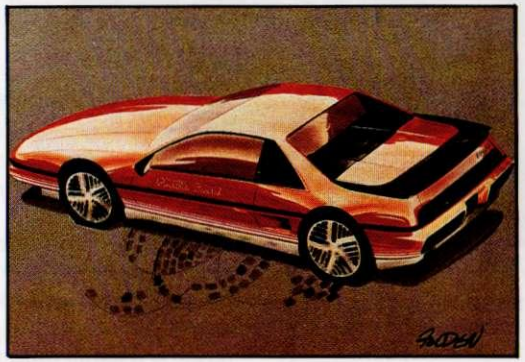
As early as Dec. 1979, Pontiac considered a true fastback "Sprint." Despite good aerodynamics, engine heat retention scotched this design.



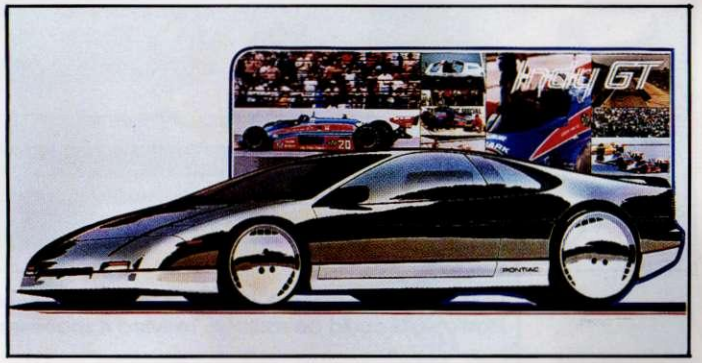
John Cafaro set 1984 Pace Car's aero front-end theme with concept sketches like this.



In 1983, anticipating the '86 GT fastback, Bob Menking suggested an F-Car-like glass hatch.



John Folden's Pace Car concept also had aero nose but took a more practical turn.



Another Fiero Indy Pace Car sketch for 1984 incorporated low fastback roof line.

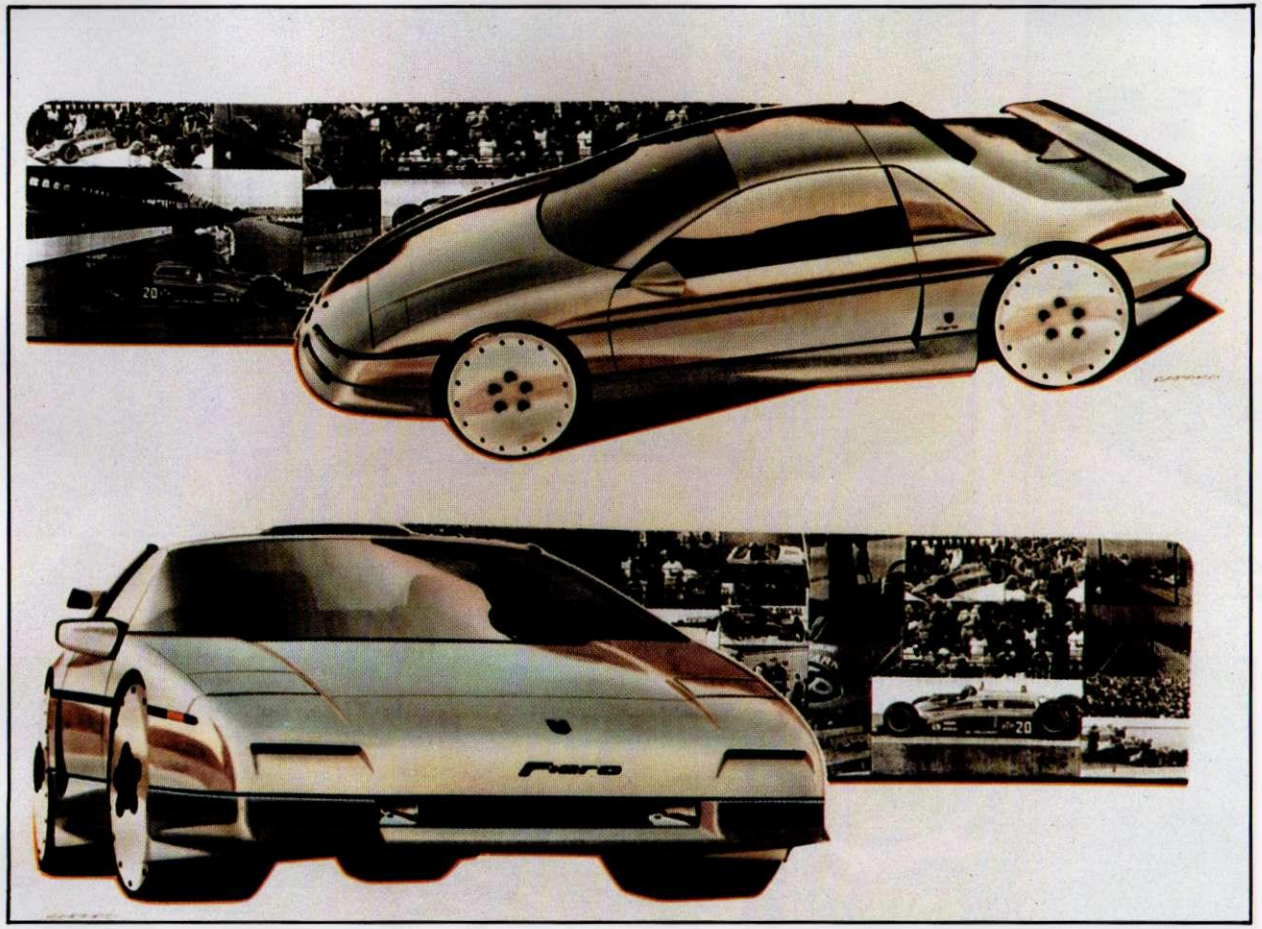
Moon and George Angersbach would continue to direct the interior program.

It came as no surprise that John Schinella took over the P-Car once it got the production go-ahead. John is known thoughout the industry as an excellent and enthusiastic auto designer—a "sports-car man." He's headed up the studio responsible for the handsome, highly regarded Firebird/Trans Am since 1973. When the P-Car got transferred, Schinella and his 15-member team were handed two principal tasks: 1) make it buildable, and 2) make it a *Pontiac!*

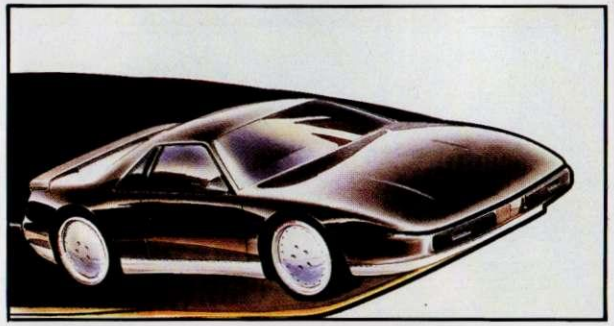
The two toughest changes Schinella's team had to make were, first, to move the entire cockpit forward and, second, to increase the windshield angle to a "fast" 63 degrees. These two changes not only helped the car's looks but improved both weight distribution and aerodynamics.

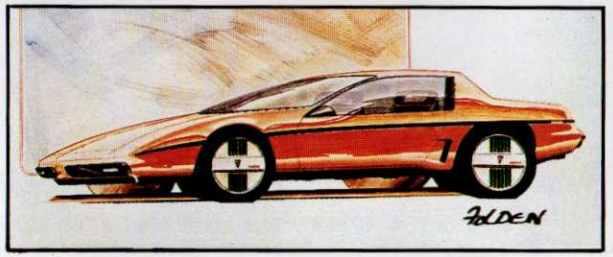
"The roof got changed and sectioned," John explains, "and we extended the length of the windshield in plan view. That shortened the hood, and then we cut five inches off the nose. We were trying to find the right proportion with a longer tail and shorter front end, because the car looked a little strange with a long nose. We wanted to give it more of a mid-engine look, and mid-engine cars seem to enjoy a longer, higher rear. This got us right down to some magic dimensions that people liked, and it helped the car a lot."

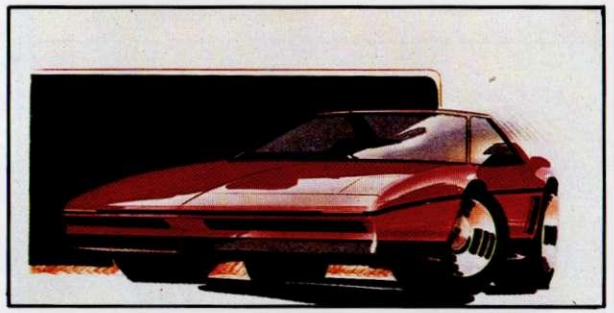
Establishing the Pontiac personality came a little easier. Assistant chief designer John R. Folden set the basic theme with a series of concept sketches that were approved by Jordan and Rybicki in early May. From then on, it was pretty



Pontiac studio spent lots of time on Pace Car, knowing that body tooling would reappear on 1985 Fiero GT. Plastic skins could be radically restyled if space-frame attachment points were the same.







Designers John Folden and Bob Menking kept refining Fiero's basic lines.

much a question of translating the major elements from these into clay and executing the details. Most important to the Pontiac look were prominent black twin bumper pads front and rear; also a flush, full-length, *neutral density* (black when unlit) tail lamp with a high-tech grid pattern inside.

The rear was sloped and shortened slightly, the upward-curving beltline was straightened to accentuate the car's diving wedge profile, and the side molding was extended and wrapped around the back. Door handles and locks were neatly integrated into this molding. Since the engineers then felt that Hill's vertical side scoops wouldn't be needed, they eliminated them completely. And the ridged black panels that simulated air intakes in the forward half of the B-pillars were changed to gloss-black panels that simulated quarter windows.

"The idea," Schinella emphasizes, "was to get the most pleasing shape in that area without it being awkward. We had to make our peace with that structure in there [the rollbar], and we tried a lot of designs that simulated this, simulated that. Finally we just made it gloss black. It was designed to read as a window outline." Schinella, of course, a champion of functional design, detests anything fake. Why fake windows, then? "I guess I had an easier time with the shiny, smooth surface than with louvers and vanes. It seemed at the time to be a more honest solution."

At one point, someone decided that the wraparound molding, an important aesthetic element that also protects the body and hides the seams between upper and lower panels, should end just forward of the front sidemarkers and *not* wrap around the nose. Schinella, Haga, and Humbert all disagreed with this decision. The resolution gives an insight into the way Irv Rybicki's system works.

"Irv feels that the more eyes you have on a vehicle," says Hank Haga, "the more critical people become. If you see flaws, or if you need alternate solutions when Engineering makes you change something, you then have four or five different directions to head in.

"At one time this molding didn't go all the way around the front. I remember Schinella having problems with that. I had problems with it, too, and I guess so did Jack. We got together and found we all felt it was the wrong way to go. So we went back to management and to Irv and said, Hey, there's something basically wrong with the way the car feels. This side molding—a major design element—starts and stops nowhere. It looks like an applique. But if we circle it all the way around the car, it becomes an inherent part of the design. Eventually we got it, but it was tough to do."

Adds Schinella, "That molding around the car integrates the top and the bottom with the door handles and sidemarkers. For the same reason—a clean look—we put the parking lamps in the front bumper pads and the rear reflex [reflectors] in the back ones."

Despite the hurry-up schedule, every detail large and small received special attention. Windtunnel testing and computer-aided design fine-tuned every shape and surface. Assistant studio chief engineer Richard A. Schell worked out the engineering details for a new high-tech, multi-slotted wheel designed by Schinella. Schinella's studio also created an aerodynamically integrated rear luggage rack, and both these items received design patents.

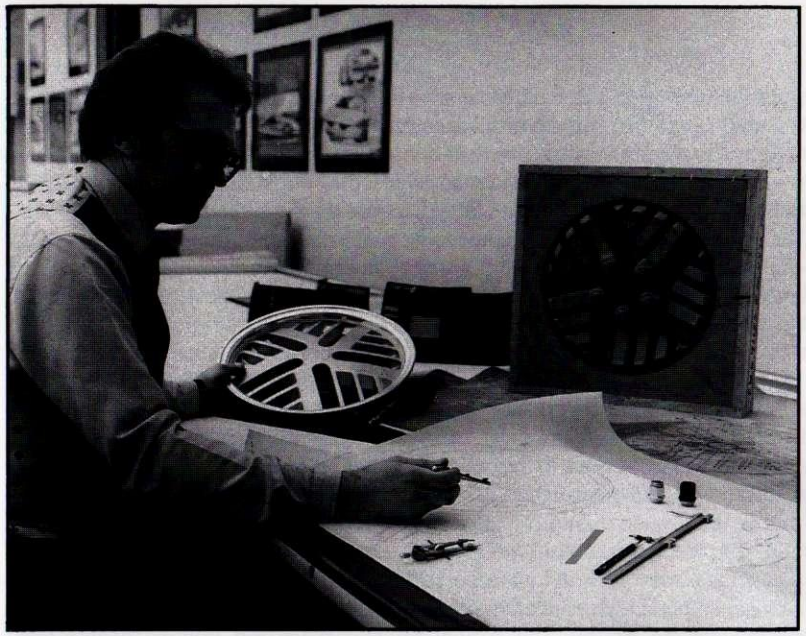
In keeping with the car's clean, uncluttered look, Pontiac identification was provided by subtle graphics debossed into the left headlamp door and rear fascia. An all-new process using 3M solar film was developed for the shiny black name and model decals on the rear panel.

Even after a design is released, with its surfaces finalized, approved, and computer-recorded for tooling, there's still a lot more work to be done in the studio. "You've got to go in and work on the door cuts, make the mirrors operate, make the gaps work," says Schinella. "It's a total commitment between Design Staff and Engineering."

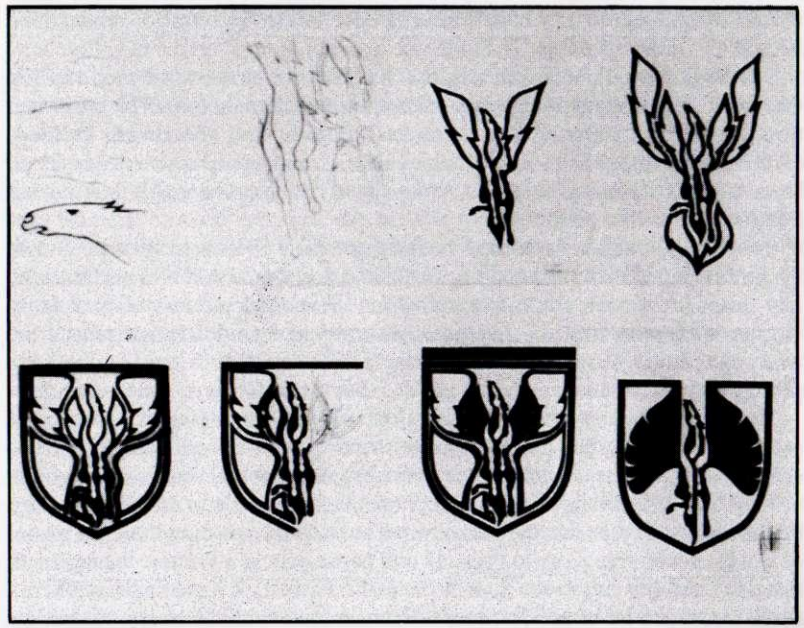
Air management under and through the car proved especially tricky. Windtunnel testing, first at Lockheed in Georgia and, once GM's own tunnel was completed, at the Tech Center, revealed an interesting phenomenon. Air washing up and around the engine from underneath not only helped cooling, it also decreased aerodynamic drag if enough was exhausted upward through vents on the deck. "It meets the upper boundary air flowing down over the roof and creates a 'fastback' of its own," Schinella points out. "When we shut that air off or left too much out, it hurt the car's aero numbers."

Later tests at the proving grounds and on the road showed, however, that this undercar air is very dirty due to turbulence from the front tires. And this dirt would quickly coat the engine and powertrain—bad news for both underhood servicing and appearance. Then, too, this undercar air was too contaminated to feed into the engine intake.

To combat the first problem, some of this airflow was blocked off, and the remainder was baffled to remove dirt before it reached the engine compartment. To remedy the second—very late in the program; just a few months before start of production—Schinella's team had to reincorporate some sort of side air inlet. Because the required volume of air was fairly small, it turned out that a few square inches of vent on the left side would do the job. Controversially, Schinella's studio refused to "balance" the left-side intake with one on the



General Motors Design Staff engineer Richard Schell checks mold and early casting for Fiero's 1984 optional Hi-Tech Turbo alloy wheel.



Jon Albert created the Fiero emblem at a time when *Pegasus* was being considered as the car's name. This accounts for the flying horse.

right...probably just as well because the lower left rear quarter panel had to be retooled at the last minute to incorporate the one intake.

But why not a second *real* vent to duct more cooling air over the engine? This would also dress up the right side of the car. Schinella explains that, "The engineers felt they didn't need one. They said they'd make the other one a fake. We decided we didn't want a fake, so we made the car asymmetrical; just put the one where it needed to be. And we designed it differently, made it horizontal rather than vertical, because it helped the lines of the car. Also, the higher it can be, the less road dust it picks up."

While all this was going on, Marv Fisher back in Pat Furey's production interior studio kept busy transforming the advanced concept P-Car interior into a functional, practical, buildable reality. By this time, he'd abandoned Fome-Cor and had gone to the more traditional medium of clay. "Once we were in clay, we could control the surface better," says Fisher, "put a little more form into it, fine-tune it. And the interior got a little softer, a bit smoother."

In Jan. 1981, two significant events took place. First, Furey and his counterpart in the Chevrolet interior studio, Bill Scott, switched jobs. Second, Pontiac's new general manager (since the previous August), Bill Hoglund, held an "image conference" in nearby Ann Arbor, Mich. All the top Pontiac people from Engineering, Planning, Sales, Marketing, Advertising, Public Relations, Purchasing, Financial—you name it—were there. So was a select group of outside consultants, PR reps, and members of GM Design, Manufacturing, and other key corporate staffs. The purpose: to discuss where Pontiac had been, where it stood then, and where it needed to be headed in terms of product and image.

The consensus: Pontiac had dug itself a hole and jumped in by, a) chasing Chevrolet on price and, b) chasing Oldsmobile/Buick on luxury. This happened throughout the tough-sledding Seventies. Pontiac had abandoned its hard-earned Sixties image as a youthful, innovative, exciting car; had tried to cover all bases at once; consequently had no image at all. No one really knew what Pontiac was at that point.

Conclusion: Pontiac would go back to the path of its past glories. But to "youthful, innovative, and exciting," the division would add real performance and clean, functional, contemporary styling. Pontiac would leave Chevrolet to wrestle with price and the Japanese; also would let Olds/Buick pursue the traditional family/luxury market. Pontiac decided instead to emulate the more prestigious European cars and to go after buyers of those models.

This new image program turned out to involve a tremendous change, but precisely the proper one for the situation. And the future Fiero wouldn't just be affected *by* it, the car would become a prime mover toward Pontiac's new goals.

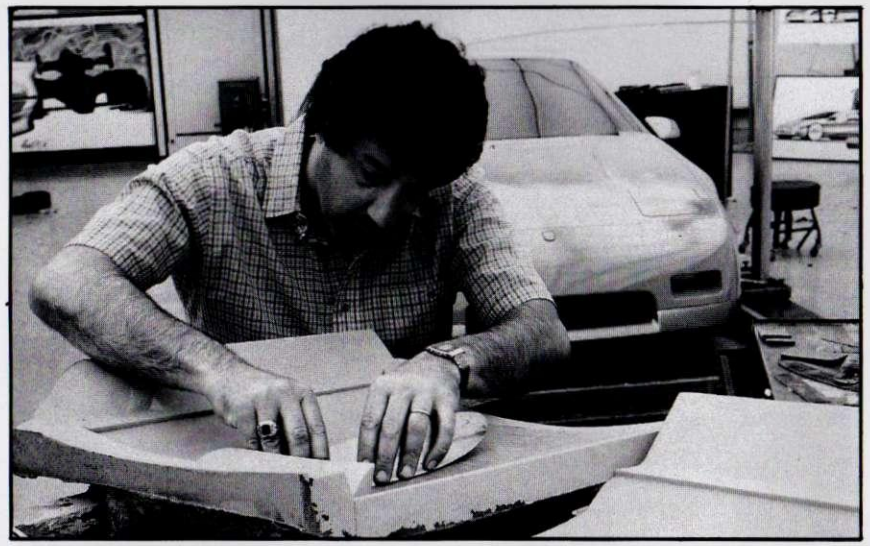
"My first line of duty with Pontiac," relates Scott, "was to attend that image conference, so I came into the studio full of an exciting new direction. In a matter of weeks, I was able to go to Phoenix and participate in a Pontiac management meeting with this car, to see it, drive it, feel it, taste it. It was at a point where I could throw in a lot of new, current refinement, and with the image conference and my direction from it in mind, we were able to re-address these surfaces. I didn't change the design *concept* to any significant degree, but I took the parts and pieces and plugged them into the new direction.

Proposal for Fiero's lift-off sunroof split it in two parts for easier removal and storage. Car's structure wouldn't allow a factory T-top.

"We remodeled the console. Our feeling was that it looked too square, too hard, and took up too much space. We tried to shrink it down as much as possible; we rounded and softened the edges. Then we took another giant step toward softening the surfaces on the i.p.—the cluster in particular. We did some steering-wheel work and a lot of button work on knobs and switches, putting in subtle refinements without changing the concept or direction. We knew there would be restraints in the plant and a certain amount of plant involvement in management decisions, so that affected the design and the build procedure."

Scott's crew soon scrapped a problematical Ferrari-type slotted shiftgate along with the proposed modular air-conditioner duct. "We've tried modular ducts in the past," says Scott, "because they seem to make a lot of sense. You could build them right in instead of having an extra part. The idea didn't work out this time, but someday we'll do it."

The mandated Camaro gauges yielded to a new set designed specifically for the Fiero. These were electrically driven, with the side effect of getting rid of bulky, potentially noisy cables. The podular forms allowed new pointers and white graphics that were to be lighted in red at night. A new rocker-type light switch, aircraft-look inner door handles, new radios and heater/air units were fresh designs already being developed for the Camaro, Firebird, and other GM cars, so they didn't add cost to the Fiero program.



Modeler Tony Campagna works on Fiero's side air intake (top), a last-minute addition. Irv Rybicki approved this final clay (bottom).

One major change at this point came in color philosophy. "In all the early stages of the P-Car program, the interior remained basically black with color accents in the seats," states Scott. To visually soften the interior and give a more spacious feeling (and also in deference to buyers in sunbelt climates), black got switched to gray or saddle tan, depending on the exterior color, with contrasting accents. Switches and knobs were also changed to gray. "The gray was developed as a way to give the interior a little more light and life," explains Scott. "This way you can see it in dimly lit environments, but without the glitter of chrome. That's really worked for us. Also, the gray makes the knobs look softer than they really are."

Seat design also came in for considerable attention. "We're really proud of the development that went into the seats," Scott continues. "We don't take total credit, though. They're Lear-Siegler seats, but Fisher Body was involved in the engineering development, and so was Pontiac. We were developing this new philosophy of contoured seats for Pontiac, and we wanted the ones in this car to be especially good.

"We did a lot of research with Recaros and others, and we had some constraints. For example, these were the narrowest seats we've ever done at GM. It was tough to design a narrow lateral-restraint seat that lets large as well as small people sit comfortably and still have access to the adjustments, safety belts, handbrake, etc. We think we ended up with a very good, comfortable seat."

Still another important design change came in the inner doors. Early development of the door had a horizontal pull strap. But when the Pontiac engineers and designers were out riding in the car, it became apparent that this wasn't the right way to go. The solution came in the form of a new integral armrest and door pull—a major improvement.

Scott's people added the optional fleece seat insert at this time. The fleece is cool in summer; warm in winter. Too, Jon B. Albert, a creative young designer in Scott's studio, conceived the winged stallion logo that became the Fiero's badge of honor. Why a horse? Because the P-Car's proposed name back then was *Pegasus*. More about that later.

Throughout the design process, throughout the long, frustrating periods of budget reviews, delays, re-reviews, and even rumored cancellations, no one at Design Staff ever lost faith in the program. "I've been around for a long time," admits Irv Rybicki, "and I can remember trying to develop 2-place cars for Pontiac over a 15-year span. It happened so many times, and we never got anywhere.

"But I thought, Well, if we can price this one around $9-10,000, I'm sure the kids will buy it.... So we went after this thing that had youth in it—movement and grace. And while it stood there as a pure-looking sports machine, Pontiac was selling it to the corporation as a commuter. They kept saying, This is our 2-place commuter, no competition for the Corvette. That's a sports car; *this* is a commuter! I'm not sure anybody downtown ever bought the word *commuter*, but they did see the possibility for volume at that time."

"When I got into the program," adds John Schinella, "it happened so fast that it looked like a flurry of clay and hands. And, as I've told some of the press, you can blame it on us if we made the car too sporty-looking. We made it sporty because we like sporty cars. The original concept was to do a little, inexpensive commuter car—not very aggressive; just a Plain Jane to plug a hole in the market. But we said, Let's make an athlete out of it!

"I think Pontiac liked the car better once they saw it evolve and take on more of the Pontiac look. But I remember the battles, because certain v.p.'s from the corporation didn't want the car at all. They'd come in for shows and be really negative and say things like, We don't need a car like this. It'll never sell.

"The big bonus was, though, that it was lightweight, with good fuel economy. It could be a commuter or a college kid's car or a good second car...even a third car. We felt that excitement *would* come back; that youth and having fun were never going to go away. Thank God we were looking down the road; looking to the future."

"There was a lot of desire to do this kind of car," concludes Bill Scott, "a lot of spirit at Pontiac and with our groups at Design Staff that wanted to make this car happen. Those [repeated delays] are always frustrating, but we persisted and finally prevailed." □

Engineering the Fiero

Chapter 3

Hulki's Heroes at Entech, June 1980: the entire workforce!

MID-ENGINE PROPOSALS, including those for several Corvettes, had a habit of getting shot down by the corporate moneybelts. Impractical and too expensive, they'd say, especially since mid-engine cars needed special transaxles and other custom-tailored components. But then along came GM's X-Cars, introduced in the spring of 1979 as 1980 models, and these had fwd drivetrains that could easily be shifted to the rear. Suddenly, the midship engine idea became a lot more feasible.

Before they decided to make it mid-engine, though, Pontiac considered doing the future Fiero along conventional lines. "For the first go-round," recalls Byron L. Warner, who was then a Pontiac assistant chief engineer and Hulki Aldikacti's immediate boss, "we went in and took a look at an all-new car; all the objectives. But we just couldn't justify the cost of setting up and tooling a brand-new car with all-new components. It would have cost close to $1 billion, designing it in steel the way we wanted it. And that billion was based on using an existing assembly facility, not an all-new plant.

"When the costs came back and were way too expensive...at that point Hulki started looking at other alternatives, such as cutting down a J-Car. Finally, though, he got the idea of taking the X-Car powertrain and sticking it in the rear, which fell right into line with the type of car we were trying to do."

Robert C. Stempel, Pontiac's general manager at the time, adds, "Hulki had this car on his mind for a long while. He's an engineer's engineer; a real tinkerer. The first cut we took on doing our own car, we couldn't afford it. But when the X-Car came along, all of a sudden we had a new set of toys. We could look at those components and begin to envision the X-Car drivetrain in the back of a car. That's when we said, Okay, we've got to be clever about this. We've got this

Hulki and others at Pontiac had to keep selling the program. Upper left shows him with sales manager Jim Vorhes; Bob Dorn (above, at left) demonstrates mockup to purchaser Alex Krenz and engineer Lefty West.

engine, and we can use these components from the X-Car...this rack-and-pinion steering and front suspension from the Chevette.... It can't be all that much to build!"

Assistant strategic planning manager Parky Parkinson brought valuable consumer research to the formulation process. "I had some past experience at the corporation," he relates, "doing research on a Chevette-based 2-place sports/-commuter program called the XP-850. We found from that research that a Ford EXP-type commuter wasn't what we ought to do. If we were going to do a 2-seater, we really wanted to execute a car along the lines of a sports car. We wanted to have sports-car cues and those things that people expect in a sports car: independent rear suspension, disc brakes, full instrumentation.

"Hulki was assigned to the program and started to explore different ways to put this thing together. That's when I began working with him on outlining objectives: performance, fuel economy, ride, handling; giving him some clues from the consumer standpoint. The concept I put together said that *mid engine* had some magic with certain owner groups, and things like plastic skins and 4-wheel disc brakes seemed to make sense."

This formulation period, Aldikacti explains, was when, "...everything fell into place. That included designing the concept on paper and making cardboard models. It turned out that 50 mpg was *the* salable number, so we figured out from that what the car's weight would have to be. They said, We don't have much money. We're not going to tool a new car, so what can you do? It was obvious that we had to concoct a car out of available components: existing engine, transaxle, suspension—the heavy tooling items."

Falardeau finished the package drawings just before Christmas 1978 and, as explained in Chapter 2, Aldikacti rushed them over to Ron Hill's advanced design studio at GM Design Staff. The next major step was a 3-dimensional appearance, a *design* that would embody what Pontiac had in mind and, more important, would be appealing enough to help convince corporate management to approve further development.

David P. Rand and John Q. Adams, two of Hill's top designers, went to work on the project shortly after 1 Jan. 1979 and, by February, had a complete series of sketches and full-sized drawings for management review. A month later, their most promising ideas stood ready in full-scale clay, and over the next three months, this model was refined and developed for a showing at the June corporate PPG (Product Policy Group) meeting. As outlined in Chapter 2, the car's interior had been taking shape simultaneously in John Shettler's advanced interior concepts studio.

Meanwhile, the formulation continued back at Pontiac Engineering. "We had three guys working on the drafting boards here with us," notes Falardeau, "and we had this front-drive C-Car program going at the same time, so it became pretty busy around here. Then, around Mar. 1979, we started getting the manufacturing people in and began mocking up." That's when Hulki's so-called stick model went together, complete with a real powertrain and suspension components. Designers Hanson and Nelson came over to build their interior proposal into it. The whole thing took just over a week to finish. Aldikacti showed it to then-Pontiac chief engineer Steve Malone, who decided to show it to Stempel, who got so excited about it he decided to show it to GM president Estes. It was *that* impressive!

At this point, Aldikacti and Falardeau had the collective brainstorm that would eventually make the Fiero important beyond even their most optimistic expectation; beyond anyone's expectation at the time. What made (and makes) the Fiero so significant to General Motors wasn't so much the car itself as its assembly process (see Chapter 4). We can see now that the Fiero spawned a revolution in auto production, and that revolution took the form of the vehicle's steel space frame—an inner "car" covered with plastic outer skins. It's a concept you'll see more and more in future automobiles.

"The space frame came about for a number of different reasons," Hulki points out. "One, if you look at the cost of producing a car and understand the process, you find that the most expensive parts come from the bodyshop and the paint shop. You say, Hey, wait a minute; we can't afford that. We'll have to find another way. Two, it became obvious that in such a small car, occupant safety was going to be critical. We had to make the structure very strong and sound. That led to the idea of making the structure independent of the body surfaces. We sat down and sketched a force diagram, and when we put structural members between two forces everywhere they were needed, it looked just like a space frame."

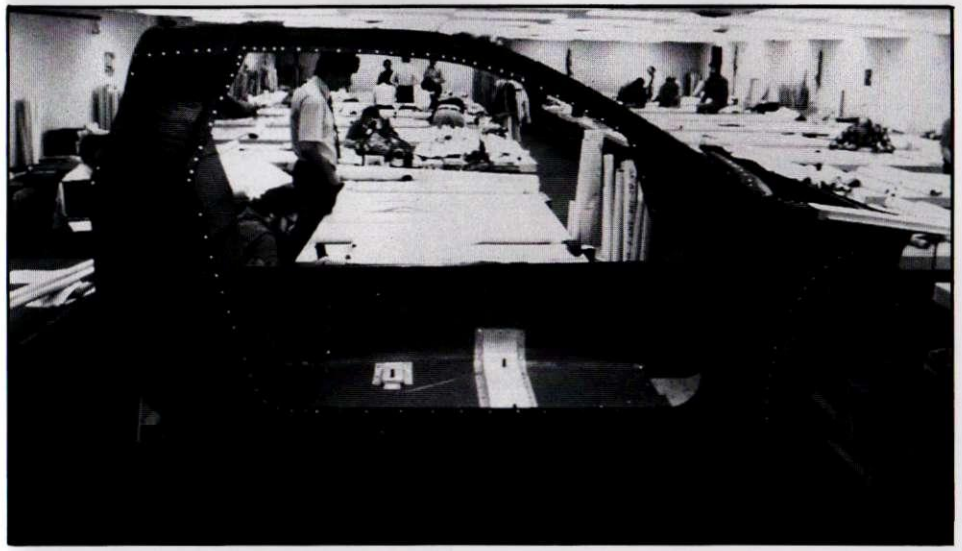
In other words, the exterior body would be made of plastic skins that bolted to the steel space-frame skeleton, an idea similar to today's race-car chassis/-rollcage. Unlike most modern unitized cars, whose metal outer skins are load-bearing and welded to an integral structural body/frame, these plastic skins would add no strength, carry no forces, and would be easily replaceable with simple handtools.

"Once we figured that out," continues Hulki, "we suddenly realized that the assembly process could be completely different. The idea grew in our minds that we could take all the mechanical parts of the car—the functional parts—and make them independent of the styling.

The formulation process also involves powertrain, and for help with that Hulki recruited Pontiac's then-assistant chief engineer for powertrain, John J. (Jay) Wetzel. As Jay remembers it, "The champion of advanced engineering, Hulki, came into my office. He said he was finishing the F-Car and was going to take a shot at a neat, 2-passenger, sporty, fuel-efficient vehicle. He had a package and concept development underway, and what would we think of that in terms of chassis, powertrain, and general concept? Well, that's an offer that any engineer could hardly refuse!

"We weren't sure at that point whether it was to be mid-engine or front-wheel drive; probably fwd because *everything* was going that way then, and it made a lot of sense to build this car off one of those new platforms. But as it developed, it became obvious that to get the aero shape, the cuteness and sportiness, the powertrain would have to go in the middle. Of course, that opened the door even wider to those of us who were waiting to add more muscle to the car once it had proved itself."

After several preliminary presentations of exterior models, interior bucks, and



Early scale model of P-Car's steel space frame begins to take shape inside the Entech complex in Troy, Mich.

Construction of Aldikacti's first running mid-engine prototype took only five months at Milford Fabricating Co. in Detroit.

packaging models to Estes and other corporate managers, Bob Stempel went to the June PPG seeking an okay to build a running prototype. "You really don't get an approval at General Motors," explains Stempel with a chuckle. "What we were looking for was to avoid a big *no*." And in that, he succeeded.

But America got bogged down in its second major fuel crisis that year. Car sales dropped, development money dried up, and it soon became apparent that there'd be no corporate funding for Pontiac's projected 2-seater. Estes encouraged Hulki to pursue the program anyway and told him to find the money in his own engineering budget.

Aldikacti and Falardeau finally handed off their fwd C-Car program to a corporate project center (they'd already finished the F-Car package) and began to devote full time to the 2-seater. "Pontiac Engineering didn't have enough space," Hulki relates, "so they told me, Why don't you go out and find yourself a place somewhere else? I said, Great!"

He went 12 miles southeast to Troy, Mich., and a company named Entech—a small, independent engineering/drafting agency that worked like Kelly Girl Services, only in engineering. Next to Entech was Models and Tools, Inc., which specializes in wood modeling and die models. And next to that stood a parts fabrication shop called Fab All. Aldikacti moved into Entech in July, contracting with Models and Tools and reserving floorspace and toolmaking time at Milford Fabricating Co., a Detroit prototype shop that had been doing work for Pontiac for 20 years.

This off-campus transfer would turn out to be a classic good move. Not only was there a wellspring of engineering, modeling, toolmaking, and fabricating talent out there just waiting to be tapped, but it also put 12 miles between the Fiero team and Pontiac Engineering. The effect was to provide unusual creative freedom and also to isolate and insulate the program from detractors and "helpers" alike. The team began to grow as Aldikacti brought in another Pontiac engineer named Harry Redding plus selected experts from Pontiac Car Assembly (James G. Bouck), Manufacturing (Troy A. Clarke), Reliability (Greg P. Kennedy), and Service Engineering (Fredrick H. [Ted] Perkins).

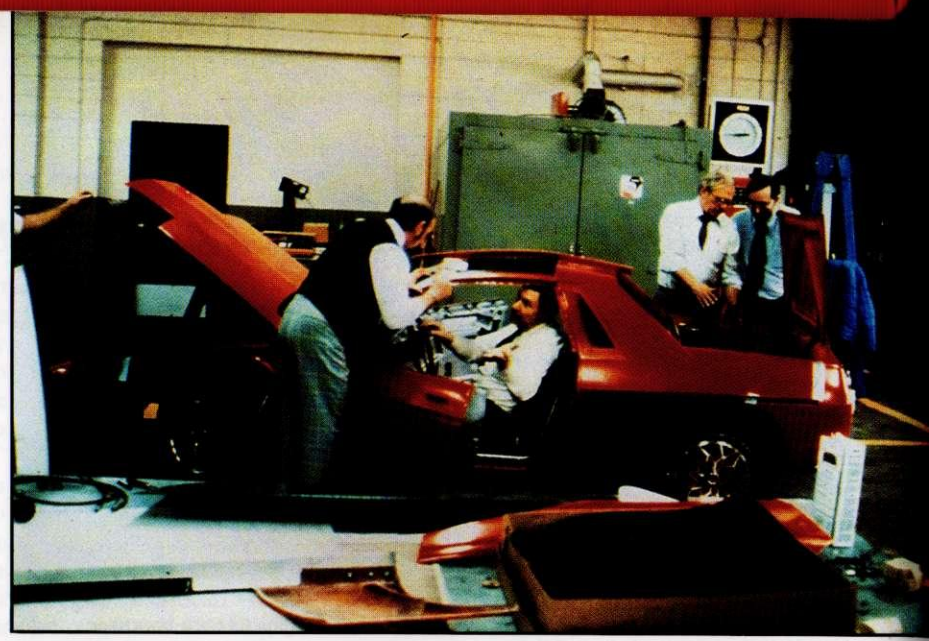
This, too, became a major innovation. "Those disciplines typically never got represented this early in a car program," Bouck explains. "What would normally happen was...they would finish the design, throw it over the fence, and say, Now go build it! Or go make it serviceable. At that time, it was only Hulki, two engineers, and about 23 designer/draftsmen working on the P-Car. We were all part-time at first, but we quickly went full-time on the project."

Hulki had been determined from the very beginning to build a demonstration vehicle, both to explore these new construction and assembly ideas *and* to have a slick running prototype that he could show around. "One thing that became obvious to us," explains Aldikacti, "was that the only way to go out and sell this project was not to write down a bunch of numbers and sketches and go to the PPG with just those. We had to bring a real car in and let them touch it, kick it, get in it, drive it."

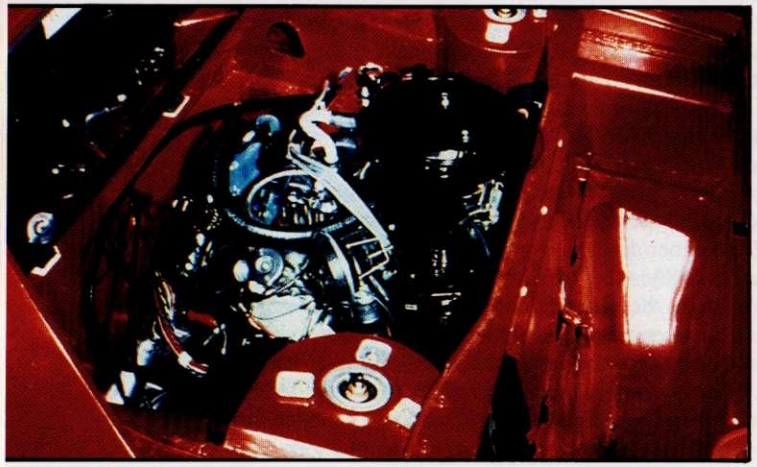
Exterior dimensions and surfaces from Ron Hill's clay model became available around mid-October. Then, in exactly five months—on 10 Mar. 1980—the first prototype stood ready. "It was remarkable to do that with just a skeleton crew," Falardeau remarks. "And it wasn't a b.s. car. It was real!"

"The prototype represented something we had no shame in showing to corporate management," echoes Tom Kalush, who worked on the program under O'Donnell as Strategic Planning's senior project engineer and would later join the team full-time as administrative assistant.

"Those guys worked seven days a week, around the clock, to get that job

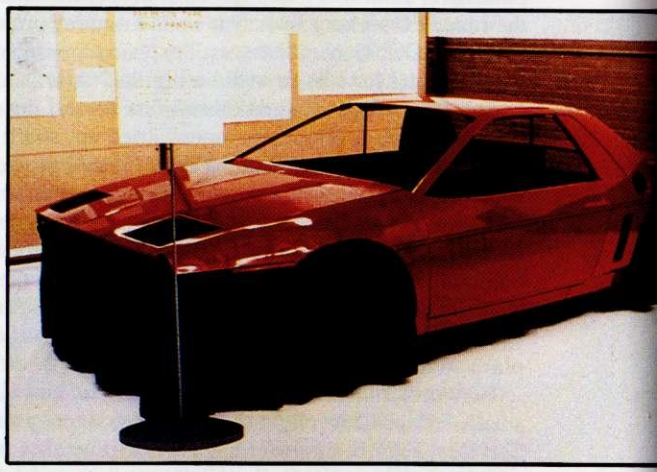


First pre-prototype, painted bright red, had fiberglass body with rear-hinged decklid. Photo at right shows Harry Redding in car, Ed Falardeau and Joe Dunn behind it.



Red pre-proto used 2.5-liter Four and fwd transaxle from GM's X-Car, same as production.

Pre-prototype's deep, uncluttered front trunk would get filled with mechanical necessities.



Fiberglass outer skins predated their plastic counterparts for pre-review purposes.

done," emphasizes Byron Warner. "We had a big party down at Entech the day the running car was finished, and I remember the first time we started showing it around. We headed over to the Tech Center on a nice, warm spring day. The P-Car was tied in with some other show, but we had the Design Staff guys over, and they had a chance to ride in it for the first time. What a kick!"

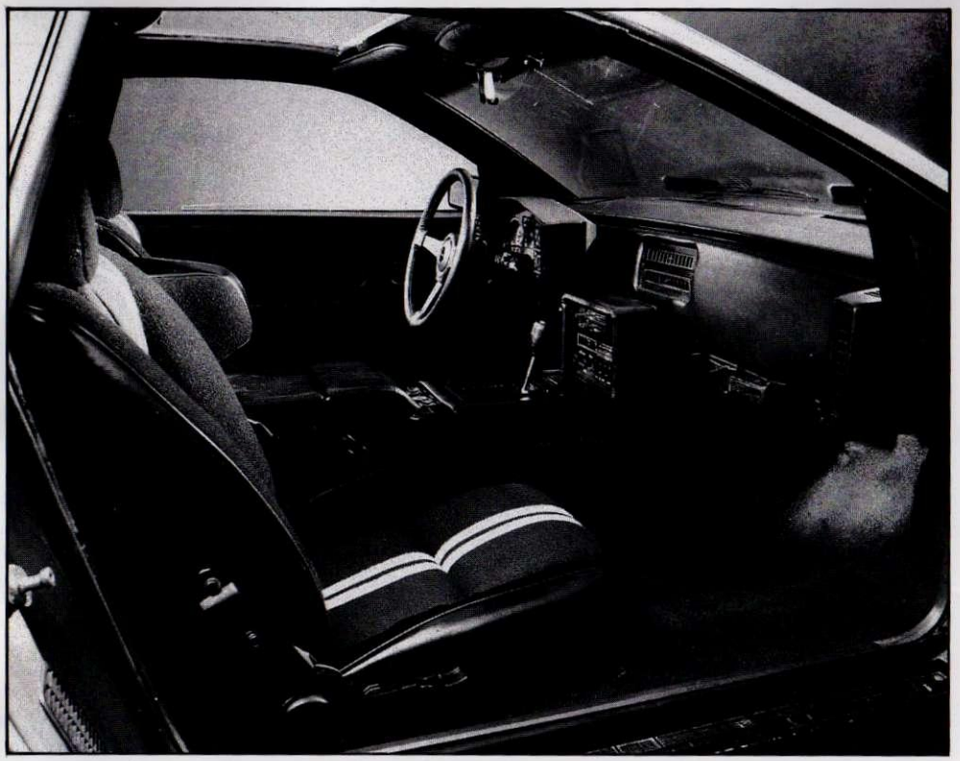
Also present that day was GM executive vice president F. James McDonald, who then had responsibility for all car, truck, and several component operations. Within a year, he would replace Estes as GM president. As Aldikacti tells it, "McDonald came over, looked at the car, and he said, Where did you get this? Did you import this car? He thought we'd gotten it in Europe. We said, No, this

This is how the red car appeared when Hulki drove it around the GM Technical Center and showed it off to Design Staff on 10 Mar. 1980. Although dozens of minor styling details remained to be resolved, the interior and overall shape looked very much like the eventual Fiero.

is a prototype. It's what we're planning to propose and build."

O'Donnell, who'd moved to Operational Planning under new planning manager John G. Middlebrook, was at GM's Milford proving ground when Stempel drove that first car. "Talk about proud parents," says O'Donnell. "Here's this little red car with two seats. They show it to Stempel, and it's another of those deals where he's just beaming. He jumps in and goes for a ride; then he comes back saying, This is outstanding! We've got to make this happen!"

Stempel himself remembers it this way. "Right from the start, there was a goodness about that car. It wasn't perfect—the ride wasn't balanced, the shocks weren't right. But it went down the road okay, directional stability was good, it wasn't roly-poly, didn't bound all over the road. Sometimes you put a car together and feel like, Oh boy, there's something screwed up here, and you've got your hands full from day one. But this car came out of the chute with a sense that, if we turn the guys loose on it, get some isolation and get the ride down,



Red pre-prototype's interior used seats and gauges from other GM cars, but essential flavor of the eventual production cockpit shone through.

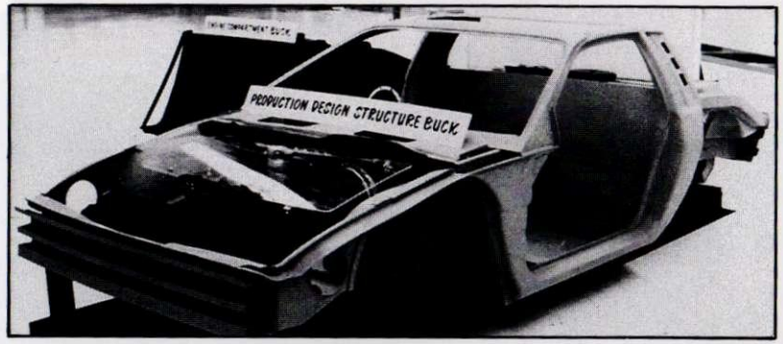
we've got an automobile. It felt like a good car, and it just got better from there on."

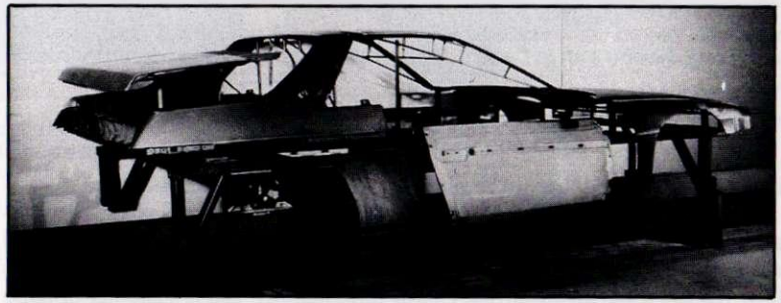
The next major hurdle was going from one no-budget prototype to a fully sanctioned, funded corporate program. GM calls that big jump *concept approval,* and it's not granted lightly. It normally takes months of preparation, shows, and presentations both within the division and to key corporate executives to win their support. Besides their research and market-development duties, their input into the formulation and development processes, working out the costs and how and where to build a new car, the winning-over process became one key responsibility of the divisional product planners, now headed by a very enthusiastic John Middlebrook.

"I got that planning job in January," notes Middlebrook, "and I recall we spent three or four months getting the presentation ready. I remember taking it to all the various parts of GM to get pre-approvals from the people who sat on the PPG—the executive committee and their underlings—so we had some gathering of strength.

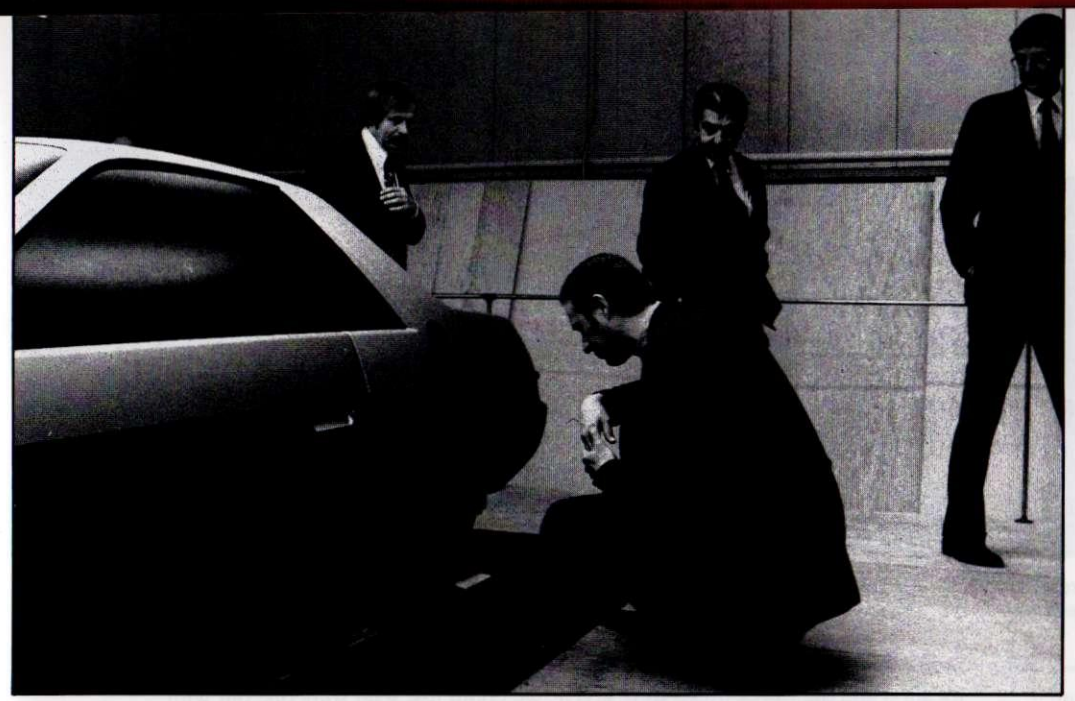
"Of course, we'd been taking that first red car around and showing it to people already. I remember having McDonald out to the proving ground and giving him

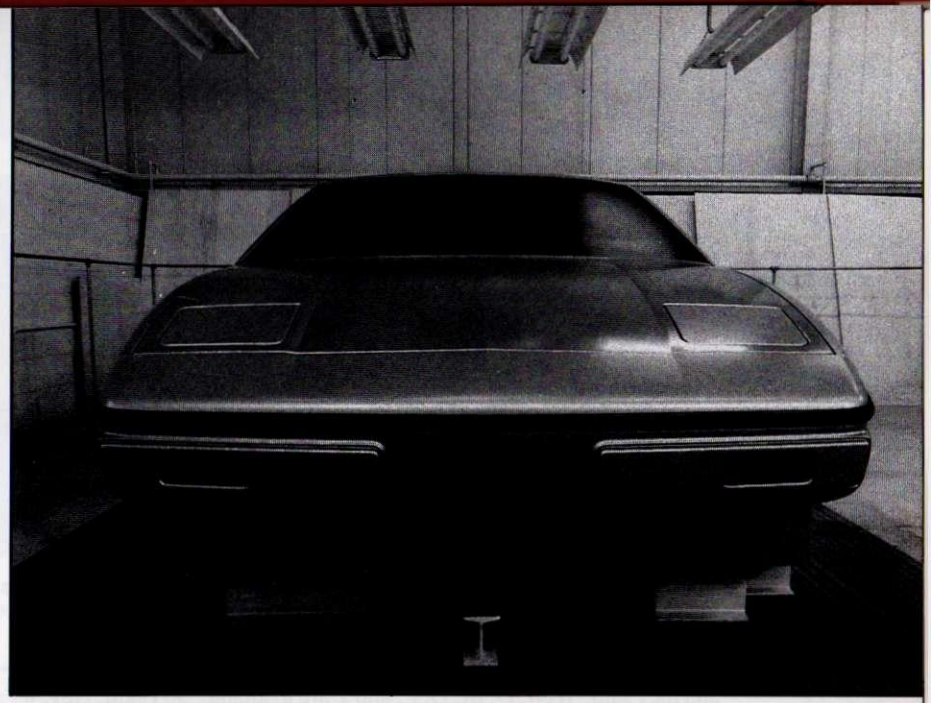
In Aug. 1979, Ron Hill (left) and Ed Falardeau (right) took a scale P-Car model to Cal Tech's windtunnel, where they worked with Dr. William Betts.





Refinement to space frame (top) continued as mill-and-drill machine evolved, and a prototype paint fixture was designed in the P-Car build center.





Wooden P-Car mockup comes under the scrutiny of (l-r) Pontiac's Wes Zaydel, Bob Dorn, Hulki Aldikacti, and Bill Hoglund. "Cubing viewing day" in Dec. 1980 allowed designers and managers to check exterior surfaces before cutting steel tools to make molds for the plastic skins.

a pitch and driving the prototype on the track for the first time. The feeling of sitting that low and not seeing anything in front of you.... I remember seeing Stempel [who's a big, bulky man and about 6-foot-4] wrap himself into the seat out there for his first run. Yet the car had enough legroom for him; he was impressed once he got in."

Of course, Stempel and most of his staff believed in this car and wanted it badly. But Pontiac wasn't faring well in the energy-conscious marketplace of 1979-80 and needed *something* it could sell as both exciting *and* fuel-efficient. "Think back to that time," suggests Stempel. "Fuel was going up in price, availability was in question. We were convinced that the idea of a good-looking, economical car was right; that most people—even if gas got really short—didn't want to give up appearance and excitement in their automobiles.

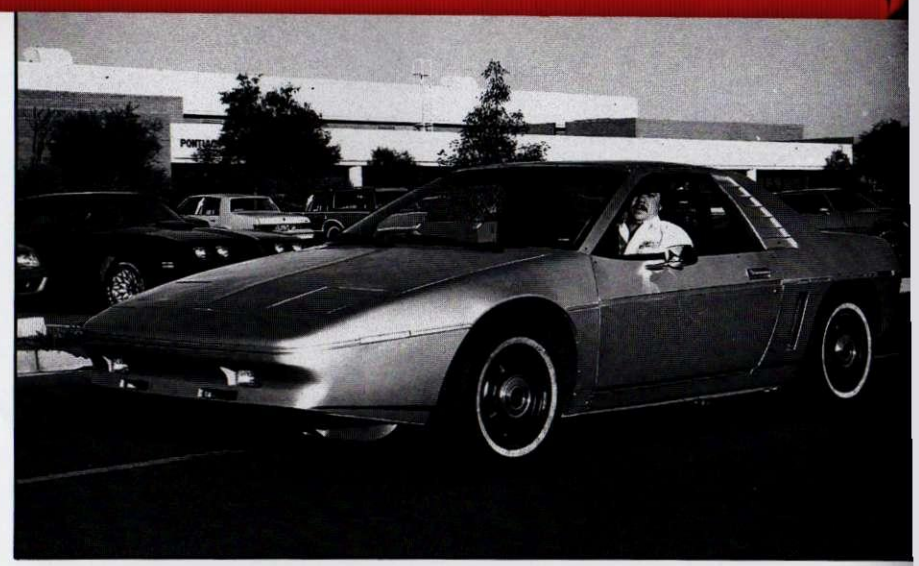
"The mood of the country said, *More miles per gallon!* I was getting letters from Pontiac owners that said: I've taken four pistons out of my Bonneville V-8 and am getting so-and-so many mpg. It was crazy! I'm sitting there at Pontiac with full-sized Bonnevilles, Grand Prix, Firebird Trans Am's, and so on. It was really apparent to the division that we needed flexibility to move with the market. We needed fuel-efficient vehicles when that was high on people's want lists, but we knew it wouldn't last. It would cycle again. What goes up comes down."

But getting the P-Car-to-be past the corporate nay-sayers might be a major chore. "It was common knowledge that 2-seaters really weren't popular," Stempel continues. "All the market studies showed us they wouldn't sell. Look what happened to MG and Triumph. Even the Corvette was moving up in price because it got so expensive to build in low volume. You'd propose a new 2-seater, and you'd get beaten down: No market; it'll never grow; the car won't pay for itself; we don't need another one."

Surprisingly, though—largely because Pontiac promised that magic 50-mpg EPA figure, but partly, too, because the P-Car did represent a potentially valuable exercise in new-tech design and production—approval came more easily than anticipated. "Stempel and I took the presentation into the PPG in Apr. 1980," Middlebrook notes. "This was to get concept approval for the program. We went in and sold it, basically, as an economy commuter car. Performance wasn't a good word to use at the time. I remember that because Stempel had me make up a big fuel-economy label with *50 MPG* emblazoned on it. He kind of kicked the meeting off by saying, 'Gentlemen, we have a car here that's going to give us this kind of label. Take it away, John!' So I got up and went through our smooth, polished slide presentation. We got done and answered a few questions—one about seatbelts, and then somebody asked about composite body panels. We answered those and got a kind of, Okay, what's next? So off we ran."

One of the first things Parky Parkinson, who'd moved up to the strategic planning slot to replace O'Donnell, had to do following concept approval was to pick a corporate code letter. "We went over to Fisher Body," he smiles,

Sneak photographers caught these early prototypes in various locations around the country. Outwardly identical to Hulki's first red pre-prototype, the darker vehicle



carried Subaru nameplates to confuse the curious. Many people identified the unmarked P-Car as an import.

"and they said, Well, D, M, Q, P, and Z are available. So I said, Hey, let's call it the P-Car: P for Pontiac and P for Parky!"

Pontiac chief engineer Steve Malone retired earlier that same month. In his place came a bright young product man and former sports-car racer named Robert L. (Bob) Dorn, former assistant chief engineer at Cadillac. And one of Dorn's first major Pontiac decisions, he now admits, almost resulted in a big mistake.

"When the car got approved," he recounts, "there was some discussion among my assistant chiefs and me as to whether Hulki should continue heading up the program or whether we should find a new vehicle chief engineer. Hulki doesn't do things by the book; that's not his style. He'd only done advanced kinds of things, and we weren't sure he could easily chase this project all the way into production. But by that time, he was more than emotionally tied to the car and, fortunately for us, we decided to let him carry it on. But we knew we'd have to protect him, because otherwise the system would eat him up.

"We also discussed whether to bring the P-Car in-house and move other programs that we were doing, like the F-Cars or A-Cars, outside to contract houses. Hulki convinced us that there was much more freedom outside, and that's where he wanted to keep the Fiero. So that's when we decided to run the program from Entech and expanded our capability there."

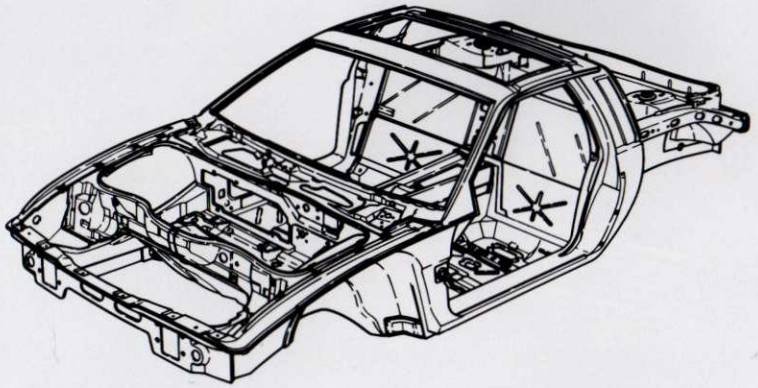
GM's Fisher Body Div. got heavily involved at that point because of the program's unusual nature. Hulki's Heroes soon swelled from 26 to 96 people and turned into Aldikacti's Army. Bob Dorn and Jay Wetzel were instrumental in keeping even well-meaning people off Hulki's back and out of his way. "Without Dorn's support," Hulki later told *Intrapreneuring* author Gifford Pinchot III from Harper and Row, "the bureaucracy would have eaten us alive. By the book, ordering a pencil can take three weeks. Every clerk has rules to follow. But I didn't have to live within the system. Because of our separate location and the freedom we were given, we could just send someone out with petty cash."

Stempel, himself a gifted engineer with strong product knowledge and experience, insisted above all that the car had to have safe handling. This would be GM's first mid-engine production automobile, and Stempel didn't want a repeat of Chevrolet's woes with the rear-engine Corvair. "When we went to the mid engine," he explains, "we could almost list the things we were going to have to resolve.... Just because we put the engine in a different place, we couldn't go out and have a completely different-behaving car.

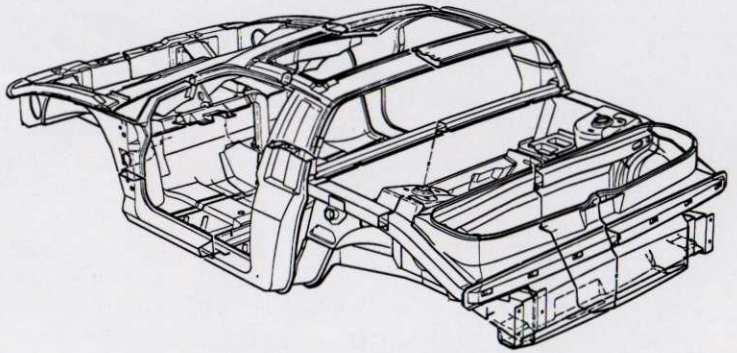
"We were breaking new ground for a company as large as ours, and there were lots of things this car had to prove in the marketplace. We did considerable work putting higher-powered engines into early prototypes to make sure where the car was, but coming out with the Four *first* established the Fiero as pretty docile. Some people said at the time that we were too conservative; that the car was underpowered. But I feel very strongly that that was the right thing to do.... The Fiero got a good reputation right off, which is important."

Admits Jay Wetzel: "The first-year car had to compromise ultimate performance for fuel economy. Then, late in the program, we had to gear it up a bit to get a little more performance at the expense of some economy. Wherever the balance was, it had to be done with a 4-cylinder engine. Those were our marching orders."

Original plans called for an even smaller engine than finally appeared. Pontiac's first specs included a base 1.8-liter Four for the best possible fuel economy. The faithful 2.5-liter Four, straight from the X-Car, would have been an option under that plan. But as development money tightened and mpg pressures eased somewhat, Pontiac dropped the 1.8 and made the 2.5 standard and the only engine available at intro. The Chevy-built, 2.8-liter V-6 came along, of course, as a second-year option.



For 1984, production Fiero's space frame consisted of 273 steel stampings welded together.



Hefty "basket handle" B-pillar above passenger compartment doubles as integral rollover bar.

Mid-engine handling concerns were addressed first by intentionally slow steering response and lots of built-in understeer. Then later, when there was more time, the engineers added suspension refinement. The Chevette's rack-and-pinion front suspension was selected not only because it was inexpensive and available but also because, relieved of engine weight, it was plenty strong for the job. And its SLA (short/long-arm) configuration, with shocks relocated from the upper to the lower arms, gave better geometry and permitted a lower hood than would struts.

Power assist for the Fiero's steering wasn't initially provided, first because it was deemed unnecessary in a mid-engine car with not much weight up front; second, because there was simply no space to package the pump and route the hydraulic lines forward. There's long been talk, however, that GM's Saginaw Steering Gear Div. might develop a new type of *electric* power steering for the 1988 Fiero.

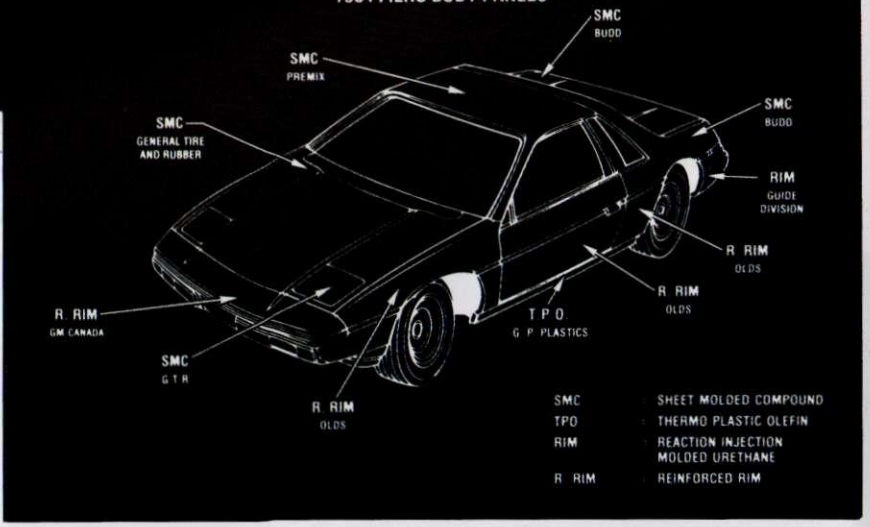
Along with the powertrain, the X-Car's MacPherson-strut front suspension moved fairly intact to the rear, where what used to be steering knuckles were

During production, space frame and powertrain become a driveable chassis, which needs no conveyor during the last part of its assembly process.

Prototype testing included running over manmade ridges to see if car would ingest dirt. Unpainted black body panels came straight from the mold.

Fiero uses different types of plastic, each suited to a specific purpose. Together they go by the name Enduraflex.

1984 FIERO BODY PANELS

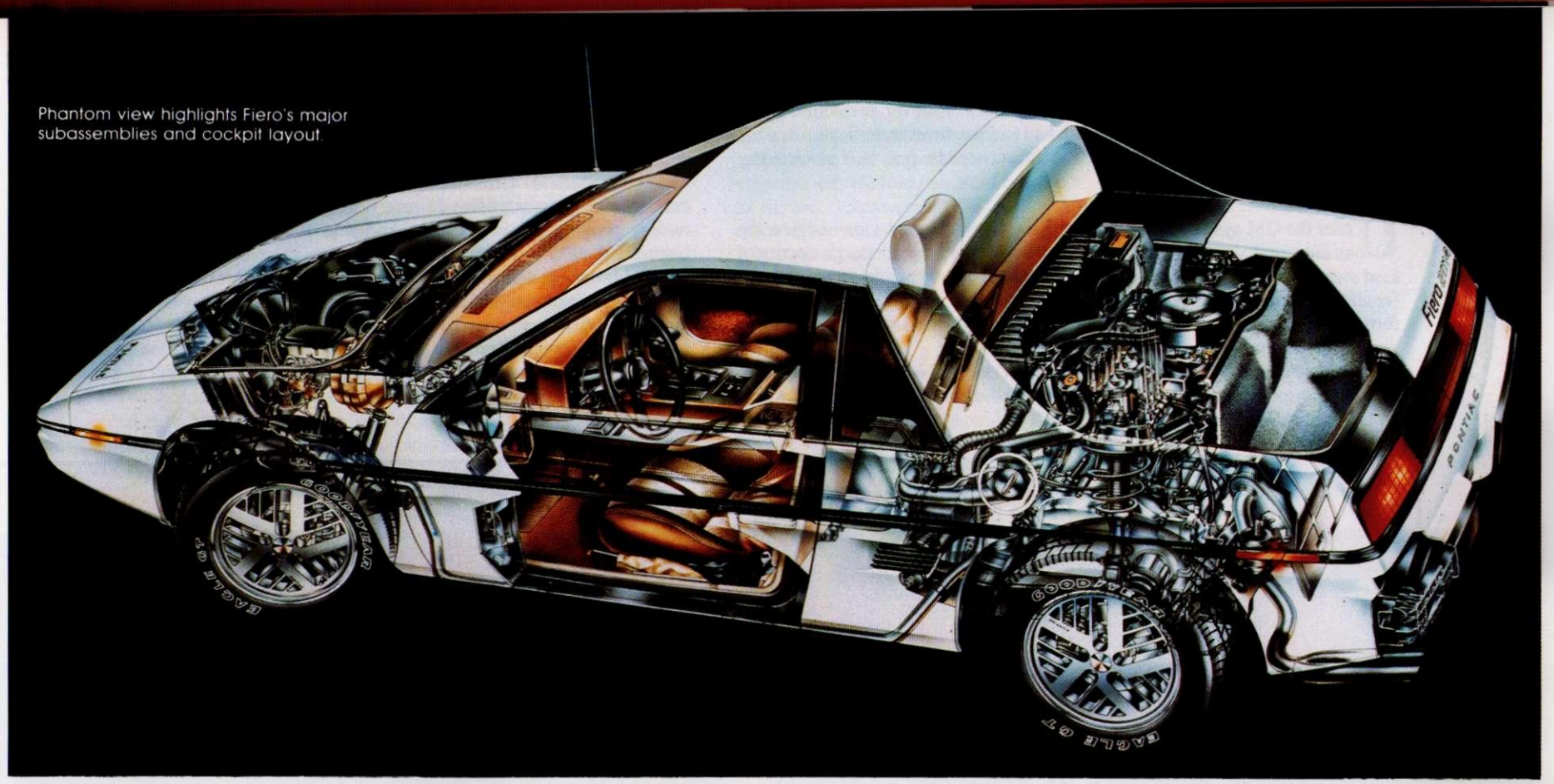


secured by a pair of adjustable lateral links. This provided an inexpensive independent rear suspension, complete with disc brakes plus easy toe and camber adjustments. The engine cradle and a few other parts eventually had to be modified from the original X-Car pieces, but the only major problem turned out to be—as Stempel foresaw—making a parking brake and routing its cable. This brake was ultimately provided by a mechanical screw behind each hydraulic piston that moves forward to clamp the disc when you pull the lever. Even so, the lever ended up to the left of the driver's seat instead of on the console, because the cable wouldn't go through the tunnel and under the engine to the calipers.

A lot of things *were* routed through the tunnel, however, even though it was already pretty full with the 10.2-gallon fuel tank. Among them were the throttle and shift linkages plus both heater and air-conditioning pipes. Designing the linkages, says Wetzel, was very educational. "When you loop them around and all the way back through the body to the engine compartment, then loop them around again.... We learned a lot about cable engineering." A hydraulic clutch system was used from the beginning, he adds, "...to eliminate the complexity of mechanical linkage."

Also "interesting," as Wetzel puts it, was fitting air-conditioning up front with the compressor around back, "...and getting those pipes on the underbody up where they had to come through." The cooling system, with its angled radiator in the nose and long pipes connecting it to the engine, presented another packaging challenge. Even figuring out a convenient way to fill the cooling system was tough. "For a while there," says Jay, "we thought maybe we didn't need a radiator at all. We considered just running a tube with fins on it all the way up from the engine compartment to the front cradle and back. But we soon found out that wasn't a possibility."

Heat rejection from the engine compartment proved another ticklish topic, as



Phantom view highlights Fiero's major subassemblies and cockpit layout.

validation engineer Peter Lupescu discovered on one of his many over-the-road test trips. He was carrying out a routine test, towing a heavy trailer up the long, grueling Baker Hill grade on I-10, 70 miles west of Las Vegas, on a 105-degree day. The idea was to see if the engine would overheat.

"Our initial throttle cable routing was too close to the exhaust manifold," he relates. "The sheathing around the cable kind of melted and took a set. The throttle wouldn't work. So we took a piece of wire, rigged it to the auxiliary throttle on the cruise control, pulled it out through the vent and into the window, and operated it by hand to get back to Vegas. If they'd caught us, I think they'd have thrown us in jail. But I didn't know what else to do."

Another glitch surfaced when dust got sucked into the engine proper. Early prototypes took air into the engine compartment and simply let the engine draw it in through a conventional aircleaner. With all that dust, though, the aircleaner would get filthy in no time. The solution, added late in the program, was the single horizontal vent on the driver's rear quarter panel.

Wetzel also oversaw considerable engine and transaxle revision to make sure the Fiero outperformed its organ-donor parent, the X-Car. "We worked on the valving; brought in swirl-port combustion for better mixing and more complete burning. We also raised the Fiero's rev limit by 500 rpm to put a little more fun into driving the car. And we went through a program where the transmissions were narrowly selected, because this automobile is less tolerant than a fwd car. We set tighter standards, narrowed the specs so we would get the best out of the general population of those transmissions. Then there was a lot of work done on that transmission for all its applications."

Starting with a full-sized occupant dummy called Oscar, the Fiero engineering team designed the racer-like space frame around two of them to ensure ample interior room. Adding the necessary components fore and aft fixed the 93.4-inch wheelbase. Falardeau is especially proud of the job he and Hulki did, along with Bob Garofalo, on the Fiero's structure in general and crash safety in particular. "Garf," says Tom Kalush, "is a bright young structural engineer and the man mainly responsible for the Fiero's good crashworthiness."

The car has tremendous resistance to side impact, Falardeau amplifies, because of the cross-car structure at the firewall, the torque box behind the seats, and the side door beams between them. There's a hefty rollbar in addition to fore-aft roof rails. The roof structure rules out a T-top and a convertible version

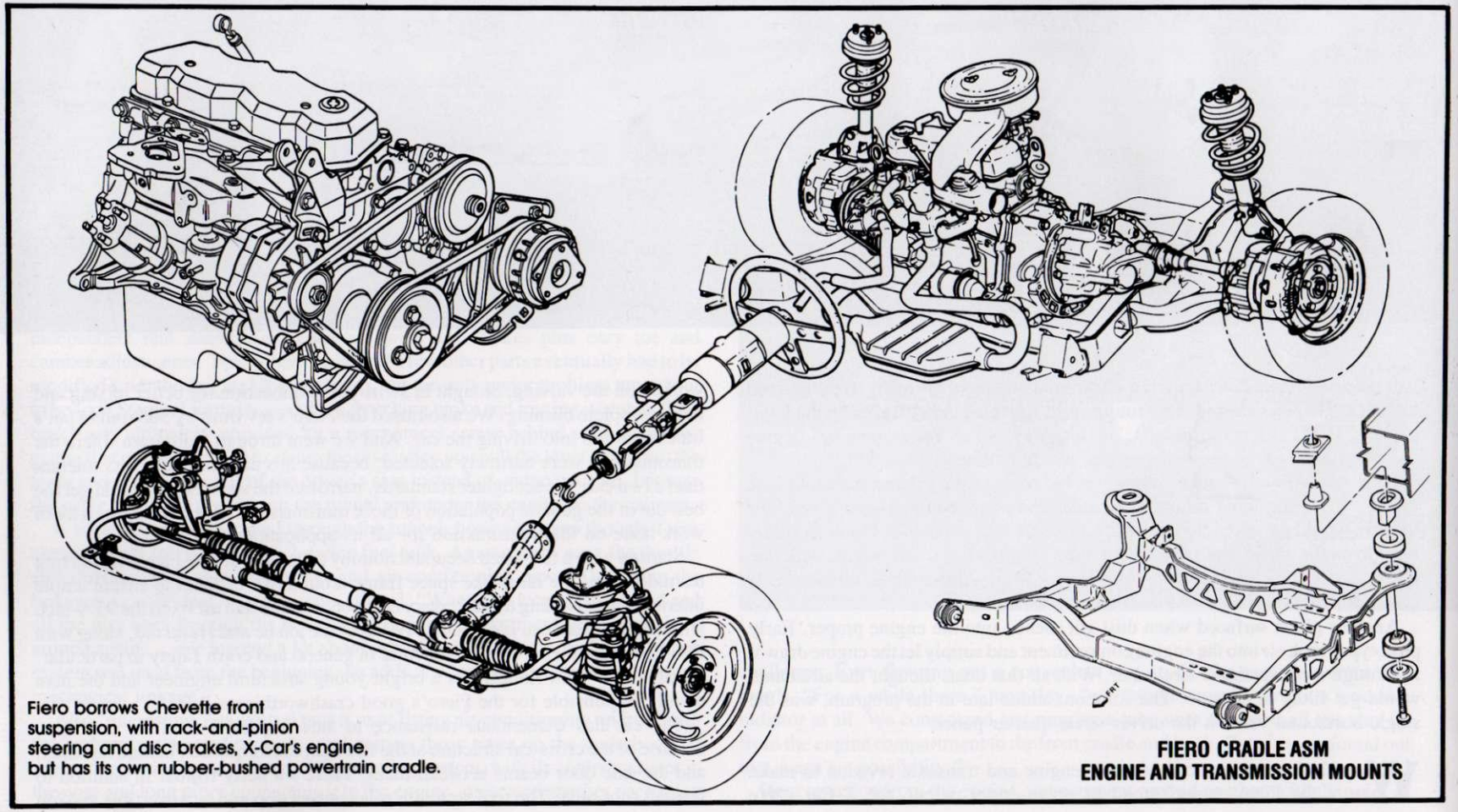
for the moment (as of 1987), but it gives excellent rollover protection and a lighter structure than if that same strength had to come from underneath. And the console-mounted fuel tank also rests in the safest possible spot, well protected by the central tunnel.

Under the GM system of that time, having one division design and develop an entire car was very unusual. Normal procedure was to assign a series of *lead divisions*, one to oversee the development of front suspensions and steering for all GM cars, another to do all the rear suspensions and axles, and so on and so forth. All these lead divisions normally would pitch in to do their respective work on a new car like the Fiero.

Dorn mentions that, "Mr. Kehrl [Howard H., then GM vice chairman] had a strong feeling for using the expertise of the lead divisions. So we got the lead divisions to look over the Fiero's design. We invited them in like consultants to see if they had any suggestions. It turned out there were quite a few people willing to help, even though they weren't directly responsible for anything."

Another method of finding and correcting potentional problems before production was by an extensive on-road testing program. This came in addition to routine proving grounds testing and was run by validation engineer Pete Lupescu.

"We'd never done a mid-engine car before," says Dorn, "so we bought a few Fiat Xl/9's to examine and do some development with. But we really had to take the Fiero and run it all over the country to find out its idiosyncracies. Pete and his people took a few cars up north to drive them on ice and snow; took them out into the desert; drove them as far as they could over as many different kinds of roads and weather conditions as they could find. That turned out to be a really good



Fiero borrows Chevette front suspension, with rack-and-pinion steering and disc brakes, X-Car's engine, but has its own rubber-bushed powertrain cradle.

FIERO CRADLE ASM
ENGINE AND TRANSMISSION MOUNTS

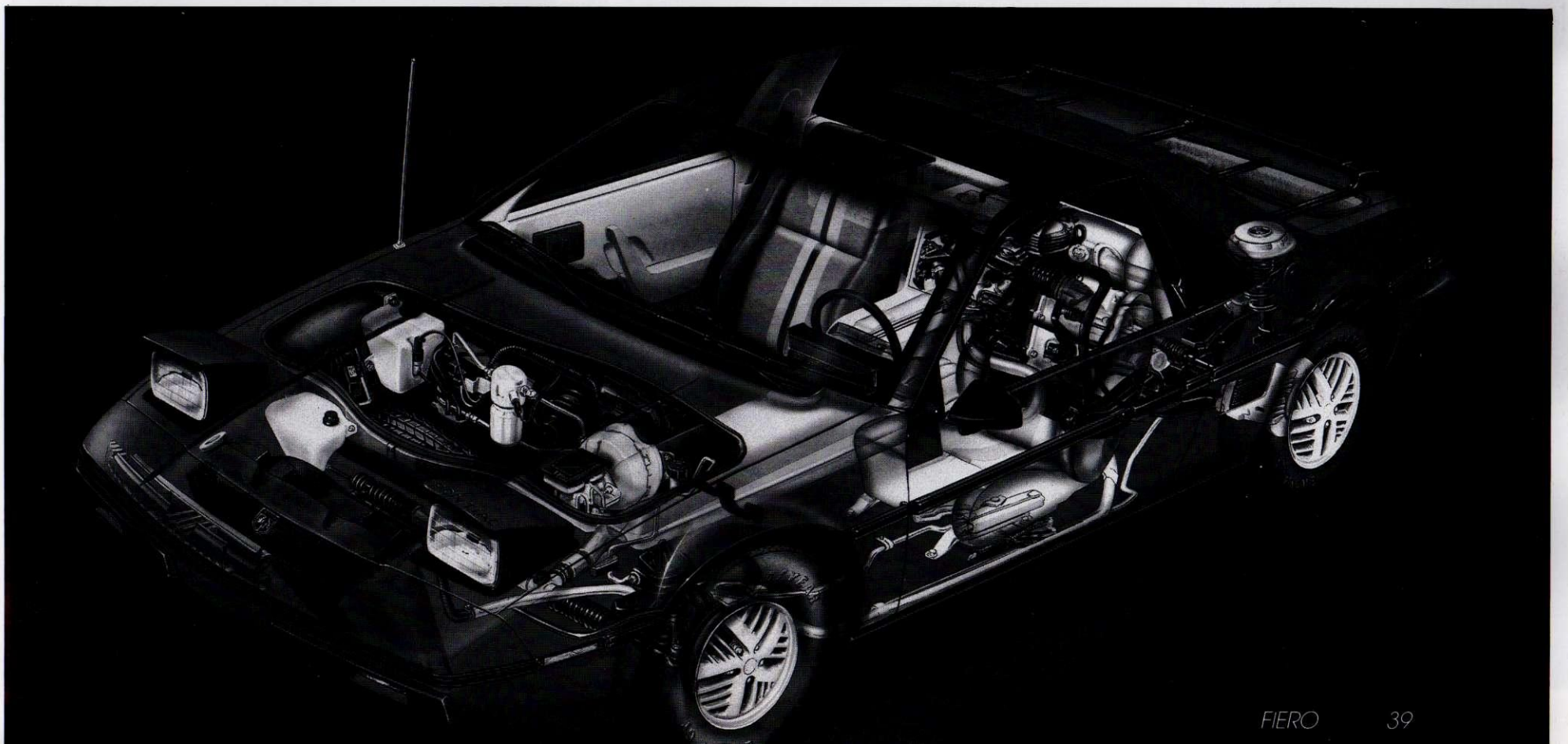
move on our part, because we found some basic problems that, had we not done it, might have ended up in our customers' hands: dirt ingestion into the aircleaner, for example, and some other things I can't mention."

Lupescu adds that he took the cars on the road as early as late 1981. These were very close to the final Fiero in appearance. They were totally unbadged and all in black, because that's the way the plastic came out of the prototype molds. "We had some fun with guys at gas stations," Pete reminisces. "We'd ask them to guess what these cars were. It was amazing how few times they even guessed GM. They'd mostly say foreign, and I suppose the highest compliment was Lotus. There were a lot of Porsche guesses and a Ferrari or two. Some just said European or Italian."

One amusing problem that Dorn ran into was fit: his own. "When Hulki sat me down in his first prototype one day down at the Arizona proving ground, I didn't fit. I said, Hulki, you've committed one of the cardinal sins; the car doesn't fit the chief engineer. My head was touching the ceiling, and my knees were on those pods on either side of the instrument cluster. This didn't make sense to me, because we had the same headroom by design as the Firebird, and I never had any trouble with the Firebird. Hulki was, of course, very embarrassed. He told me, But I laid it out so you *would* fit! This car's supposed to fit you. I answered, That's nice, Hulki, but it doesn't." Bob Dorn, incidentally, stands about 6-6.

It turned out that the prototype seat was mounted very high and too far forward. "After that," continues Dorn, "I think Hulki reduced the steering-wheel offset, moved the seat back as far as he could, and even had to thin up the seat, which put him into a seat redesign program he hadn't anticipated."

But of all the Fiero's problems, the biggest would come a little later: sagging auto sales during final development, a deep recession, and GM's first red-ink year in modern history. As the bean counters struggled to squeeze budgets and pinch pennies, the Fiero would be delayed, delayed again, and even—just as Pontiac's new general manager, Bill Hoglund, came aboard—effectively cancelled. As we'll see in Chapter 5. □



Chapter 4

Manufacturing

THE LIGHT FLASHED GREEN in June 1979, when GM president Pete Estes told Bob Stempel to go ahead: build a running prototype of Pontiac's proposed 2-seat econosportster. Hulki Aldikacti was present at that meeting. Hulki headed up Pontiac's tiny advanced engineering group at the time. He and his assistant, Ed Falardeau, had conceived and packaged the embryonic Fiero.

"As a kid, I always used my hands," reminisces Aldikacti. "I liked making things. So over the years, I trained myself in manufacturing. Very few engineers in product engineering are manufacturing-oriented."

Seeing the green light flash, Hulki hit the ground running. One of the first places he ran to was the division's home assembly plant next door to Pontiac's headquarters in Pontiac, Mich. "Suddenly, I saw an opportunity," he explains. "The Pontiac assembly plant was going to be shut down because a brand-new facility at Lake Orion was going up." Lake Orion, Mich., is just north of Pontiac. Hulki recognized that the old plant might be just the place to build Fieros. "Among other things, we'd have manufacturing and assembly people available!"

Aldikacti rather brashly insisted on tapping some of those people if Pontiac wanted him to continue on the project because, as he puts it, "We had to design the manufacturing *process* for that vehicle along *with* the vehicle." Ultimately, he got his way. "And that," he states, "was a fundamental break."

Adds Jim Bouck, senior manufacturing engineer at the Pontiac plant, "It was early summer 1979 when Hulki came to our plant manager, Lynn A. Minger, and explained how he was designing this new car. The car would be built at Pontiac. He asked Lynn to assign someone from the plant to represent Car Assembly on the design team. Lynn and my boss, Sam Savas, got together and assigned me to the program."

Like many steps Aldikacti would take to get the Fiero properly engineered and into production, this way of doing things was completely unheard of. "What would normally happen at GM," says Bouck, "was that the engineers would finish the design, throw it over the fence to us, and say, Now go build it!"

Not this time, though. Even while the car was still in its gestation stages, Hulki was putting together an engineering team that included Bouck from Car Assembly, Troy Clarke from Pontiac's Pressed Metal stamping plant, Greg Kennedy from Reliability, and Ted Perkins from Pontiac Service.

In July, as mentioned, Aldikacti moved his little band out of Pontiac and into rented space at Entech, in Troy, Mich. "About a dozen manufacturing guys moved in with me," Hulki recalls. "We immediately agreed on one thing that was pretty interesting. We agreed to *start the plant*. In other words, if you were assigned to the project and you had the trim line, you had to start the trim line at the plant. That meant you had to design [with the idea that] it's going to be yours. You weren't going to hand it to somebody else. That caused the manufacturing guys to be vehicle-oriented and the design engineers to be manufacturing-oriented, and that was very fundamental; made a big difference in this car."

Denny O'Donnell, Pontiac's strategic planning manager at the time, remembers a lot of head scratching about where the car ought to be produced: "Where to build it? Maybe along with the Corvette in Bowling Green, Ky.? No, that won't work. How about Plant 21? No again. We even got a company that builds truck bodies in Illinois to come in and talk to us, but that didn't work out either.

"Meanwhile, later in the program, we heard that GM had decided to shut down our own assembly plant. All of a sudden it hit. Aha! Our home plant! That would work! But we didn't need a plant that big. Well, how about if we take just the Fisher Body part of it and make *that* the plant? That, of course, turned out to be how we did it." (The Fisher Body part of the plant completed car bodies before shipping them next door on an overhead conveyor to Pontiac's own main assembly plant.)

Stempel points out that the forthcoming availability of that home plant—practically next door to Pontiac's administration and engineering buildings—turned out to be a major factor in the Fiero's favor. "The Pontiac plant," he says, "got word it was going out of business. Here it was, 55 years old, an old vertical plant, and Lake Orion was coming up. People were saying, What can we do with the old factory? We need to work here.

"Meanwhile, the division was thinking about a new car and the potential of building it here. The two circumstances were very, very complementary."

Well, it wasn't quite that simple. "At that time, mid-1979," Bouck explains, "the corporation was planning its big $40 *billion* modernization program. We knew the Pontiac plant would be among the last of several to shut down. What our industrial engineers did—and Jim [industrial engineer James S.] Pass is the guy who gets a lot of credit—was to put together a scenario that showed: 1) our car assembly shutting down, 2) the new plant being built to replace it, 3) the Fiero coming into the Fisher facility, and 4) moving the timeframe up so we could do all that and get the Fiero out on schedule. They put together this package deal and sold it to the corporation so we'd get the Fiero as a low-budget program; low-budget because we were putting it into an existing building."

This proposal wasn't taken too seriously down at Corporate Planning at first, says Ernest P. Schaefer, then body and assembly manager. "I was working on the manufacturing side of GM's Worldwide Product Planning, in charge of assembly plant planning, when this project from Pontiac came floating across my desk. They wanted to build a little car at 30 jobs an hour, which is an ungodly small line rate. And they wanted to do this program all by themselves. That was back when we did all these joint programs. Everybody, including me, said, These guys have to be crazy! There's no way they're going to put this thing together and sell it.

"To be honest, we sold it short at the central-office level. But it had enough sponsors, including people in high places, who saw the wisdom of that particular car. So it made it through the central-office bureaucracy. Once the program became understood and Pontiac put the numbers on it to make it a viable project, the Fiero had very broad support. But initially, we viewed it with a lot of skepticism simply because, how can you do a program like that and make money?"

Aldikacti, of course, was convinced it could make money, provided the entire, integrated program could be done logically, intelligently, and *cooperatively* from the very beginning. "Hulki probably spends more time with the manufacturing guys than with the engineers," Schaefer continues, "because he recognizes that the design has to be built. If you're going to have a competitive

General Motors would have closed Pontiac's home plant if the Fiero hadn't come along to claim it. The plant's Fisher Body section was gutted and totally refurbished for the Fiero's unique assembly process.

vehicle, you have to have some pretty strong interface not only between manufacturing and engineering but among all elements, including sales, marketing, and so forth. He got deeply involved in manufacturing very, very early. We were sitting down and working on plant layouts at the same time they were designing the car. There's absolutely no question that this led to the manufacturing innovation that's in the vehicle today." Later that year, ironically, Schaefer moved to Pontiac as director of industrial engineering. Little did he know that he'd soon become the new Fiero facility's plant manager.

Early in the Fiero's formulation process, Aldikacti and Falardeau decided that the car's main structure should consist of a strong inner steel space frame with outer plastic skins. We've talked about this before, but part of their reasoning had to do with plastic panels being corrosion-proof, ding-resistant, and easy to apply and replace. From the design and manufacturing standpoints, since plastic tooling is vastly cheaper than conventional sheetmetal tooling, it would also keep Pontiac's initial investment low and provide the possibility of rapid, inexpensive restylings later on.

Observes Bob Stempel, "We started to think, Gee, if we had a chassis we could move around by itself, it would be its own carrier. We could put the body on later. As Hulki began to tie this together, the manufacturing guys started seeing in their minds, Hey, we can put the suspension on it, plus the cradle and wheels, and we can roll the whole thing around the plant. We wouldn't need conveyors, because the car would be self-supporting. Next thing you know, we've got a driveable chassis."

The Fiero's construction method—plastic skins over a steel inner space frame—plus the driveable chassis brought about another major innovation: mill-and-drill. I'll explain how that works in a moment, but before we get into that, Hulki takes up the narrative.

"When we decided to do the body in plastic, we first went to our experience with steel, and that suddenly brought us to an astonishing conclusion; actually the key to the Fiero. The space frame, as you know, is made out of steel, formed and spot welded. It turned out that the final frame has 4300 welds and 273 separate pieces; stampings. When you put together the space frame with that amount of heat from the welds, and that many pieces, the steel distorts. Steel bodies aren't perfect; they buckle and bow and deflect slightly, because you're putting so much heat on them.

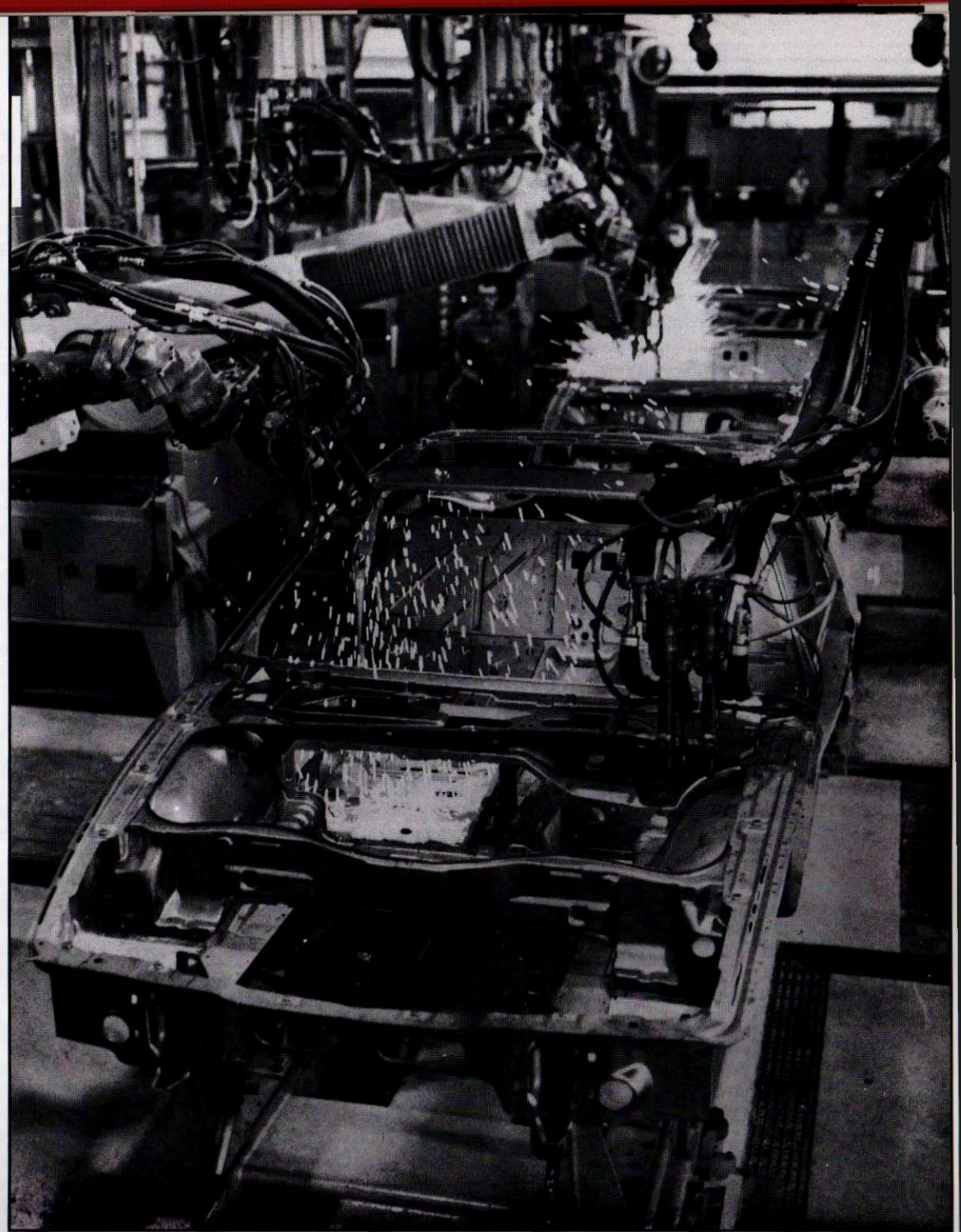
"But the plastic panels, whether they're injection- or compression-molded, turn out to be very accurate. They're not distorted. So we quickly found out that you can't take an accurate part and put it onto an inaccurate part. The two don't mate. We realized we had to weld the space frame, get all the accumulated distortions and deformations, and then machine it to *net* all the errors in it.

"Conceptually, netting a distorted structure—bringing it to a final dimension—isn't new. Machining an engine block uses the same idea: You cast the block larger than final size and machine it net so the heads fit. That's what the mill-and-drill machine does to the Fiero structure. So we got the idea that if we did this and maintained those machining points, we'd have a perfect body fit.

"A second effect of the mill-and-drill technique is that, if you don't change those machining points, you can restyle the car every year so long as you go with the same attaching-bolt holes. It means Pontiac can keep the same space frame no matter what the exterior looks like. In the future, you'll see some drastic changes in the Fiero's appearance, but we won't have to change the inner structure."

Adds Jim Bouck, "Troy Clarke and the guys from Pressed Metal, as they were designing the car's stampings, would be doing draw-die work to make sure they could actually produce each steel piece. We were specifying some new and bigger shapes than they'd worked on before. The door opening ring, for instance, has a very deep draw on the rear and a very shallow draw on the small pillar that comes up beside the windshield. In other words, we had combinations of deep and shallow draw on a single panel. We also had high-strength steel in this car, so they were learning how to bend that into the intricate stampings we needed."

In early pilot production, a door build fixture (above) helped locate weld sites and check tolerances. Since then, 26 Unimate robot welders (right) plus hard automation have been installed to do 40% of the 4300 welds needed for each space frame. This main welding line shows an eery absence of humans, yet the other 60% of the Fiero's welds are done by hand. Process weld monitors collect data on the welding shop and identify problem areas. Fiero plant covers 57 acres, 1.8 million sq.ft. under one roof.



By *draw*, Bouck is talking about the depths of the mating surfaces in the dies that press flat metal into shape. You have a male die and a female die, the male fitting into the female, with the sheetmetal to be stamped going between them. The two dies are squeezed together with tremendous force, and this bends the sheetmetal into the shape you want.

To understand *deep draw* and *shallow draw*, let's take the example of an aluminum beer can. The main body of an aluminum beer can is one stamping. It's formed by pressing a single, round aluminum sheet between male and female dies. These dies are made of very hard, solid steel. The engineers and metallurgists who figured out the beer can's stamping process had to take into account the thickness and ductility of aluminum so it didn't crack or split or run out of material at the bottom of the pressing. At any rate, the main body of an aluminum beer can is *deep drawn*. The top surface, which later gets clamped onto the main body, consists of a very shallow stamping; it's *shallow drawn*. So you can see that combining these two types of draws in one stamping can get a little tricky, as it was to some extent on the Fiero's door ring.

Another problem had to do with forming the Fiero's plastic skins. The dies for *sheetmetal* (not plastic) skins have to be designed to compensate for a phenomenon known as *springback*. Springback occurs because a flat sheet of steel really wants to stay flat even though the male and female dies are trying to press it into *their* shape. When you release these dies, the sheet steel always springs back slightly toward its original flatness.

So to overcome this springback tendency, dies for sheetmetal stampings—especially for larger pressings like outer doors, hoods, roofs, etc.—are slightly *overcrowned*. That means the dies exaggerate the bends a little. Then, when the sheet steel springs back, it springs back to the shape the engineers wanted in the first place.

Well, as Hulki's Heroes first designed the dies for the Fiero's plastic skins, they built in the normal compensation for springback. They specified overcrowned dies, as they would for sheetmetal skins. Plastic, though, comes out of any molding process dead accurate, with no distortion and certainly no springback. When they discovered this, the Heroes immediately had to go back and re-do their designs.

Jim Bouck continues, "The guy from Service, Ted Perkins, was working on things like, Can you lift the car from both ends with a tow truck? Can the average person change the alternator belt? Can you reach the oil filter? Do you have access to the major engine components? We wanted this to be an owner's car, something anyone can service him- or herself. Meanwhile, I was working on different assembly sequences and tooling concepts for putting the car together. Greg Kennedy, our reliability man, was helping all of us by identifying things that might have given down-the-road problems: using a specific type of electrical connector, for example. He could specify any sort of electrical connector available, but would it stay connected? Those types of things.

"Hulki was such a great guy to work with. If you had an idea, and you had a reason for needing to do it, you could just sit down and talk to him. Between Hulki and me, we came up with a hundred different ways to do a lot of things. The mill-and-drill process—the method of attaching plastic panels to bodies on machined pads, for example—was so new that General Motors patented it. Hulki and I were sitting around late one night, throwing around different ways to attach the plastic panels accurately, and we came up with several concepts. Mill and drill was one of them. The mill-and-drill machine was designed and built under my direction, but Wes [Wieslaw] Zaydel is the guy who did the development work and came up with the epoxy-filled blocks. He actually laid out the attaching surfaces and, once you had an idea, worked it out. He's also a great idea man. The real beauty of this whole project was the teamwork."

Strategic planning senior project engineer Tom Kalush remembers how nearly everyone helped put together the first demonstration car. "Our whole crew, even the designers off the board, would go over to Milford Fabricating [a Detroit prototype shop] and put in 12-, 14-, 16-hour days. They'd work with the fabricators assembling the car, handfitting each panel. When you have 30-40 panels to fit together like a jigsaw puzzle, each made independently, there's a lot of fitting to do."

That car, completed in an incredible five months, was running on 10 Mar. 1980. It would help win corporate approval for the P-Car project the following month to move the Fiero along to production.

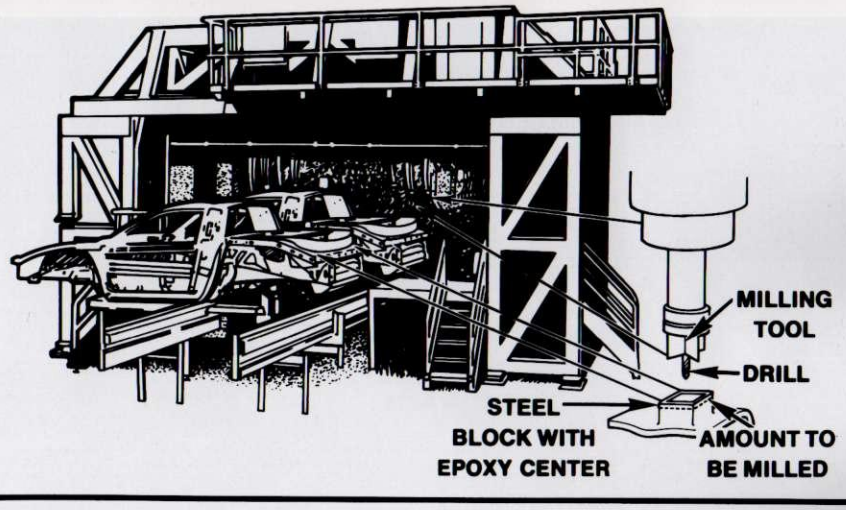
Kalush, who joined Hulki's Heroes as administrative assistant engineer that June, also cites a good example of how the early manufacturing involvement worked. The car's pop-up headlamp doors originally stood at the outer front corners of the hood, where it met the front fenders and fascia. "The manufacturing guys just absolutely came out of their chairs when they saw that," Kalush relates. "They said, Hulki, you've just designed an impossible build condition. We can't mate four panels in one area like that. Hulki said, Sorry; what would you like? They said, Take those headlamp doors and move them so they're completely surrounded by the hood. Then we have to mate them to only one part.

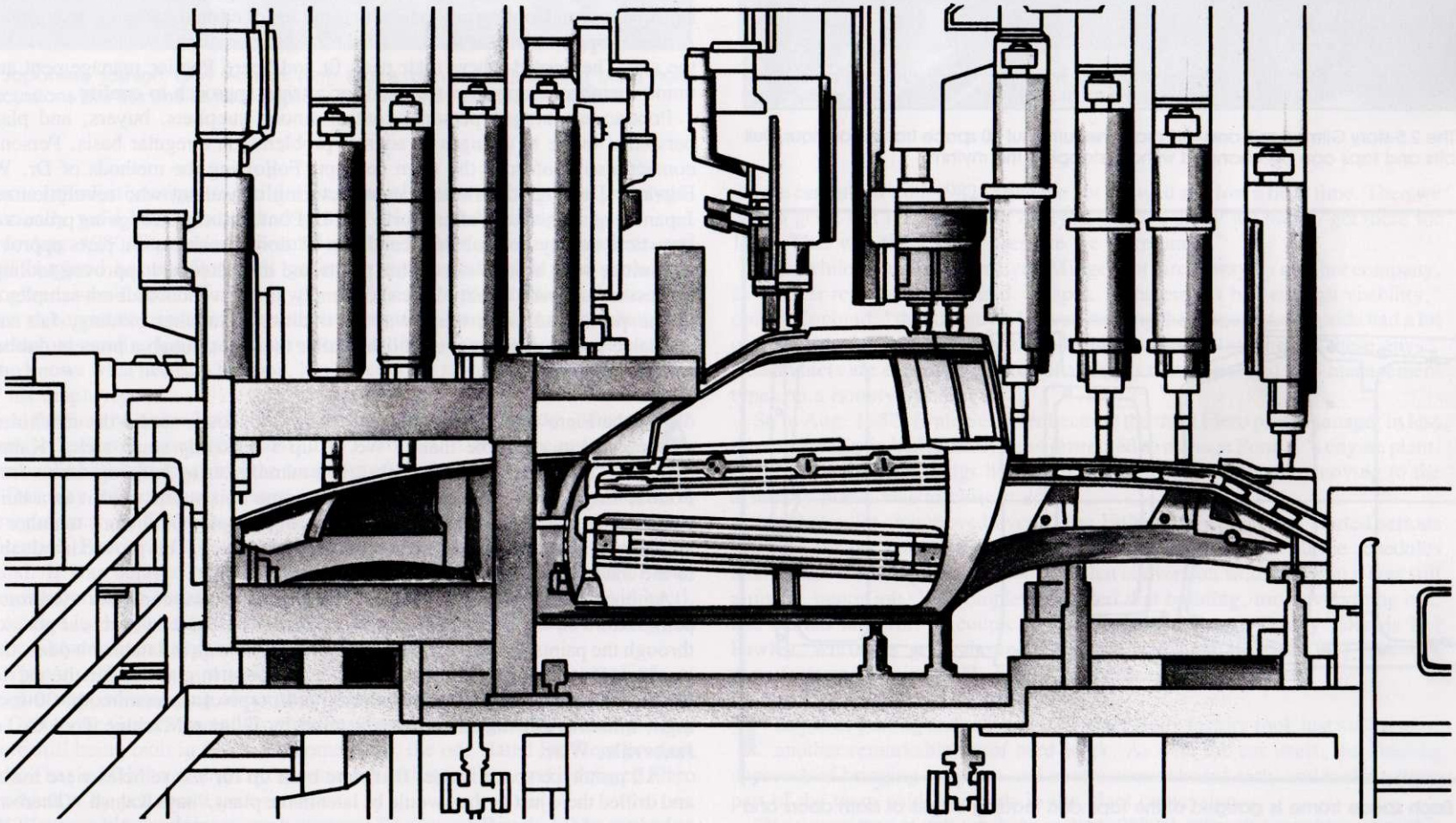
"That was a situation where the manufacturing people said to the engineers, Boy, you're really tying our hands for quality, and the engineers changed their design to accommodate them. Having those people with us from the start helped us tremendously."

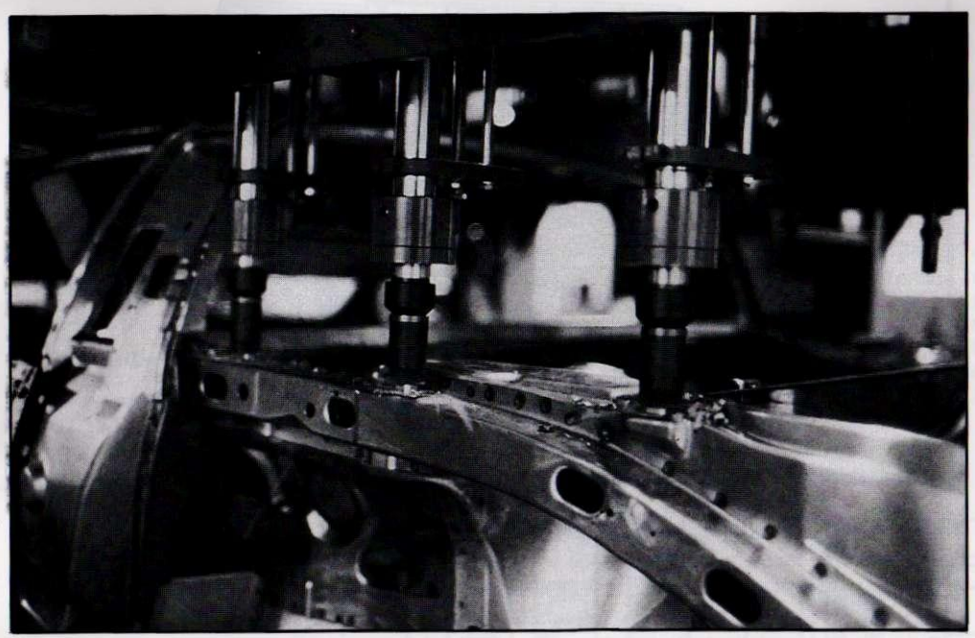
Another key part of the Fiero manufacturing story is Pontiac's very early involvement with—and commitment to—the car's various suppliers. "Hulki got GM Purchasing to agree to pre-source some of the parts and components," Bouck explains. "Typically, you'd wait until a part was designed, send out the drawings, get three bids, and give the job to the lowest bidder. Well, Hulki did a lot of hard work to get Purchasing to agree to have suppliers come in and work with us, *knowing* they were going to get the business."

Sources for the plastic body panels, for example, were chosen based on past performance and overall quality, without any price bid and before designs were even on paper. To make sure their parts were readily buildable, and to avoid unnecessary midstream changes, supplier reps worked alongside the design and manufacturing engineers from the very beginning. Wherever possible, these parts were sourced in "families" to ensure proper fit and finish of adjacent parts and surfaces; e.g. headlamp doors and hoods were sourced from General Tire and Rubber Co.; rear deck and upper rear quarter panels came from the Budd Co.; front fenders, doors, and lower rear quarters were supplied by Oldsmobile

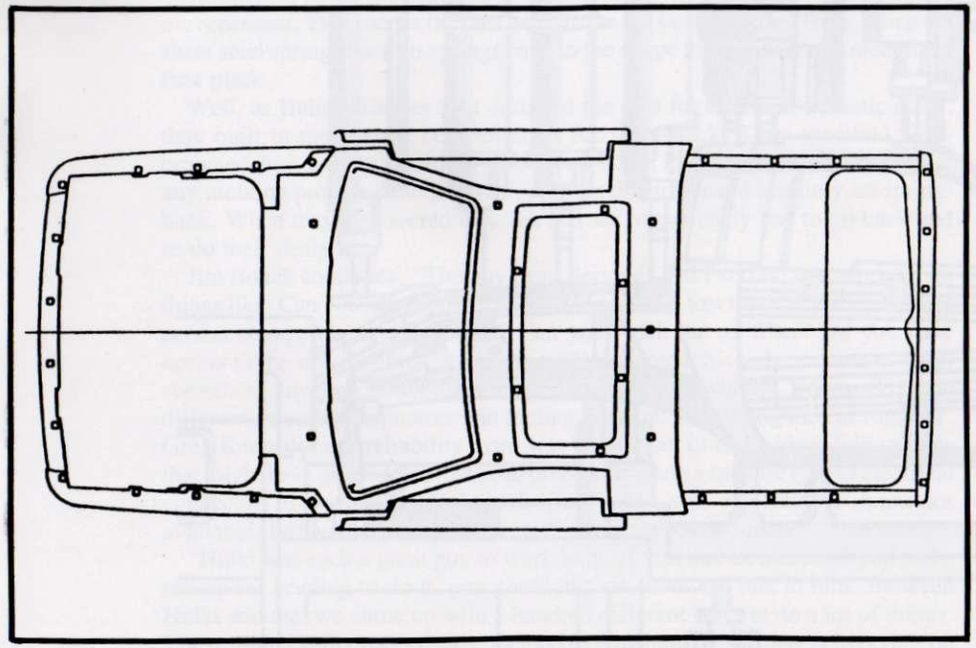
Only two Gilman mill-and-drill machines exist, one prototype and one that finishes Fiero space frames. Each frame is held in exact position, then 39 milling tools close in to grind the epoxy-filled attaching points for the plastic body panels. Once they're at the right height, they're threaded so the panels can be installed.







The 2.5-story Gilman mill-and-drill machine turns out 30 space frames an hour. Dull bits and taps can be changed without stopping the rhythm.



Each space frame is gauged at the tops and leading edges of both doors and centered cross-car so the drills hit their 39 (count 'em) points exactly.

Div. And the dies for the metal parts to be produced by Pontiac—more than 50, costing a total of $14 million—were also early-sourced.

Most parts were also single-sourced, meaning one company got all the business of producing and supplying a specific part. GM generally avoids single sourcing, partly because suppliers are expected to compete against each other to keep prices down, but especially because one part available from just one source leaves GM vulnerable to strikes, plant fires, etc. This could cause a total shutdown of a car assembly plant. Single sourcing, however, does have the advantages of reduced variability, increased *accountability* for quality, and stronger supplier relationships as well as a significant saving in time, paperwork, and purchasing workload.

The overall program for improving supplier relationships, in addition to ensuring high quality, began with early top-level management meetings and accelerated with one-on-one meetings with buyers, design engineers, and reliability engineers. So-called quality-value management teams reviewed design changes and tooling progress with suppliers of critical stamping assemblies. A major supplier seminar in Nov. 1982 brought more than 250 vendors in to see the car. They noted where their parts fit and heard Pontiac management and union members emphasize the need for a team approach to quality.

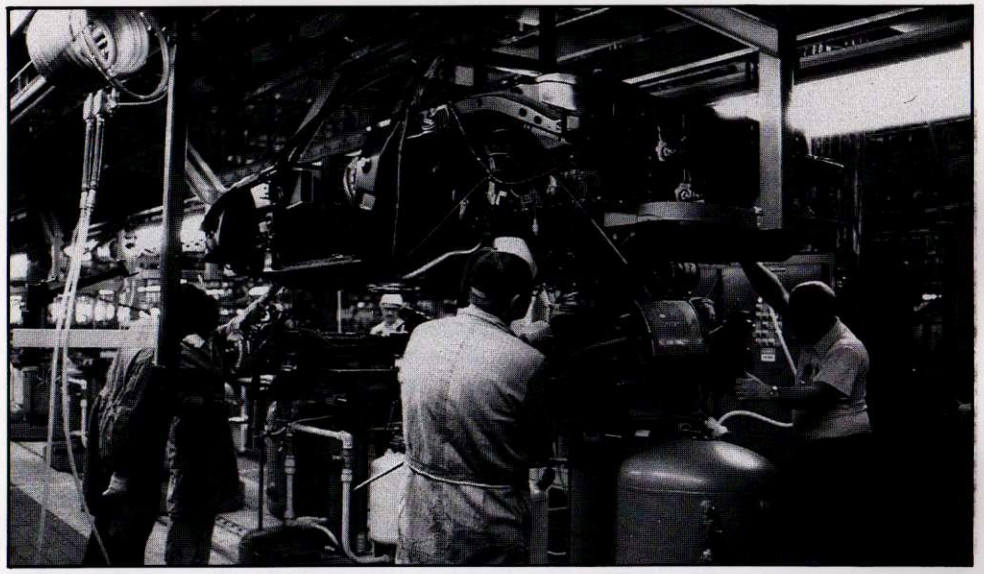
Pontiac encouraged personal contact among suppliers, buyers, and plant personnel to see to changes or address problems on a regular basis. Personal contact also reinforced the team concept. Following the methods of Dr. W. Edwards Deming, the famous manufacturing consultant who revolutionized Japanese quality control after World War II, Pontiac set up an ongoing process of statistical quality control as a condition of doing business. A parts-approval committee went around to supplier plants and inspected and approved tooling, processes, and parts quality instead of simply having vendors submit samples as in the past. And since there was no traditional supplier bidding, fair and equitable parts prices were established after the fact through a process dubbed *value engineering*.

As the Fiero and its bits and pieces came together, so did the machinery needed to assemble them. "We set up a relatively small area," Kalush explains, "maybe 10,000 square feet, in a manufacturing building across from Pontiac Engineering. We gutted it, put in some hoists, and used it as a build center where the engineers and manufacturing people could work together in actually building prototype cars in production sequence. This proved invaluable to the manufacturing guys."

Among the equipment developed, there were special conveyor systems; a paint fixture on which each Fiero's body panels would ride in exact car position through the paintshop; puff-n-stuff hydraulic hoists with inflatable bladders that would *puff* up and *stuff* front and rear suspensions in place under the car for bolting on by assemblers; and a working prototype of the mammoth, 30-foot-high, mill-and-drill machine manufactured by Gilman Machine Tool Co. of Janesville, Wisc.

"All prototype space frames that were built up for test vehicles were milled and drilled there just as they would be later in the plant," says Kalush. "There are only two of those machines in existence—that prototype and the one in the

In Japanese fashion, UAW workers form teams, can swap jobs and often hold discussions like this one to help improve the way they perform their tasks.



Suspension and powertrain units get positioned by special hoists called puff-n-stuffs, which air-puff them upward and stuff them into place.

plant. I think it's unique to build a machine of that magnitude as a prototype. Normally we'd have handworked all that welding and drilling."

In Aug. 1980, Stempel was promoted to head GM's overseas operations, and Bill Hoglund became Pontiac's general manager and a GM vice president. Hoglund, who'd been a financial type—he'd risen to comptroller at Pontiac and then to corporate treasurer—nonetheless proved himself a strong product man and an outstanding leader and motivator; one of those rare, all-around managers who knows what needs to be done, has the courage to do it, and gets the support of his employees.

At the time he arrived at Pontiac, sales were off throughout the industry, with Pontiac suffering more than most. The Fiero would soon become Hoglund's personal challenge, possibly the toughest of his career.

One way for a company to save money, of course, is to delay investments in new products. And, as a questionably profitable, low-volume car with unproven potential, Pontiac's little 2-seater was now expendable in many a corporate mind. It was delayed once, twice, and once again. The dark cloud of total cancellation hung constantly on the horizon. Through it all, Hulki Aldikacti, protected by Hoglund and Pontiac chief engineer Bob Dorn, kept working and kept his people and suppliers charging ahead.

Then in 1982, as the economy and the new-car market began to come back, as people stopped worrying about their jobs and gas lines, Pontiac's mid-sized G-Cars—the Grand Prix and Bonneville—suddenly surged in popularity. They were still being built in Pontiac's home plant, the one slated for Fiero production. That led GM to extend G-Car assembly at that facility, and it delayed Fiero production by yet another six months.

"We were always doing a crash program," grimaces Bouck. "First we had to get the car out for mid-1982. Then we got delayed and lost a little time. Then we had to get it out for 1983. Got delayed again. Finally we had to get there for 1984. That was the kind of pressure we were under."

Meanwhile, plant manager Lynn Minger got hired away by another company, as was *his* replacement, Karl J. Krapek. "The project had enough visibility," opines Hoglund, "that the guy who was running the manufacturing side had a lot of exposure. My guess is that the headhunters came looking for these guys." Headhunters are executive personnel agencies that go out and find management types on a bounty system.

So in Aug. 1982, Ernie Schaefer became the third Fiero plant manager in less than a year. Ernie had recently been promoted to manage Pontiac's engine plant. And one of the first things he had to do, just two weeks after moving to the assembly plant, was to close it down.

"At that point, we moved over to the Fisher Body plant and started serious planning for the Fiero," Schaefer relates. "Actually, we had all the schedules already laid out and plans made on how that conversion would go, but it was still a major, major job. We completely gutted that building, took everything out, and started all over. A couple of the key players were Denny [Dennis K.] Pawley, who was general superintendent, and Don [Donald W.] Ableson, manufacturing engineer. He basically did the plant conversion."

The job of gutting and refitting the Fisher Body factory took just six months, another remarkable bit of hard work. As with the car itself, the Deming approach of bringing suppliers and contractors onboard early and making them part of the team paid dividends in the plant conversion.

"Now came one of our very big concerns: Whether Pontiac would manage this

plant," as Schaefer puts it, "or whether it was going to be given to GMAD [General Motors Assembly Div.]. There were two schools of thought at the time. One was, Let's give all the assembly business to GMAD. The other said, Let's let the car divisions keep their home plants. GMAD had plants all over the country, running much higher line rates, and they were building Lake Orion, plus Wentzville [Mo.], plus starting work on Hamtramck [Mich.]. They had a lot of other things going on. This wasn't a big project to GMAD, whereas to Pontiac it meant a lot.

"I think there was also some recognition that Pontiac, with its desire to make this a good car, might be a better choice to run the plant. Second, I think GMAD themselves agreed that it might not be in their best interest to get deeply involved because of everything else they had on their platter. But they did have a lot of expertise, especially in starting up new plants.

"Fortunately, it all worked out for us," Schaefer goes on, "and we did rely on some of their expertise, as well as that of Fisher Body, in putting that plant together. GMAD kind of looked over Pontiac's shoulder as we were putting the assembly plans together and made sure everything would work; that we weren't just a bunch of wild-eyed guys trying to throw something together just to sell cars."

Schaefer further points out the configuration of the design team's efforts to separate fit from function and appearance from hardware throughout this car. "A good example is the door. Each door has to shut easily. It has to lock and so on. But it also has an important appearance feature. One of the things you always fight in the assembly business is the contradictory nature of those two elements. A door might fit perfectly, but it might not close right. Or vice versa. Sometimes when you adjust it to get it to look good, that messes up the function."

The Fiero automatically separates those concerns. The structural inner door is already mounted and its function perfected before the mill-and-drill process that locks in the outer panel fit. Same with the headlamp doors. In most other cars with hidden lamps, the door lids attach somehow to the mechanism that raises the entire assembly. On the Fiero, the headlamp door is cammed up so you can fit it in the opening independent of the mechanical portion. It's attached to the hood by pins in slots, pushed up when the lamp unit rises, and is spring-loaded to snap back in place when it retracts. Very clever. That again came out of the combined design/management efforts early in the game. It probably wouldn't have happened at all had these disciplines not worked closely together.

Even the assembly sequence turns out to be unique. "Typically you build a car from the rear end forward," explains Jim Bouck. "You put the quarter panels on, then the doors, fit the fenders to the doors, and the hood goes in the middle. Our process is different. We put the rear quarter on, we put the fender on and create the opening. Then we put the door into it as you would a cabinet door at home. And when we put that door on, it's net in all three planes. The operator has no control over it. The hinges have flat surfaces that go up to the body side ring. That controls the cross-car positioning, so it's net in and out. Then the bolts go into exact-sized holes. They can go only in one place, so that puts the door in only one place fore and aft and up and down.

"Every space frame out of the bodyshop is exactly the same regardless of option content. Whether you have a sunroof or a solid top, manual or automatic transmission, heater or air conditioning, it's generic. One's the same as the next. There are tremendous manufacturing advantages to that.

"The driveable chassis itself is different in that you can install all the mechanical, functional, and electrical items, hook them all up, and see if everything's working. If something isn't, you can fix it before you attach the body panels. If you have an engine defect, you don't have a guy working over a painted fender, trying to fix it. You get no panel damage; certainly no dents and dings.

"After we put the panels on and tighten them, we water-test the car. Everything's now complete, except there's still no interior. So we can get inside to track down leaks and fix them before the interior gets wet or dirty or in the way."

Some 75% of the Fiero's parts travel by truck from supplier sources within 200 miles of the plant, and 80% get routed directly to their points of use. This just-in-time delivery system saves space and cost by keeping in-plant inventories to a minimum. It also keeps suppliers on their toes because any out-of-spec problem parts are detected immediately instead of weeks or months later. The plastic exterior panels are carried from the plant receiving dock to a second-floor loading area by an AGVS, an automatic guided vehicle system. This is a driverless truck that reduces handling damage and is both safer and cheaper than vehicles with drivers.

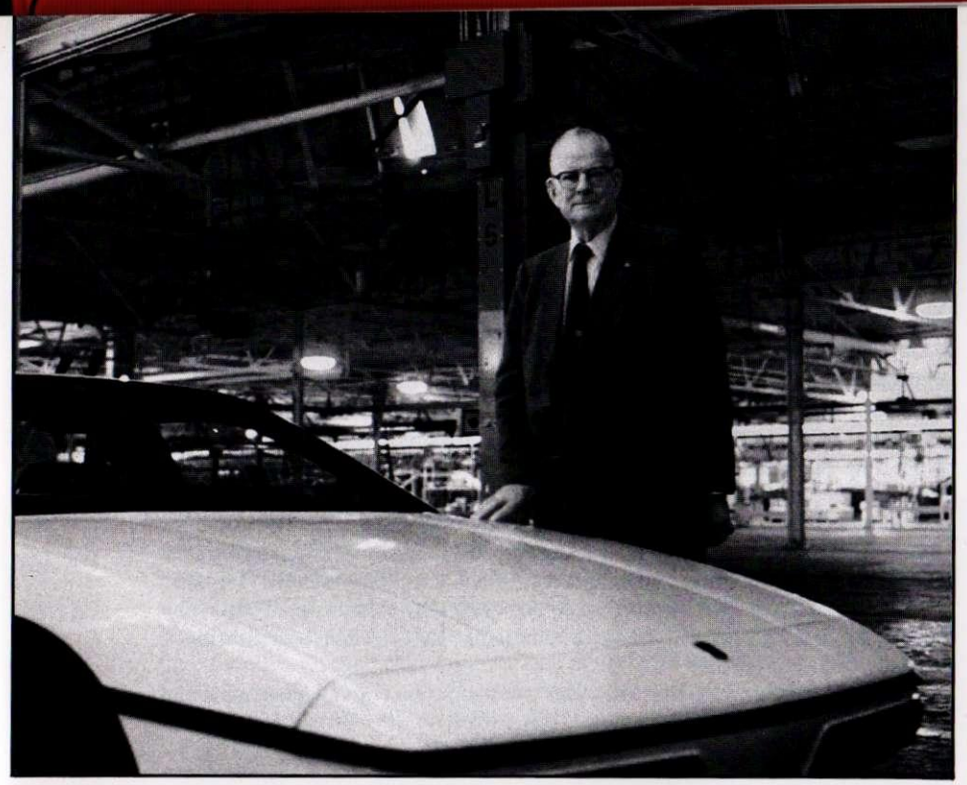
As of the 1987 model year, of the 273 steel stampings for the space frame, roughly half come from outside suppliers. The others are produced at Pontiac Pressed Metal. Most are either 1- or 2-sided galvanized for corrosion protection. Those for structural areas are HSLA steel—high-strength low alloy. Each set is carefully positioned in fixtures and welded together in six major subassemblies: front and rear tubs, door rings, floorpan, and cowl/roof. These are later mounted onto a larger fixture for joining into the completed, 600-pound space frame. Twenty-six Unimate robot welders perform about 40% of the 4300 spot welds.

The doors are then bolted into place and the space frame precisely clamped onto a fixture to pass through the giant mill-and-drill machine. Small, hollow, epoxy-filled sheetmetal cubes get welded to each of the space frame's 39 body-mounting points. Each cube is half an inch high by about 3/4 inch square at the base. The doors are held accurately shut, and the frame's position is sensed and adjusted by linear variable differential transformers: LVDT. Then 39 drill bits, ranging in size from 5.2mm to 10.0mm, descend to cut quickly through the epoxy and more slowly through the steel.

Tungsten-tipped milling inserts on the neck of each drill bit cut all 39 pads to an exact design height. A computerized panel-fit feedback system controls this. The whole process takes less than a minute—half the 30-car-per-hour line speed, and accuracy ends up at $+-0.50$mm.

These tools are designed to operate through 500 cycles between routine maintenance intervals, or 16.6 hours at full line speed. Built-in thrust detectors can tell when a tool is dull or damaged, or if a pad is missing. It then retracts the spindle and alerts the operator. Replacement tools can be fitted in a few seconds, and the assembly process goes on without interruption.

Following the mill-and-drill, each frame is dipped into an electrically charged primer called cathodic elpo uniprime. After dipping, it's never again drilled or pierced. It's a system that provides outstanding corrosion protection. The doors



The man who put the Japanese auto industry on its feet after WW-II, Dr. W. Edwards Deming, also taught Pontiac statistical quality control.

are then removed for access to the interior, and in go the wiring harnesses, steering column, shift cables, etc. Powertrain, suspension, wheels, and tires are hoisted into place and bolted on from underneath. After that, other mechanical components get installed, working fluids added, wheels electronically balanced and aligned, and the resulting driveable chassis, which looks a little like an ugly dunebuggy, is driven off the end of the line under its own power. Now mechanically complete, the car goes onto a chassis dynamometer for powertrain, electrical, and brake tests before moving on to pick up its body skins.

Although Pontiac calls it all *Enduraflex* for marketing reasons, five different varieties of reinforced composite plastic make up the Fiero's body panels through the 1987 model year. And because the eye picks up imperfections more easily on horizontal surfaces, the car uses sheet-molded compound (SMC) for the hood, roof, rear upper quarters, and rear decklid. Reinforced reaction injection molding (RRIM) serves for vertical surfaces like the friendly, damage-resistant fenders, door panels, and lower rear quarters (later changed to injection-molded nylon).

A more flexible variety of RRIM is used for the front bumper fascias, while the rear fascia is non-reinforced RIM urethane. The rocker panels are chip- and dent-resistant thermoplastic olefin compound. SMC panels are molded by Budd, Premix, and General Tire; the urethane by Oldsmobile Div., GM's Guide Div., and GM of Canada. The '84 engine cover grille, by the way, is magnesium, one of the few automotive applications of that exotic, lightweight metal.

Each set of panels gets loaded onto a special carrier, which holds it from below in exact car position. It's then painted in a state-of-the-art finishing system that eliminates variations in gloss and color on the different types of plastic. They get a layer of primer, a matte layer of color, and a top layer of glossy clearcoat. These are all high-solids acrylic enamel. All panels are painted simultaneously and not handled until they're unloaded for attachment to the car.

The Fiero's doors, now complete with glass, tracks, and window mechanisms, are remounted to the space frame and body skins fitted and bolted into place prior to water testing. Following that, the interior—seats, carpet, headliner, inner door panels, etc.—goes in, and the car stands essentially finished. Interior fits, incidentally, can be checked by using a master fixture to which all components can be assembled. This is another Fiero first for Pontiac but, I understand, will soon be standard procedure for the corporation.

Statistical quality control as per Dr. Deming is used throughout assembly to assure maximum quality. Data are collected and charted in all areas of production, including body, paint, chassis, and trim departments. Schaefer calls the work that Pontiac did with Dr. Deming "...a very significant influence. I think he influenced Hulki as well as the rest of the organization. Dr. Deming definitely played a role in the Fiero, and a lot of his philosophies became cornerstones in the way we approached the project."

"One of the big things that Dr. Deming brought about," says Schaefer, "was just eliminating repairs. We had to do the job right the first time, because we had a very small, minimal repair area within the plant and nowhere to park cars outside and bring them back in for repairs. By building that into the plant—the inability to work any other way—we forced everybody to live by those rules. At first that created a lot of fear in the place. Are we really going to be able to run that way? If we turn out 30 cars an hour and they're not right, we'll have to shut the place down. That was certainly the Deming influence, coupled with recognition of what the Japanese are doing."

One more interesting feature of the manufacturing story is the length to which Pontiac goes to ensure damage-free delivery to its dealers. Carrier drivers are specially trained in handling the cars. Cross-country shipment is permitted only in fully enclosed railcars. Transportation damage claims get reviewed monthly with carrier personnel to track down and correct problems.

Finally, none of this could have happened or worked without the people. If ever there was a dedicated group inside one auto plant, from Boss Schaefer on down, it had to be this one. The unprecedented levels of team spirit and cooperation that developed between union and management might have been born out of desperation ("one last chance for a dear old plant"), but it flourished out of mutual respect and a common goal.

"I remember the day I called them in and said we're going to stop building cars at Pontiac," Stempel comments. "You could call that a significant emotional event, all right. Then the union went with me to see the mayor of Pontiac and tell him we were going to stop building cars. From that point on, the union had a little

different viewpoint. They weren't pushovers, but they had a lot of things to change, and they did. I give them a lot of credit."

Adds Bill Hoglund: "The whole key to the manufacturing process was to get the union onboard. We had the UAW's regional director over and laid the books open. I told him, This is what the car's going to cost...but we can't do anything unless you guys come along and work with us. So they agreed, and together we appointed the chairman of the shop committee, Jerry D. Lewis. Well, Ernie Schaefer and Jerry Lewis developed a tremendous working relationship."

Schaefer turned out to be an enormously talented manager. "One thing we insisted on very early was to get some union people into planning how we were going to run that plant," he stresses. "Pontiac sat down with the union guys and said, If we get this project approved, we've got to have a separate local agreement for that plant. We wanted a separate group over there with a separate identity that would live and die with the car. We asked the union for that, and they gave it to us. In my mind, that was a very important element in the union/management philosophy that developed.

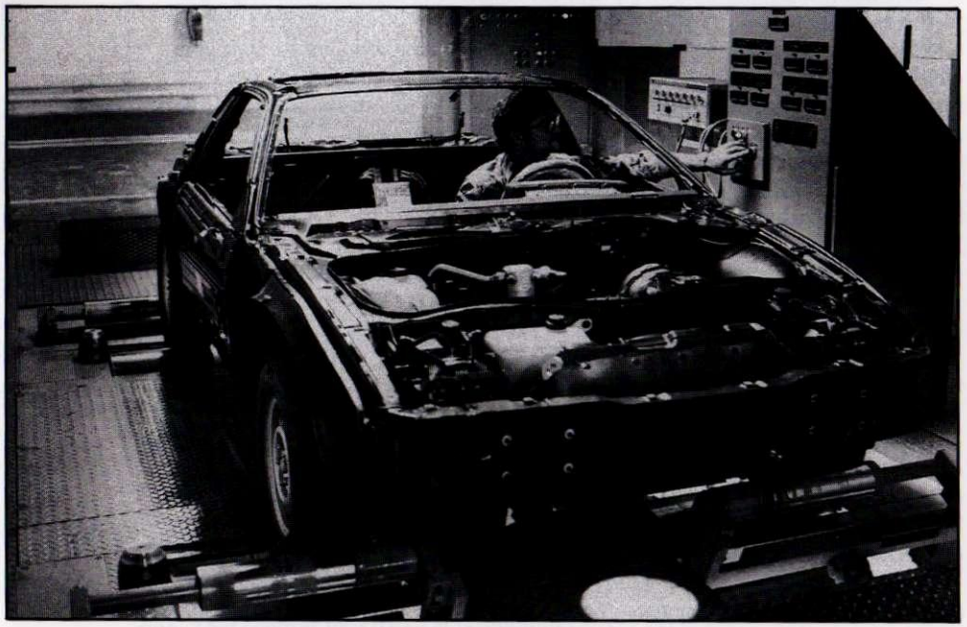
"Jerry Lewis is an individual who ought to get tremendous credit for the success of that plant and the car. He was way ahead of his time in recognizing the need to do some things differently." Schaefer points to the importance of a 3-day, off-site workshop at the Michigan State Management Center in Troy.

"It was at this series of meetings," continues Schaefer, "that this whole idea of team concept started to evolve. I think there was some general agreement that we ought to break into teams, but what came out of it was, Well, if we work in teams at the hourly level, why shouldn't we have teams at the superintendent level? As a matter of fact, why shouldn't we, as plant staff, be part of a team? So we kind of worked our way into the concept of having teams at all levels. Nobody had ever tried that before at General Motors.

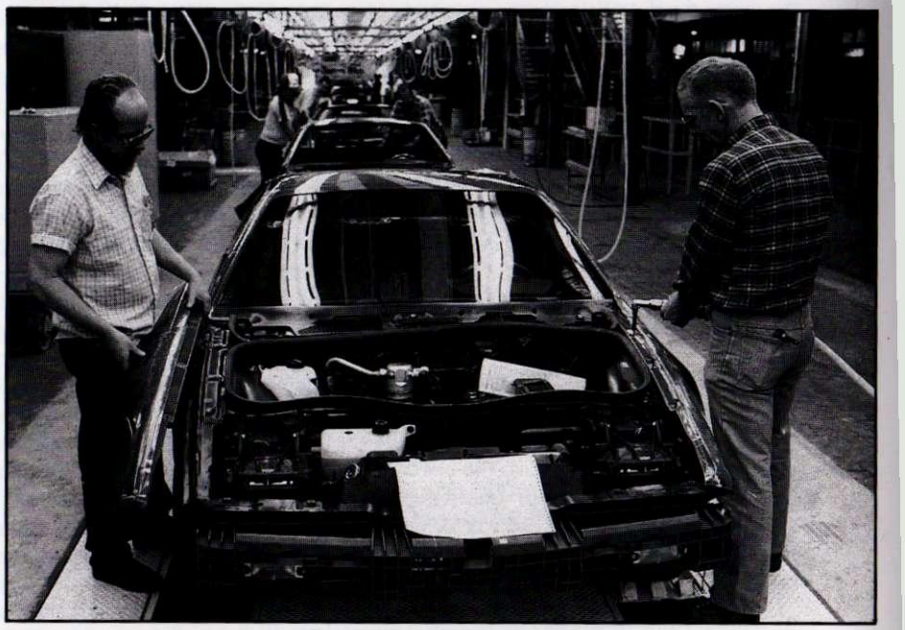
"Out of that also came the idea that we're all going to park in the same parking lot. No more reserved spaces for top management. We all ate in the same cafeteria. And nobody's going to have to wear a tie. The reason was to break down traditional barriers between labor and management. I think one of the things like this Fiero project—a brand-new car; very exciting—is that you can do a lot of things you couldn't do in a more traditional vein. People all bought into it and became part of it, partly because it was new and different.

"But the fact remains that we had a serious problem at Pontiac as this thing evolved. People saw us as non-conformists; prima donnas. I'd have my tie off and go into the executive dining room at Pontiac headquarters. Three or four guys would come up to me and say, Jeez, you've got to wear a tie if you're coming over here. That was a sore spot for a while. But people like Bill Hoglund, who understood what we were trying to do, were very supportive. That's why the idea survived and became kind of a cornerstone for the whole organization."

Another big step, Schaefer adds, was a trip to Japan with the plant staff and representatives from the union. "We picked up a lot of good ideas over



Once chassis becomes driveable, it needs no conveyors. Technicians dyno-test powertrain and can make other adjustments before the skins go on.



Enduraflex panels, painted in matching sets, are installed near end of assembly line. Car is then checked for leaks before interior goes in.

there," he enthuses. The group also visited other GM plants in the U.S. where innovative practices were working well.

"Just going on a trip together with the union people was very helpful to get to know these guys and let them know that we're human, too. All that paid some pretty significant dividends when we sat down to iron out our first union contract. The contract was very different in that it didn't have a lot of traditional language in it. We reduced the number of in-plant job classifications, and this gave us a lot more flexibility in building the car and building it competitively.

"The opportunity to be a team leader turned out to be a rewarding challenge to some people and certainly a motivator in job performance. We originally selected the leaders from those to whom we'd given special training...some of the early people we'd brought in who were skilled and had been with us for a long time. We knew they were good workers, that they knew the areas they'd be involved in and were natural leaders.

"It was interesting to see the variety of approaches that evolve when you take workers out on the line and turn them loose with such a totally new concept. Some were very meticulous and took notes and used parliamentary procedure at meetings. And others were pretty laid-back in how they went about their business. The more we trained them and worked with them, though, the better they functioned; the better they became at problem solving and other things.

"Later, the teams themselves elected leaders. In some cases, we had individuals vying for the jobs, so they were trying to serve their groups in the most positive fashion in order to get votes. I'd say roughly half the original leaders kept their leadership jobs.

The people within each team can organize their work however they want as long as they follow the specified assembly techniques. For example, if the guidelines specify an air wrench to tighten a certain nut, you can't use a hand wrench. Other than that, though, people can alternate jobs, switch jobs, split up the work; that's all up to the team.

Finally, he adds, there was a strong realization of the importance of trying to recognize the worker's needs and give him a hand so he can solve some of his problems. Past practice let management ignore most of those problems.

"For example," says Schaefer, "we decided early that we were going to stop the line for half an hour each week and let every team meet to work on its problems. It's getting to the point where you hire a worker for his intellect as well as his muscle. Used to be we figured, We don't want you to do any thinking. Today we're saying, We want you to tell us how you can do it better, how you can eliminate mistakes, how that part can be improved, what kinds of quality problems you're having with it. And would you talk to the vendor for us and explain that to him? In the past, it was just, Do the job! Now those people out on the line are really getting involved."

And how did Ernie Schaefer like being involved? "It was a neat process," says the former Fiero plant manager with a grin. "Those kinds of projects you get only once in your entire career. I was very glad to be part of it." □

Plant manager Ernie Schaefer inspects a nearly completed Fiero along with a couple of workers. Schaefer played a crucial role in starting up the plant.

Earliest Fieros came only in red and white, rest here outside plant awaiting shipment to anxious dealers, who couldn't get nearly enough at first.

Chapter 5

Frustrations

ONE OF THE LAST THINGS Bob Stempel did as Pontiac general manager was to speak at the 1980 *Automotive News* World Congress in Detroit. His topic was "Pontiac Revs Up for the Eighties" or, as he later put it, "...where we were coming from, where we were, and which way we were going." The very last slide he showed had a rough outline of what would later become the Fiero. As Stempel well knew, however, Pontiac's proposed 2-seater was already in serious trouble within the corporation.

Just three months earlier, GM's corporate Product Policy Group (PPG) had approved the P-Car for production development. This hard-won approval came partly by way of Ron Hill's and John Shettler's clay models plus Hulki Aldikacti's exceptional running prototype. What really clinched the deal, though, was Pontiac's assurance of 50 mpg from 80,000 units a year plus the P-Car's unique, pioneering, quality-assured manufacturing process.

But such approvals remain tenuous and revocable almost until the first salable car begins to roll down the assembly line. And a very unusual thing was happening that year at General Motors: The company was actually *losing money!*

Now, any self-respecting business expects to shed a little red ink once in a while. Markets and economics change, demand ebbs and flows, old products have to be replaced with new ones. Yet GM isn't just any business. It's a massive corporation ruled by financial whizbangs whose annual bonuses and very careers

rest on the bottom lines of quarterly statements. GM has long been a company that takes profit almost for granted, where the only yearly question is how much. General Motors, in fact, hadn't lost a nickel in 60 years.

But in Oct. 1980, 12 weeks after Stempel left to head up GM Overseas and Bill Hoglund came in to replace him as Pontiac's general manager, GM announced worldwide car and truck sales *down 24%* and dollar sales *down 17%* for the first nine months of that year. That came to a net operating *loss* of $824 million for the period.

The nation lay buried under a deep recession caused by high interest rates and the new administration's anti-inflation program. In the wake of the 1979 Iranian hostage crisis, which touched off that decade's second fuel shortage, most Americans who were still shopping for cars were buying them small and/or Japanese. The desperate rebate and incentive programs used by GM and other automakers to keep U.S. cars selling were proving *very* expensive. Labor and material costs shot up, too, and to compound its cash shortage, GM was well into a multi-*billion* dollar plant modernization and expansion program, announced just that January.

Perhaps luckily for them, GM chairman Thomas A. Murphy and president Pete Estes retired that December and January, respectively. Elected by the board to replace them were executive vice presidents Roger B. Smith, who'd risen through the corporate finance ranks (customary for the chairman's job), and F. James McDonald, an engineer with a manufacturing background and a former Pontiac general manager. Named to the new position of vice chairman in what would be a top-management triumverate was GM executive vice president Howard H. Kehrl, a former chief engineer and ex-general manager of Oldsmobile Div.

But if GM found itself in trouble, Pontiac Motor Div. was in even worse shape. Once known for engineering prowess and high performance, Pontiac had been backing away from that hard-earned image throughout the social-conscious Seventies. By 1980, the public no longer had a clear idea of what a Pontiac ought to be or what market niche it fit into. Even the people who ran Pontiac weren't sure.

Pontiac sales plunged from 830,000 in model-year 1979 to fewer than 639,000 in 1980. Sales were still sliding as the 1981 models bowed that fall. There was even talk, both within and outside the corporation, of dropping Pontiac as a nameplate or merging it into a giant B-O-P (Buick-Olds-Pontiac) division. B-O-P would stand between Chevrolet on the low end and Cadillac at the top of GM's domestic spectrum.

Thus the arena was set for a classic intra-corporate confrontation: In the near corner, wearing second-hand trunks, the GM Goliath, losing money for the first time in modern history and convinced it couldn't afford much of *any* new-product investment, let alone one of considerable risk and questionable potential. In the far corner, in torn and tattered trunks, the Pontiac Div. David, fighting for its very life and convinced that its fortunes couldn't turn around without a $300 million investment in a brand-new sports commuter.

The corporation, Hoglund explains, "...had a lot of problems with the money on the project. There were wide variations in sales-volume estimates, ranging from 39,000 to 85,000 cars a year. Of course, when they laid the 39,000 estimate up against the investment, it became a crumby deal."

To put things into perspective, the sequence of events went something like this: GM's top PPG had granted *concept* approval to the P-Car in June 1979. In Apr. 1980, a month after Aldikacti's demonstration vehicle was on its wheels and running, the PPG had re-reviewed the program and granted *final* approval. Almost simultaneously, the corporate finance committee had approved funds for tooling and the conversion of Pontiac's main plant, which had been due to shut down anyway.

Now, in Sept. 1980, a month after Hoglund arrived, with "business going to hell in a handbasket," as he puts it, "they pulled that approval out and said, Take it off the shelf and don't spend any money on it. The one agreement we got was to continue the engineering, which gave Hulki the opportunity to keep charging. He took a few risks and did a lot more than just maintenance engineering. I mean, he kept going full-bore."

According to Gifford Pinchot III in his book *Intrapreneuring* (Harper & Row), orders to stop work on the P-Car went out no less than three times between Apr. 1980 and Dec. 1982. "Each time," Pinchot writes, "Hulki shielded his people from the order to stop while trying to reverse it." Pinchot's description of how he did this makes interesting reading:

"By the time the third kill order rolled in, the Fiero was not a small, easy-to-hide project. About 225 people working full-time on the project reported directly to Hulki. Another 275 were working on the Fiero in functions such as crash safety. Vendors were working on it, too: About 500 people outside GM were devoted to the Fiero.

"Through all this, Hulki encouraged his people to keep working. Finally pushed to the wall, he made an announcement: 'You may have heard rumors that the [Fiero] has been killed. Ignore the rumors and keep going.'

"He took the same approach with vendors. When vendors called because they had been told to stop all work on the Fiero, Hulki told them, 'Keep going and we'll straighten it out.' The vendors, who also believed in the project, kept on working. Hulki drew his courage from a belief that he wasn't wasting GM's money but rather was using it in the most effective way he knew. 'I don't do hobby things,' he said. 'When I do something, you know it's serious. Time was against us, so we couldn't afford to stop. Besides, it is very difficult and very expensive to stop and start again on a very large project—we had to keep going.'"

Pinchot relates how Hoglund, Pontiac chief engineer Bob Dorn, and comptroller James B. Fitzpatrick—all highly committed to the P-Car as the cornerstone of the division's new image program—not only shielded and protected Aldikacti during this difficult period but also bought time, lobbied, and eventually saved the program each time it was killed. "They could have just dropped the ax on it," Pinchot quotes Hulki as saying. "Instead, they kept analyzing it to find new ways to demonstrate to GM that it was good business financially."

At one PPG meeting, Chevrolet came in and explained the plan for their all-new 1984 Corvette. "The back benchers at the PPG were pretty excited

about the Corvette," Hoglund recalls, "and one of the interesting observations was that we should switch the cars around among our divisions. In other words, the Fiero, being an inexpensive, entry-level car, should be sold by Chevrolet, whereas the Corvette, being upscale in price, would more logically be marketed by Pontiac. But recognizing the longterm Corvette/Chevrolet link, switching divisions on these two cars wasn't a realistic way to go. It generated some intriguing conversation, though."

One of the major arguments, of course, was the P-Car's volume potential. No automaker had ever sold more than about 52,000 2-seaters a year since WW-II. The P-Car, though, needed to sell around 70,000 just to break even and 5-10,000 more to turn a profit. But Hoglund and staff, analyzing the results of consumer clinics and surveys, were confident the market was there. "Empty nesters, commuters, young singles, high-school kids...." he counts off. "It's a great car for 16-, 17-, 18-year-olds, because it's sporty but doesn't have more performance than the average driver can handle. And as a 2-seater, it feels intimate and cozy. The image direction and the market were apparently perfect, because people were moving away from econoboxes and toward expressiveness. And that's what this car is: an expression of personality."

Hoglund strengthened his hand in June 1981 with the addition to his team of a new general sales manager, William W. Lane. Lane, who later became Oldsmobile's general manager, bought into the image program immediately and was especially excited about the P-Car, which Hoglund demonstrated the first time Lane visited Pontiac to interview for the job.

"We went over to the Engineering garage," Lane remembers, "where we looked at what turned out to be a driveable chassis. They also had a Design Staff mockup car which, of course, looked very exciting to me. Hoglund and I went out and drove this chassis—no body on it—and we were scooting around, really having fun. This was my first exposure to Hoglund, and I was finding out that our vibes were right together.

"Then, after I took this job, I started seeing what Pontiac's marketing woes were: the disgruntled dealer body, the lack of just about everything you need to have a going organization. And then I found out that, lo and behold, we didn't have any funding for this great, great car. I said, Wait a minute! All of a sudden this takes on a different aspect. The car I thought was going to be the nucleus of what would bring Pontiac back and put all those things together...now I find out that there's a possibility it won't be a go.

"So we put on our marketing hats and tried to add some pizazz to the presentation for those GM execs who were going to give us the funding. We began a very, very serious campaign of meetings and conferences and bringing everyone, from the chairman on down, over to show them this car. We'd tell them what it would do, how it would bring Pontiac back, and how it was going to give technological leadership to Pontiac and General Motors."

Bill Hoglund continues: "We had a series of meetings with Howard [Kehrl] and [other top GM executives] to convince them that the concept of having three kinds of composite materials on the exterior was reasonable and do-able, that the space-frame technology was not only realistic but a wave of the future, that the mid engine would work, that the thing was a real car. I don't know how much influence those meetings had, but I think it began to bring people onboard when they could see and touch and feel and understand that there was a helluva lot more to this car than just the papers they were reading on the engineering effort, the testing effort, and everything else."

Hoglund, Dorn, and Fitzpatrick also conducted a high-level lobbying effort once domestic new-car sales finally began to pick up. "The market started to come around a little," Hoglund says, "and the corporation got beyond their cash-flow problems to a degree. It got to the point where they didn't have to cut *everything* out. There was some money out there that could be spent, and it was a matter of allocating resources.

"So we got together to decide how to get this P-Car sold downtown, and we developed a massive sell program. I even had a financial analyst come out—someone the guys downtown knew—to go over the program. I told him, Okay, now you've got a job to do. Call Roger [Smith] and everyone and tell them what a great car this is and how important it is to General Motors. Bob Dorn worked on the technical community. Al Mair liked the project [Mair was then the GM vice president in charge of technical staffs], thought it was tremendous, so he was selling. Fitzpatrick was pushing the financial guys, and we were all working on the planning guys.

"Our biggest problem had to do with some of the people in Corporate Planning who had the volume projection down around 40-50,000 cars a year. At that volume, the project was in serious trouble. But one thing that really helped us was that, by that time, we'd had our image conference, had set the direction, had come out with the *We Build Excitement* theme, and were working toward it. I think this car was awfully important to Pontiac to cement that direction."

Asked by one interviewer at that time just how important the Fiero really was to Pontiac, Hoglund replied, "It's everything!" Years later, he explains why: "The car was so important because it became the embodiment of our whole image direction. Internally, it was a team effort—an exciting kind of program for a division that was trying to *be* exciting."

Highly effective, too, were the research and selling efforts of Pontiac's product planning team. "As soon as they would say, We're not going to do it," notes Denny O'Donnell, "Don Parkinson and I would trot out the presentation and go back down there and resell the program. [You wouldn't believe] how many times it was either dead or delayed, and we went and revitalized it.

"You do a zillion pre-reviews before the official meeting, so essentially the decision is already made by the time you get there. In the 11th hour before *final* approval, word was coming back from the pre-reviews that the P-Car wasn't going to make it; that it was in trouble because of the low projected return [on investment]. Fitzpatrick came back here—PPG was the next day—and said, Take that investment number down to right there. Just take it down! And we did. And he said, Okay, that's the return; that's the investment; here's how much money you've got. So that was it, like, Okay, we'll just do it for less than we'd estimated.

"It turned out to be in the $300 million range. Not a billion, not half a billion. One factor in that was using a lot of existing components: engines, transmissions, brakes. Another was that tools to make plastic panels are cheap compared to steel; and I mean *really* cheap! A die to make a metal fender is $5-7 million.

GM president F.James McDonald (3rd from right) visits Fiero plant during stressful time when the car's fate hung in the balance.

Throughout this frustrating period, Pontiac kept the P-Car program going. To stop and restart it would have been tremendously expensive.

Tools for a plastic fender run maybe $50,000, so you can see it's orders of magnitude cheaper.

"We were even going to use gauges out of an existing car so we wouldn't have to tool any gauges. At one point we were going to use the engine cradle out of the X-Car, but as it turned out, we couldn't do that. We had to tool a new cradle. But there were lots and lots of pieces in there that were right off the shelf.

"It sounds fine to say, Great, we'll use X-Car components, but what if there's not enough plant capacity? You're talking now about future capacity to turn out parts. Suppose you know a plant can build so-and-so many brake sets. The question is, How many are you going to need for X-Cars? You don't really know. You're forecasting; guessing. So now it's an argument between those who want to use some X-Car brake sets for the P-Car and the corporate marketing guys, who say, Yeah, but we need this many for the X-Car and we can't spare any."

Even while approval was still being hotly debated, however, GM had one more frustrating delay in store for Pontiac, whose sales continued to slide from 639,000 in the 1980 model year to 601,000 in 1981 and a dismal 462,000 in 1982. Instead of closing the main Pontiac plant for conversion in early '82, as proposed, GM decided to continue building the surprisingly popular rear-drive Grand Prix and Bonneville through the 1982 model year. That delayed the plant's shutdown by six months, to July 1982. Production startup got pushed back to July 1983, and public introduction of the P-Car was slated for that autumn.

GM president Jim McDonald, given his engineering and manufacturing background, turned out to be a strong P-Car supporter and, in fact, might have cast the deciding vote for funding approval in early May 1982. "We were faced with the CAFE standards," he comments, "and some people predicted that gasoline would cost anywhere from $2.25 to $2.75 a gallon by 1983-85. We were looking at challenges and niches in the marketplace. There were some 2-seaters out there in the low price range that we didn't think were well done, and we figured that if we could along with one that was attractive and gave the customers what they wanted, it would certainly help us in fuel economy."

McDonald was especially impressed by the concept of a space frame with plastic outer skins and the giant mill-and-drill machine that would make it work. "I remember going out and looking at the prototype of that drilling mechanism and watching the thing cycle. That was a heckuva fixture. Once we committed to the space frame and hanging those exterior panels on it, that fixture and that process became the keys to success. It certainly looked like it was going to do the job, and it was on that basis that we decided we could go ahead. It also goes along with many of the other things we're doing today to get the body located in a fixed position with everything else referenced from there.

"I think our fascination with the process, the true opportunity to test both the manufacturing potential and how customers would react to the plastic panels, the fuel economy...there were lots of things going for it. With the inexpensive dies for plastic panels, we further had the potential for getting model changes and aesthetic changes on the exterior at less cost than the conventional way.

"All these things," McDonald concludes, "looked like they offered a lot of opportunity. And that's how it was sold. It was the people who understood the manufacturing potential and the marketing potential who fought for the Fiero. The record will say that once I was convinced, I became a champion of the cause." □

Chapter 6

The Launch

THE MOTORING PRESS CAUGHT WIND of Pontiac's 2-seater long before GM had a firm idea whether it would ever be built. As early as Oct. 1980, *Motor Trend* ran a slightly far-fetched sketch of what they called Pontiac's "mid-1982 2-seat, mid-engine Banshee," saying it would come in both notchback and fastback versions, with a choice of 1.6-liter turbo or 2.5-liter non-turbo power. A followup in January gave the wheelbase as 90 inches and overall length as 150 inches. MT correctly described the future Fiero's X-Car-derived powertrain and rear suspension, Chevette front suspension, first-year production target of 75,000 units, and P-Car codename. The article added that Pontiac favored *Sunfire* as the actual model name and ran a near-perfect sketch of a prototype.

Popular Mechanics also profiled the P-Car in Jan. 1981, giving it a 1.8-liter Four, 1800-pound curb weight, $8500 base price, and 1983-model intro date. PM predicted that the price might go up another $1500 by introduction and that Chevrolet would get a version of the car for 1984.

A spy photo of a P-Car engineering prototype graced the cover of that February's *Car and Driver*, and the full-page report inside included a lot of accurate details. "Its fuel efficiency is expected to be far superior to that of any other U.S.-built car," wrote engineering editor Don Sherman. "But it's our guess Pontiac won't mind whether you buy a P-Car to drive to work or to feed your Ferrari fantasies. Who knows what the distinctly mid-engine proportions and the streamlined silhouette are likely to conjure up, come 1983...? With all-disc brakes, all-independent suspension, a mid engine, and a sub-2000-pound curb weight, the P-Car might make commuting 1983's favorite national pastime."

The biggest splash yet—a 4-page cover story—appeared in the May 1981 *Road & Track*. Dominating the cover was a perfect illustration of a P-Car prototype along with its then-most-obvious competition: a Mazda RX-7 and Fiat Xl/9. Inside were another illustration, a cutaway drawing, several spy photos, an accurate specification table, and even sketches of the space frame and individual body panels, complete with color coding to indicate the various types of plastic.

R&T listed engine choices as a standard 1.8-liter ohc and optional 2.5-liter pushrod Four, both with TBI throttle-body electronic fuel injection. "Another possibility further down the road," wrote R&T editor Tony Hogg, "is a Chevrolet-designed, 60-degree V-6, also with TBI, which we're told is currently pumping out approximately 180 bhp in a P-Car weighing around 2100 pounds. That combination has the makings of a road burner the likes of which we haven't seen in ages, and also the potential for a GM interdivisional squabble of monumental proportions. Chevrolet may be more than a little reticent to release such an engine to Pontiac because it would give the P-Car Corvette performance at half the price."

As it happened, Pontiac engineers were indeed playing with turbocharged 1.8-liter Fours and V-6's prior to introduction (see Chapter 9). So accurate were the *Road & Track* and other sneak stories that someone at Pontiac had obviously leaked the information. The intent was probably to boost the division's sagging image and create interest in the new car well in advance of introduction. Pontiac might also have hoped that public clamor for the P-Car might influence GM's decision on production funding.

Then *Popular Mechanics* reported in its Oct. 1981 issue that the entire project had been postponed. "Sources indicate that GM has put a hold on [the] P-Car, originally scheduled for 1983 introduction," said the magazine's *Detroit Listening Post* column which, incidentally, I authored at that time. "Cash-flow problems due to continuing slow sales and a developmental glitch involving the engine subframe are cited as reasons for the delay." My column speculated that GM's powerful Chevrolet Div. might have influenced the delay in fear that the P-Car's intro might steal thunder from its all-new Corvette, which was also scheduled for a mid-1983 launch.

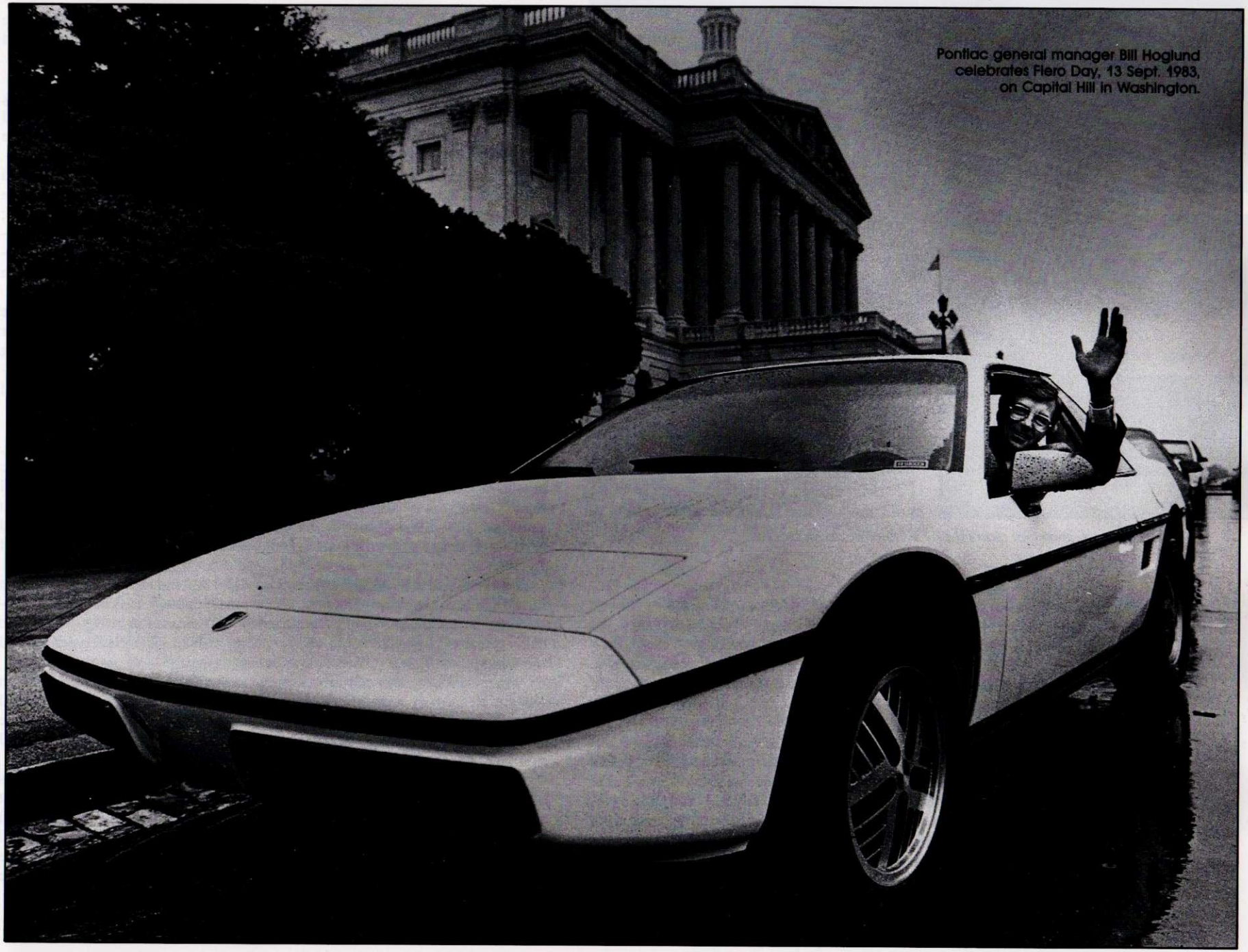
My next month's DLP column said that, "GM has again flashed the green light," but added that the P-Car wouldn't hit Pontiac showrooms until the fall of 1983, a year later than originally planned. In December, GM launched a rather desperate National New-Car Sweepstakes to build showroom traffic, clearly demonstrating to the nation just how bad off its largest automaker really was.

Then, in *Popular Mechanics* for May 1982 (distributed in early April), my DLP column reported that, "A decision on whether or not to go with the eagerly anticipated mid-engine Pontiac sports (wups, *economy*) car should come sometime next month. Word is that design and engineering work are well along, and it all depends on how solvent the company is come spring. We can only hope—and emphasize again how important this exciting little beauty is to the youthful new image Pontiac is trying to achieve."

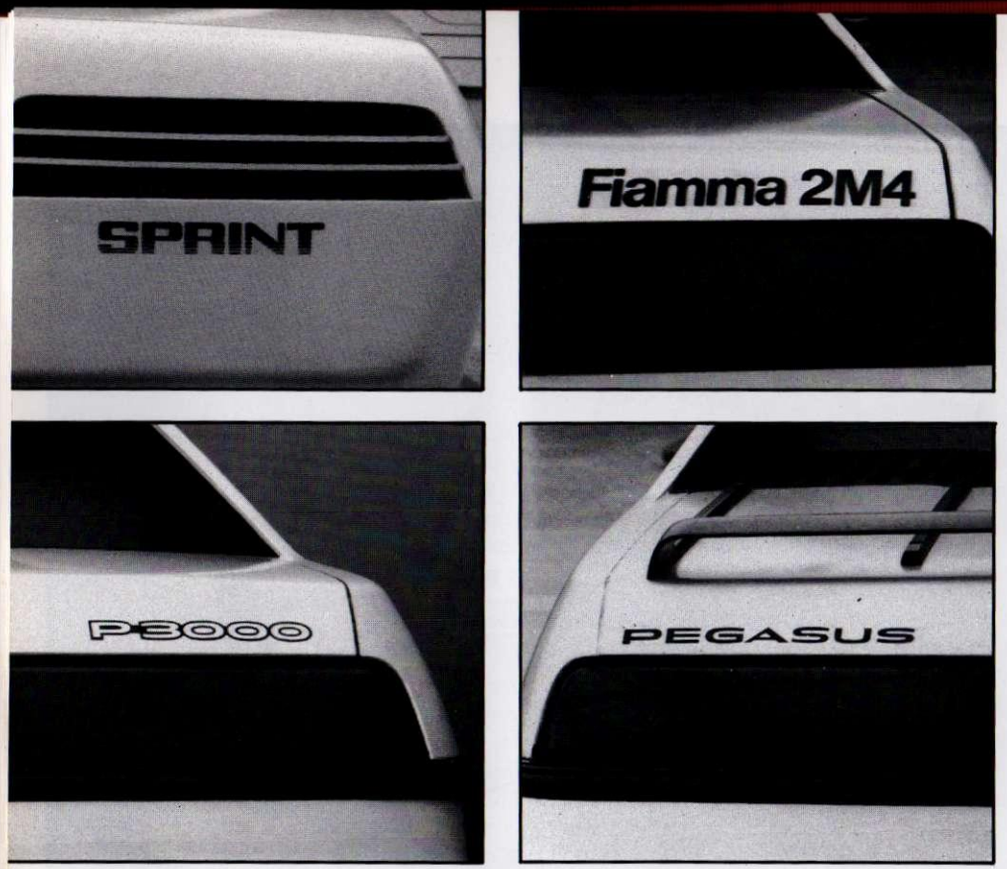
Sure enough, in a letter to his staff dated 4 May 1982, Pontiac general manager Bill Hoglund joyfully announced: "General Motors has given Pontiac...approval to build and sell the sporty, 2-passenger car we have been developing.... The corporation's approval of the major financial investment for this project...in spite of current depressed economic conditions, is a tremendous vote of confidence in all the people who work at Pontiac.... Please accept my personal congratulations for a job well done, and join me in the sincere belief that our cooperative efforts toward mutual goals will mean continued excitement at Pontiac."

The first thing sales manager Bill Lane did upon receiving this happy missive was to send copies to Pontiac zone managers across the country. He then sent copies to every Pontiac dealer nationwide. "If we'd had our druthers," says Lane, "we'd have come to market with the V-6 the first year. But time spent on the launch was really directed at the 4-cylinder car. We knew that engine was all we were going to get, and we also knew that there was a way to have the P-Car still be an exciting automobile."

With the corporate blessing in hand and the old Pontiac big-car plant already



Pontiac general manager Bill Hoglund celebrates Fiero Day, 13 Sept. 1983, on Capital Hill in Washington.



Of the names that didn't make it, Fiamma came closest.

under reconstruction, Hoglund spoke before the 1982 *Automotive News* World Congress in Detroit. His topic: "Pontiac's New Image." Toward the end of his speech, Hoglund surprised everyone by candidly acknowledging the P-Car's existence, saying, "...it has been developed on the leading edge of technology...[and] from the standpoints of both design and engineering, we feel this is the most innovative new General Motors product since the first Corvette 30 years ago."

That speech and an exhaustive followup campaign were the work of another important addition to Hoglund's staff, an energetic, enthusiastic new public relations director named Bruce G. MacDonald. MacDonald had moved to Pontiac from corporate PR just that June. He immediately felt that, "The P-Car was clearly being sneak-released without any control or attention to what might be in the best interest of the division. Our No. 1 job, as I saw it, was to get control of the information going out and shift the focus to some sort of organized effort designed to build not on the car but on the manufacturing process, the design, and the people.

"We talked to the union," continues Bruce, "and we talked to the people running the plant. They gave us input and became part of the team. As a staff, we probably spent the most time struggling with two pieces of business: 1) to make sure, through the designers and engineers, that we understood the product; and 2) to work with our ad guys to assure consistency."

In late 1982 and early '83, MacDonald spearheaded a series of planning sessions attended by representatives from all Pontiac staff areas. Also invited was the division's ad agency, then known as D'Arcy MacManus & Masius. The purpose: to discuss methods of publicizing the P-Car.

These sessions reviewed marketing strategies and brainstormed a list called *101 Ways to Create Desire for the Pontiac P-Car*. Among the *101 Ways* were such must-do's as: create a pace car, preferably for the 1984 Indianapolis 500; get the P-Car mentioned in the Congressional Record; make toy models available at introduction; demonstrate the P-Car's serviceability and corrosion resistance; win races; win styling awards; earn special insurance rates; and design custom-fitted luggage.

A secondary also-do list included ideas like commissioning a P-Car song once a name had been selected, affiliating Pontiac's sportster with a tennis or soccer team, creating a special racing class for the car, offering incentives to graduating seniors, getting an international union endorsement, sponsoring a design competition for custom body panels, and even advertising the car in *Playboy* and *Playgirl*—a longtime taboo at conservative GM.

Yet, fairly late in the program, no one could agree on what to call the car. *Sprint* had been one possibility. The designers and a lot of other Pontiac people favored *Pegasus*, an old Pontiac showcar name. One designer in Bill Scott's studio, Jon Albert, even took it upon himself to create an emblem showcasing the winged horse from Greek mythology. Jon's design was so good that it eventually became the P-Car's badge even though the Pegasus name didn't fly.

Pontiac rejected Pegasus, according to Bill Hoglund, because most people mispronounced the name. They put the accent on the second syllable (Peg-*gas*-sus) instead of the first syllable (*Peg*-uh-sus). "So then we had a big, huge name study," relates Hoglund, "and finally came up with *Sunfire*. We figured we had *the* name!

"Then one day I got a call from a janitor at the assembly plant named Calvin Queen. He told my secretary he wanted to talk to me about the Sunfire. I said fine, and I went over there. He came in—this was when they had a prototype over there and were doing some [corporate] selling on it—and I said, What did you want to talk to me about?

"Calvin said, It's the greatest car, but everybody thinks the Sunfire name is awful. I asked him, What's wrong with it? It's old-fashioned, he said, and that car is too new and fun and fresh to have that tired old Pontiac name on it. Okay, I said, any suggestions? No. Well, why don't you have a survey here in the plant? So they did, but the names that came back weren't a heckuva lot better. And the only guys who liked the name Sunfire were the salesmen, because it had Pontiac recognition. It sounded Pontiac.

"Finally we said, Okay, let's set up a meeting. Bring in every name you want, and we won't leave the room until we can all agree on one name."

Before that meeting took place, though, Pontiac chief designer John Schinella came up with the name *Fiamma*. "It means *first love of the heart; flame; excitement*, in Italian," he relates. "One night Sergio Pininfarina, the Italian designer, was in town, so we went out to dinner, and I later had him over to my house. I showed him slides of the car and a list of Italian names and, after much discussion and a sorting out of the phonetics, we felt that Fiamma best suited the spirit of the car.

"Everybody liked it until they took it to the dealer council, and then Bill Lane and Hoglund called me and said, John, we just can't use that name. The dealer council doesn't like it at all. I said, What's the matter with it? Lane said, They just think it ought to be Firebird XP or something similar. I felt that would take away from the Firebird. They said, Well, have you got any other names? I told them I'd get to work on it right away.

"Being somewhat discouraged but also knowing the great team spirit and camaraderie between Bill Hoglund, Bill Lane, and the studio, it gave me renewed energy to press on. In the studio, we all felt that an Italian name was very appropriate, especially with a few of us being of Italian descent. That next Saturday, while thumbing through the Italian dictionary at home, my wife, Roxann, came into my home studio and asked why I was so quiet. I replied that we'd lost the Fiamma name, and I mentioned that some of us were disappointed, but we still wanted to pursue a new Italian name.

"Then almost immediately, I tripped on the word *fiero*! I said, Hmmm, that sounds interesting. My wife asked what it meant. I told her, It means *very proud*. And we both agreed that this was the right name.

"Hoglund was about to have this big meeting to decide on a name. I called it The Last Supper, because we were all going to go into this room, about 12 of us, and lock the door, and we couldn't leave until we had a name.

"Before the meeting, I started calling some of my supporters. Hulki didn't seem to care one way or the other, although he wanted a Turkish name. Jim Fitzpatrick, the comptroller and a real Design Staff supporter, liked it. So did [executive designer] Hank Haga and [Pontiac interior studio chief] Bill Scott."

Bill Hoglund picks up the story here: "So we got to that meeting. We'd invited everybody who had anything to do with the car: Hulki, Schinella, Bill Scott, manufacturing guys, sales guys, the whole staff. They'd submitted names beforehand to Planning, so we put them all up on the wall. The first process was, Okay, each guy can choose his favorite, and he had five minutes to sell it. We went around the table, and we got the list down to five. Then we got it down to three: Fiamma, Sunfire, and Fiero. Fiamma was considered too sleek. Sunfire sounded too old. But Fiero seemed just right."

Once the car had a name, the first thing PR director Bruce MacDonald did was to organize a big press conference at the plant to announce it. Despite a blustery winter morning on 9 Nov. 1982, an impressive array of local and national media turned out—from *Newsweek* and *Time* to the *New York Times, Los Angeles Times,* AP, UPI, *The Wall Street Journal*, industry trade magazines, and several local radio and TV correspondents. Everyone assembled at the former Fisher Body plant—soon to become the Fiero plant—at 900 Baldwin Av., Pontiac, Mich.

At a Pontiac press preview, public relations director Bruce MacDonald gives his son, Glenn, a turn at the wheel of the first Fiero convertible.

In addition to the press, VIP's included Pontiac mayor Wallace Holland; Pontiac's Hoglund, Aldikacti, Schinella, Scott, and Schaefer; the union's Jerry Lewis plus several hundred laid-off UAW workers and their families. A Fiero prototype stood beside the podium, under a tarp, with a symbolic chain and padlock around it. Music rose up from the GM Boogie Grass Band, made up of plant employees.

Plant manager Ernie Schaefer took the podium, introduced Mayor Holland and the Pontiac contingent, commented on the significance of holding this event jointly with the union, and briefly described the plant itself. It was originally completed in 1926, the year of the first Pontiac, and it currently covered 57 acres, 1.8 million square feet, with renovation for Fiero production started in Aug. 1982 and now 35% complete.

He mentioned that the early pilot-car build would begin in Feb. 1983, with actual Fiero production slated for late summer and public intro due in the autumn of 1983. Some employees, he added, would be called back to work in late January for the pilot program, that 750 would be working on pilot and production-readiness programs by mid-June, and that full 2-shift employment would eventually reach about 2400.

By that time, Bruce MacDonald's Fiero publicity program was pretty well set for the entire coming year. As outlined in a 23 Nov. 1982 letter to Bill Hoglund, MacDonald's busy calendar included the following highlights:

★**January**: background briefings for major magazines to "whet their appetites and get them planning Fiero coverage down the road."

★**February**: interviews for local newspapers and magazines, the wire services, trade and financial publications concerning the Fiero plant's unique programs involving the union and individual workers. Also for February, a press announcement of the pilot build program.

★**March**: press conference at the plant to discuss the manufacturing story.

★**April**: teaser photos and Fiero background briefings for the general press.

★**June**: three separate long-lead press previews for editors of the nation's car magazines. These would take place on the East Coast, West Coast, and in Detroit. The three events would be held one full month ahead of GM's multi-divisional long-lead press previews in July. (Long-lead press previews are held by all carmakers, domestic and foreign, specifically for auto-magazine staffers, usually about three months ahead of the public announcement of the next year's models. These three months give the magazine people time to get pictures and information into their publications.)

★**September**: short-lead press previews for daily newspaper and weekly newsmagazine writers, to be held in Detroit, Los Angeles, and Washington, D.C. (The short-lead people need only a few days to prepare their material for publication, and if they were invited to the long-lead press previews, their stories would come out far ahead of the auto magazines and also far in advance of public introduction of the car.)

★**November**: press preview to announce the 1984 Indy 500 Fiero pace car.

"What I think we did pretty effectively," observes MacDonald, "was to bring in the long-lead editors and other key media early enough to meet with the Aldikactis, the Dorns, the Wetzels, the Schinellas and Scotts, the engineers and designers who were putting this car together. It was obvious that the Fiero represented the rallying cry for American labor to rebuild a tarnished image with an automobile that was so revolutionary."

Unrelated to these orchestrated efforts but indicative of the pre-intro interest in the car was a Jan. 1983 DLP in *Popular Mechanics*. Nearly half the column was devoted to the Fiero, complete with sneak photos of a test vehicle, probably V-6-powered, on aggressive 50-series tires. These pictures showed the Fiero's actual styling, not prototypes as seen in dozens of earlier spy shots. The copy correctly reported that the only available engine for 1984 would be the X-Car's 2.5-liter pushrod Four bolted to either a standard 4-speed manual or optional 3-speed automatic transaxle. It also said a 5-speed and either turbo or V-6 power would be future improvements.

One *direct* result of MacDonald's efforts was an 8 Feb. 1983 *New York Times* article on the Fiero's manufacturing process by auto writer John Holusha. "There is a section in most automobile assembly plants," it began, "that is not usually shown to visitors. It is the place where burly men with rubber mallets and wooden wedges grapple with sticking doors and misaligned hoods, pounding and twisting them until they fit functionally, if not very well.

"This need for crude adjustments has seemed to be one of the inevitable, though unwelcome, byproducts of the mass production of stamped sheetmetal: the accumulation of errors, no one of which is beyond allowable limits, but which together add up to a door that will not close properly or a fender that does not line up. Most of these errors are impossible to eliminate completely.

"But engineers at General Motors' Pontiac Division have developed a process for close-tolerance bodywork that may not require Japanese labor relations or Mercedes-Benz sticker prices. And this process is the result of what many have thought has long been lacking in the once-dominant American auto industry: important technological innovation."

That January, Hulki Aldikacti moved over to Chevrolet to become vehicle chief engineer, and Ronald A. Rogers took his place at Pontiac. Rogers thus became the engineer who shepherded the Fiero along those few final steps to production. "At the time," recalls Rogers, "we were doing things like finishing up our pre-pilots and getting into our pilot vehicles, going through the last-minute problems that you find when you try to put things together on-line. You work on those one by one."

The pilot build program began on schedule in late January, and a 4-page press package about it went out the next month. The package included several photos and covered every aspect of the assembly process The release explained the Fiero's 3-phase *match-metal* program, which involved the testing of hundreds of production-tooled Fiero parts for fit, buildability, and adherence to blueprint specs. Body panels and critical interior parts had also been checked and rechecked for fit well before the pilot program had started.

A total of 41 pilot Fieros would be assembled over three months to prove the integrity and accuracy of the new production facilities. These cars would then go through an intensive GM quality audit, followed by a tough program of testing on various real-world road surfaces at the GM proving grounds. Included would be emissions and both cold- and hot-start driveaway tests, severe angle parking tests, squeak and rattle checks, and much more.

Starting in Apr. 1982, a slow, careful, pre-production, lead-unit build of three cars a day would incorporate all changes and improvements resulting from the match-metal and pilot programs. Actual Fiero production would begin in July at a rate of just three cars per hour, accelerating gradually to 30 an hour by the end of August. As it turned out, the Fiero build program stayed remarkably on schedule throughout this period.

Earlier in 1983, Bruce MacDonald decided that Pontiac needed a full-time public relations presence on the West Coast, so he sent ace product/PR person M. Jill Witzenburg (yes, the name does sound familiar) off to Los Angeles to open an office there. One of her first projects was to put together a trio of sneak-preview drives for editors of the three major auto magazines at GM's Arizona desert proving ground. This was a good seven months before the car would appear in Pontiac showrooms.

Witzenburg reported back to MacDonald in an 11 Mar. 1983 memo, saying the buff-book editors' impressions were good overall, with specific positive comments on the Fiero's styling, ride, interior roominess, silence, and even the

performance of its 4-cylinder, 4-speed powertrain when considered as a *commuter* car. Negative remarks involved slow steering and throttle response, tires too small for the wheel openings, soft suspension, and too little performance for a *sports* car. "Could use a 5-speed," said one editor. Others noted the incomplete gauge cluster that lacked oil-pressure information; too-tall console, which interfered with elbows in spirited driving; and too little lateral support in the seats for hard cornering.

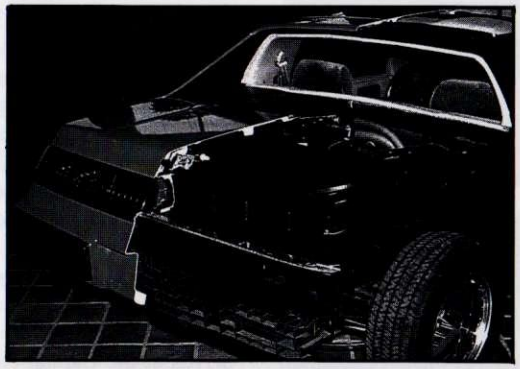
Motor Trend editor Tony Swan wondered why the 1.8-liter turbo engine (a 1984 Sunbird option) wasn't available for the Fiero. *Road & Track* editor John Dinkel predicted that the Fiero would sell well if priced at about $9500.

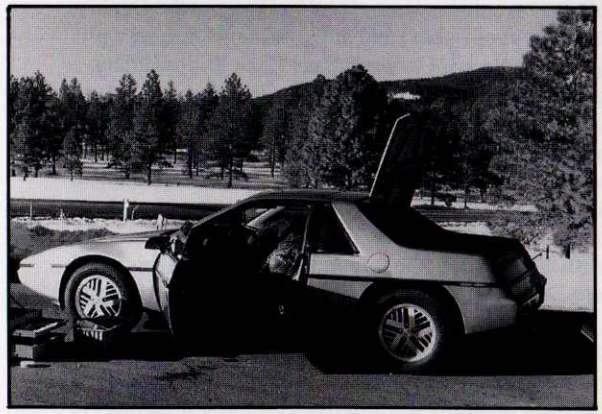
Meanwhile, Dick Thompson in Pontiac's main PR office and Fred Mackerodt in New York made a slide-show presentation to the East Coast press corps, same as in L.A. but minus cars. Again, feedback was mostly positive, with styling the biggest rave. On the downside, a few editors mentioned missing a high-performance engine, 5-speed gearbox, and power steering. Thompson reported that some of the New York group "felt the car looked like it should do better" than its projected 0-60-mph time of 11 seconds.

Trade magazines, however, positively put the Fiero on a pedestal. *Modern Plastics* called the car "...a milestone in a technology transition...as sweeping as that from custom bodies to Henry Ford's assembly line." *Plastics World* wrote that, "The innovations represented by the Fiero are bound to have strong influence on how cars will be planned, designed, and assembled in the future."

Plastics World also gave the Fiero its Better Way design award in the 1983 transportation category. Established "to give recognition to products that exploit the design and manufacturing advantages of plastics in a particularly novel or imaginative way," this was only the first of a long list of trophies the Fiero would bring home to Pontiac in the coming year.

In early June, right on schedule, the long-lead magazine press previews started to happen, first in the Detroit area, climaxing at GM's Michigan proving ground near Milford. A second preview on the West Coast started in San Francisco, with a ride-and-drive through California's wine country. That eve-





During the uncertainty, Fiero engineers kept testing, here at Death Valley and in Sierra.

Press exhibits included a cutaway Fiero and a space frame separated from its body panels.

The motoring press put pre-production Fieros through their paces innumerable times.

Pontiac released several teaser photos prior to Fiero's 22 Sept. 1983 introduction, including this view of 2-seaters on their way to dealerships.

ning, writers and editors dined at the Silverado Country Club in Napa, with driving trials the next day at Sears Point Raceway, near Sonoma.

The Eastern media had their turn on 29-30 June, an event again organized by Thompson and Mackerodt. It started at Tavern on the Green in New York's Central Park, with a ride-and-drive to Snow Ridge Village, Jack Frost Mountain in the Poconos. Fiero flogging took place the next day at Pocono Raceway, and everything went smoothly.

At all these previews, Pontiac set up elaborate displays and demonstration booths where editors could study the Fiero in detail. For example, one display had a Fiero door—the inner steel space frame under its plastic body panel. To one side, suspended by a chain, hung a bowling ball. A Pontiac engineer lifted the ball head high, the chain stretched parallel to the ground. He then released the ball, which smashed into the Fiero door. Time after time, the bowling ball crashed into the plastic-skinned door, but with no visible damage even after hundreds of impacts.

Other displays included a running Fiero without its skins. People could and did drive and photograph the nude, unpanelled space frame. On display, too, were a Fiero roadster concept car and a Fiero SD-4 (see Chapter 9). The SD-4 had racing body panels, a Super Duty 4-cylinder engine, and a host of other high-performance modifications. All these were shown again at GM's regular multi-divisional press preview in mid-July.

Not just auto enthusiasts wanted to hear about the Fiero and its manufacturing technology so, starting on 29 July 1983, Pontiac set up a 32-event speech and presentation schedule that eventually stretched into the following May. The series kicked off with a talk by Hulki Aldikacti and Ron Rogers at a University of Michigan management briefing. Those two plus Jay Wetzel, Ernie Schaefer, Tom Kalush, and others formed a sort of Fiero speakers' bureau. They spent considerable time spreading the Pontiac word and found themselves traveling to all parts of the U.S. and even to Canada and Germany.

The jewel in Bruce MacDonald's publicity crown, though, came out of that original *101 Ways* list. Ironically, the unlikeliest proved the most interesting and, in some ways, the most rewarding: getting the car mentioned in the Congressional Record.

Fiero Day, 13 Sept. 1983, was the brainchild of U.S. congressman Bob Carr, whose Michigan district included the city of Pontiac. Carr himself announced the four avowed purposes of Fiero Day: 1) to promote the new technology being used to produce the Fiero as proof that the American auto industry is very much alive and aggressive; 2) to recognize union and management at Pontiac Motor Div. working with renewed vigor and mutual cooperation to produce new, competitive products; 3) to salute the people of the city of Pontiac, Mich., for their contributions and sacrifices; and 4) to promote Pontiac's new Fiero in an effort to spark the renewed interest in American-made automobiles in general and to help sell this new car in particular.

Carr invited absolutely everyone who was anyone to take part in Fiero Day: all Pontiac city officials, UAW representatives, General Motors and Pontiac Motor Div. management. Also invited were all members of Congress plus federal and D.C. officials and, of course, the national and international media: TV, magazines, and newspapers.

To commemorate the event, Pontiac PR printed up official "Take the Hill" envelopes and letterhead, used for all invitations, presskits, and Fiero Day mailings. The schedule of activities noted that Fieros would be available for test drives at the Capital entrance from 10:00 a.m. to noon that Tuesday, and that UAW and Pontiac representatives would be demonstrating Fieros at the Department of Transportation, Department of Labor, and at the White House as well.

Fiero Day began with a welcome by Congressman Carr, followed by a luncheon co-sponsored by Pontiac and the 60-member Congressional Auto Caucus, and finished with a UAW-sponsored reception that evening. As one of the speakers at the luncheon, along with Carr and the UAW's Lewis, Bill Hoglund told the assembled congressmen, press, and other guests that the event was much more than just a preview of another new car. "It's a preview of our advanced state of the industry," he said, "both in how we design our cars and, more important, how we're all working together at Pontiac to produce this car."

Bill Lane remembers Fiero Day with particular fondness. "We were trying to show the legislative world," he smiles, "that you didn't have to go overseas to get a great innovation in our business.... We had the UAW people fly out to Washington with us on the GM plane, and we stood there together on the Capital steps with our Fieros and showed them off to Congress. Can you imagine Tip O'Neill getting into a Fiero? Well, it happened!" And as MacDonald had planned more than a year earlier, Fiero Day and many of its specifics were entered into the Congressional Record.

With two months still to go to public introduction, Steve Kopcha and the ad agency put their various media blitzes in motion. First came an August teaser poster in Pontiac dealerships, followed in September with an ad in magazines and newspapers that quoted John Holusha's *The New York Times* technology article and closed with: "It's been called one of the most innovative American cars ever. We call it the Pontiac Fiero, and it's arriving Sept. 22, 1983."

Then came some TV teaser spots showing a bright-red Fiero zipping along a narrow, twisty road somewhere in the Southwest. Just as the car gets close enough for the viewer to really see it, it's partly obscured by the gold-on-black Fiero emblem. "That teaser got pretty good airplay," Kopcha says, "and the dealers supported it themselves. So the stage was set, with all the PR and our teaser advertising going on simultaneously."

Bruce MacDonald sums it up this way: "I thought it was a very orchestrated approach. We tried to send out two distinct messages: One, American design ingenuity is alive and well. Two, the car is being built in Pontiac by American labor. What I felt good about was that, everywhere you looked, there was consistency. Everything built toward the same end."

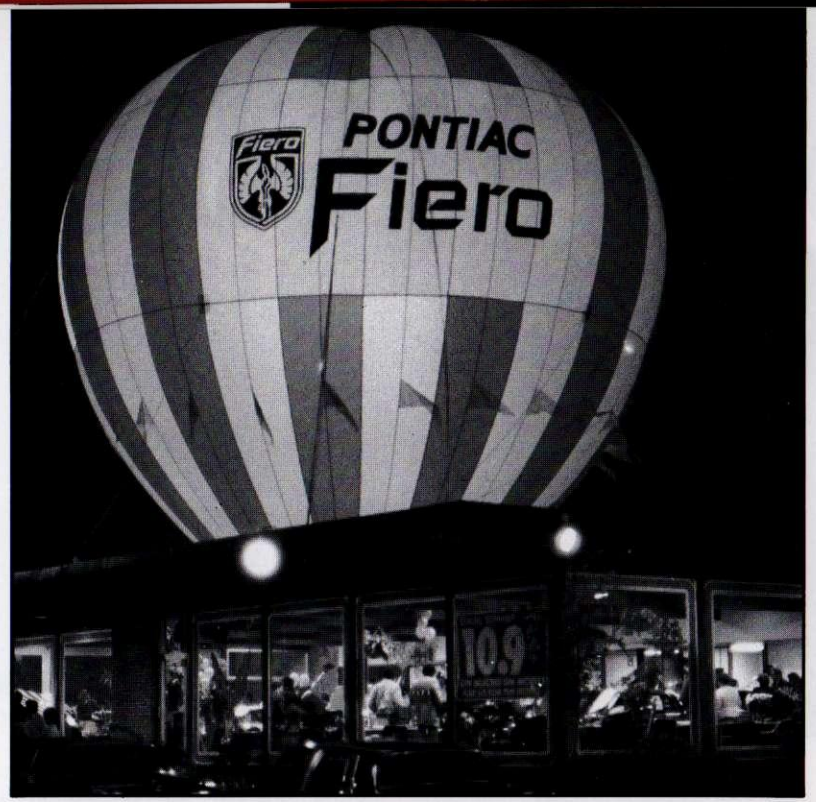
Few people outside GM had any idea that Ron Rogers's Fiero engineering team was wrapping up its final, exhaustive durability testing on the Fiero. These tests had to be successfully completed before the first production car could be released. "We had to be sure there'd be no last-minute snafus," relates Rogers. "Did we have temperature or overheating problems, bearing problems, or anything else that would show up with extended mileage? We kept checking, and we actually completed the 100,000-mile testing between the pilot program and when we delivered the first vehicle.

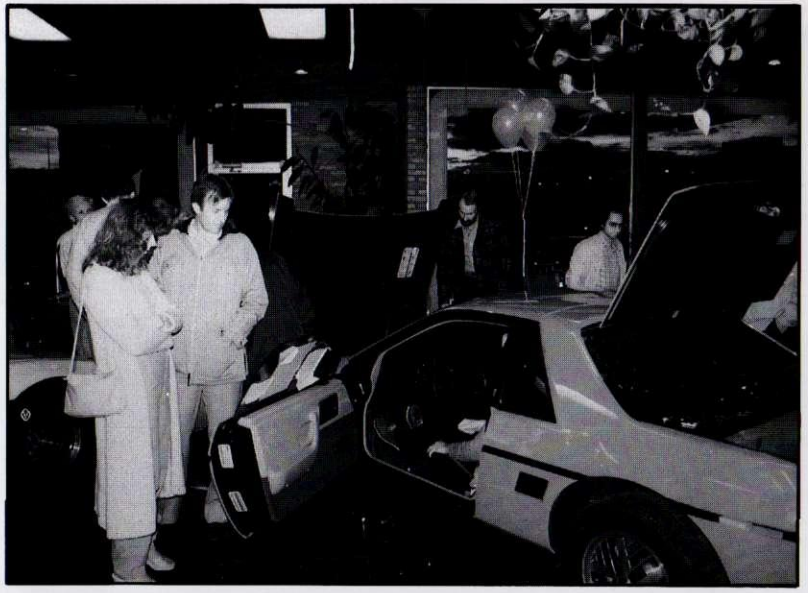
"Those tests ran over a period of about six months, day and night, seven days a week, between early March and early September of 1983. We were actually holding units that we'd built in the plant, not shipping them until our durability tests were finished."

One other crucial decision had to be made before intro day. How much should the Fiero cost? "Were our cost estimates correct?" asks Bill Lane. "Were our analyses right? There was a lot of discussion on price and what the return would be."

As Hoglund puts it, "We got down on the snorting post and had a little problem with pricing. As I recall, Roger [GM chairman Roger Smith] was concerned that we were overpricing the car and wouldn't get the volume we wanted. Usually he worries that we're *underpricing* a car and won't get the *profit!* So he asked the planning guys to have a [consumer] clinic, and they did, and it came back absolutely dynamite! People loved the car, and they estimated a price that was somewhere around $1500 *over* our proposal. I think that gave the corporation a lot more confidence...."

Hoglund adds that two competitors had come out since the Fiero's initial conception—the Ford EXP, costing $6645, and the Nissan Pulsar at $7749. "We looked for a way to scheme a low base price for ourselves," remarks Hoglund, "so we hit on this fuel-economy leader model. You couldn't get air conditioning and some other options, but it let us put the car out there for under $8000." The Fiero's initial base price, as of 22 Sept. 1983, was $7999. □

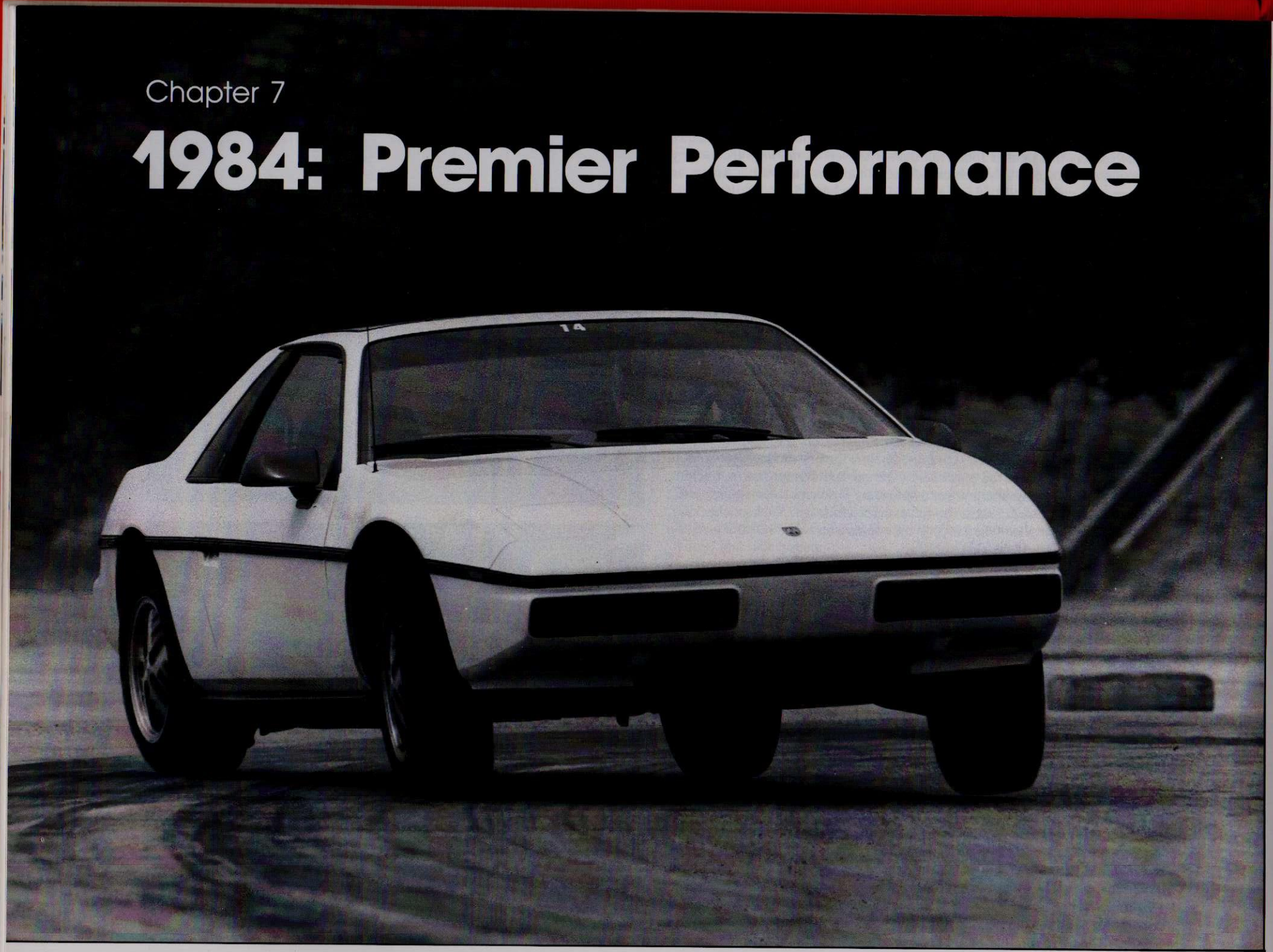


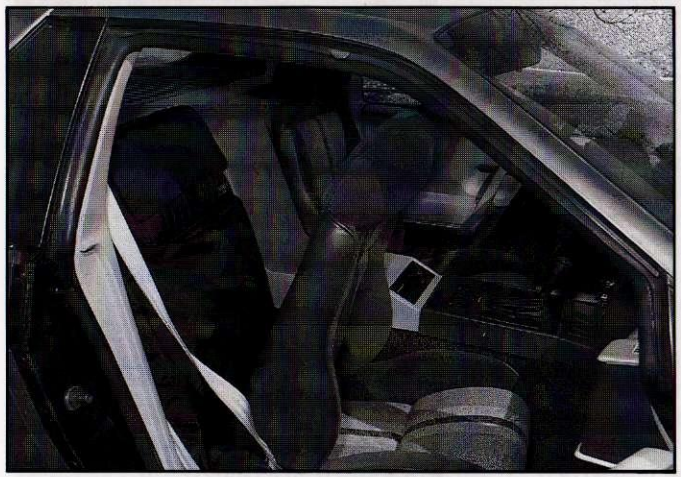


Fiero generated more showroom fever than any car since the Mustang. Art Moran Pontiac-GMC in Southfield, Mich., lofted a balloon and invited UAW workers in to help explain the Fiero to prospective customers.

Chapter 7

1984: Premier Performance





Soft 2-suiter can be stowed behind passenger's seat without sacrificing much legroom.

All 1984 Fieros with optional stereo systems came with twin 3-inch speakers in both headrests.

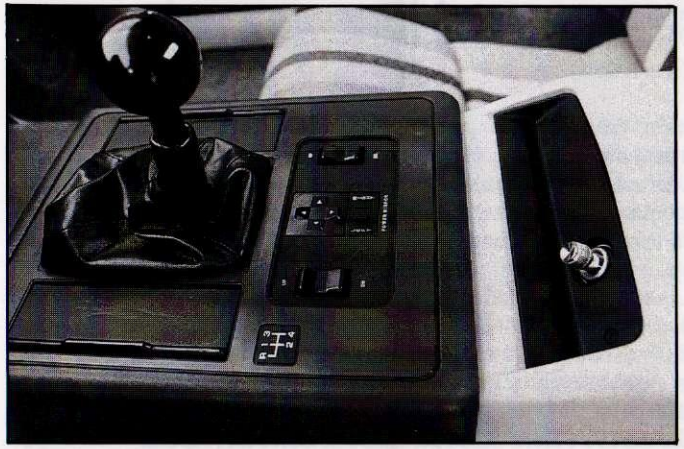
Fiero's 1984 Level III trim in SE Up-Level had fleece inserts in tan suede leather bolsters.

INTRODUCTION DAY FOUND HUGE CROWDS jamming dealer showrooms. Not since the Mustang had there been this much public interest in—and demand for—a new car. Thousands upon thousands of people flocked to see the new Fiero, and lots of them ended up buying cars, or at least wanting to.

Supply fell short of demand at first, due to the slow and careful production startup. Every Pontiac dealer in the country screamed for more Fieros. John Middlebrook, who had the job of allocating cars at that time, remembers, "I found that in distribution you were never right," he says. "You were always one long or 100 short. With the Fiero, we never found the happy medium, because we were always short!"

Adding to the problem were the thousands of Pontiac and GM employees who craved Fieros for themselves. "There was talk at one time about cutting all employees off," declares Middlebrook. "In the end, we made them wait just like our outside customers. I think we sold something like 10,000 Fieros to employees that first year; unheard of for a single model of a GM car."

Fiero fever was especially high in California. Pontiac's newly appointed western regional manager, William E. Enockson, pleaded for more cars with



Lighter plus controls for optional window lifts and electric outside mirrors rest in console.

Standard AM radios could be deleted for credit or applied to the price of an optional sound system.

Calibrated in both mph and kph, '84 Fiero's speedo tops out at 85 mph. Tach contains voltmeter.

both Middlebrook and sales manager Bill Lane. "This was absolutely a California car," states Enockson, "and the first thing we set out to do was to get Central Office to give us a fair share." Enockson's two California zones, Los Angeles and San Francisco, ended up with a whopping 20-25% of production for the first two months and 15-16% for the first year. "Our other dealers still didn't have enough," continues Enockson, "but they knew Pontiac was looking at them favorably. Fiero *made* Pontiac in California!"

Bill Lane puts the distribution strain into nationwide perspective: "I wanted to make sure we had credibility with all our dealers, so we told them up front where we saw the Fiero selling best, and obviously California was the big market ...where we felt we'd be able to do a good penetration job. That was never at the expense of other dealers, though. We'd have taken the same approach with any car: This is where the market is; this is where those Fieros should be going. I always felt pretty good about that. I could stand up at any dealer meeting and look them all in the eye and say, This is the plan *because*.... They all wanted more cars, but they did have a clear understanding that California represented the biggest market."

The 1984 Fiero burst onto America's roads with a lot of standard equipment and engineering features that people usually expected with more expensive, more exotic automobiles. Among its engineering nuances were not only the mid engine configuration, the plastic Enduraflex body panels over a steel space frame, but also 4-wheel power disc brakes with aluminum calipers, all-independent suspension with a 23mm front stabilizer bar, rack-and-pinion steering, hidden halogen headlamps, steel compact spare wheel, side-lift jacking, base/clearcoat paints, and extensive corrosion protection.

Standard equipment included bucket seats, freestanding instrument cluster with tachometer and working gauges (excluding an oil-pressure gauge), a dashboard information center, Delco AM radio (U-63 or UL-6, depending on series), hobnail carpeting throughout the interior, full console, map and interior lamps, side-window defoggers, dual outside mirrors with remote-adjusting driver's mirror, day/night inside mirror, trimmed front and rear luggage compartments, locking fuel filler with remote release, plus various smaller touches like map pockets, cigarette lighter, and dual fluidic windshield washers. These came on all 1984 Fieros, no matter which model you chose.

For 1984, the Fiero offered just one engine—Pontiac's trusty 2.5-liter pushrod Four with electronic throttle-body fuel injection (TBI). New-for-'84 swirl-port combustion chambers spiraled the incoming fuel/air charge for faster, more efficient burning, and the compression ratio went from 8.2:1 in the 1983 X-Car to 9.0:1 in the Fiero. But while the 1984 engine ran more smoothly and economically than before, its output dropped to 92 bhp from 94 in the previous year.

Fiero buyers did have a choice of three transaxles: two manual 4-speeds with different overdrive ratios and the 3-speed Hydramatic 125-C automatic. These drivetrains, too, came directly from the X-Car but were tuned and geared for specific Fiero models, some for economy, others for performance.

That year's Fieros came not in two basic flavors, as the 1984 equipment and sales literature might have you believe, but in at least three and maybe even four versions, depending on how you look at the lineup.

At the very bottom stood the base WS-9 Fuel Economy Leader, also called simply the Fiero Coupe and coded PE-37. This $7999 version amounted to more than just an option package, although that's how you ordered it. The Fuel Economy Leader came only with the MY-8 4-speed manual transaxle with 0.73 overdrive top gear and a high-mpg 3.32:1 axle ratio. You couldn't order air conditioning or the automatic transaxle, but you did get all the Fiero's normal standard equipment, including P185/80R-13 glass-belted radial tires on 5.5-inch steel Rally wheels. The Coupe/Fuel Economy Leader was actually the only Fiero capable of meeting GM's fuel-mileage target of 50 mpg. Its published 1984 EPA highway/city figures were 50/31 mpg.

Next up the scale came the $8499 Fiero Sport Coupe, the so-called base car. Its gearing differed from the Fuel Economy Leader's in that it had the M-19 4-speed (0.81:1 fourth gear instead of 0.73) and 4.10:1 differential ratio (versus the Fuel Economy Leader's 3.32:1). This gave the Sport Coupe much sprightlier acceleration than the Coupe, since its final drive ratio was 3.32 as against 2.42. You also got a standard Delco AM radio in the Sport Coupe plus Level II deluxe luggage compartment trim. And you could order practically any options you wanted, including a/c and automatic. The MD-9 Hydramatic 125-C, by the way, ran a 1:1 top ratio and a 3.18:1 axle. EPA estimates for the M-19 4-speed were 42/26 mpg; for the automatic, 37/25 mpg.

The Fiero SE stood another notch above the Sport Coupe. It cost $9599 and added, among other things, the WS-6 handling package (P215/60R-14 Goodyear Eagle GT blackwall steel-belted radial tires on 6-inch Hi-Tech Turbo alloy wheels plus revised rates on bushings, struts, and shock valving), Level II or III deluxe trim in the passenger and luggage compartments, 2-tone instrument panel, the 3-spoke Formula steering wheel, a digital clock in the Delco AM radio (UL-6), electric remote decklid release, luggage rack (a delete-for-credit item), and tinted glass.

Finally, there was also what the factory unofficially called the SE Up-Level which, like the Fuel Economy Leader, didn't have a true series designation, but some literature listed it. What differentiated the SE Up-Levels was the Level III interior—a trim option (see below).

At the start of production, the 1984 Fiero came in only two exterior colors: red and white. Later in the model year, black and light gray metallic were added, all in basecoat/clearcoat acrylic enamel (the Fiero paint shop could handle only four exterior colors at any given time). Interiors came in just two colors, gray and tan, with three interior trim levels. Early trim books showed Level I using Sierra vinyl on seat bolsters and headrests, with Genor cloth inserts, but production Level I was all cloth (Genor) without vinyl. Level II consisted of Placid cloth inserts and Pallex bolsters and headrests. Level III had tan sueded pigskin leather bolsters and headrests, with real wool fleece seat inserts. And you could get any interior/exterior color combination except tan seats with the gray metallic paint.

Among major options for the 1984 Fiero were four AM/FM Delco ETR sound systems, all with dual conventional speakers and two 3-inch speakers in the headrest of each seat. There was also a hinged/removable Vista Vent sunroof,

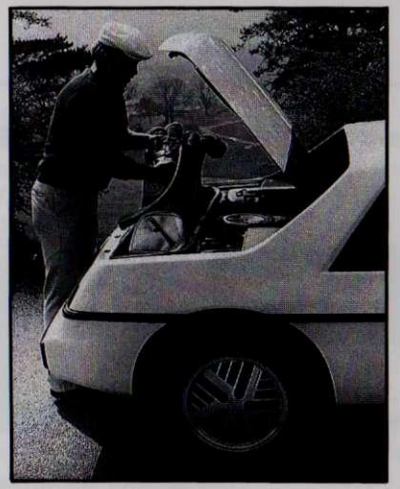
For 1984-85, Fiero offered 3 steering wheels and 3 types of road wheels. The 4-spoke steering wheel came standard on the Coupe and Sport Coupe, with SE's Formula (NK-3) 3-spoker available for all series. The leather-wrapped Formula wheel (NP-5) was also optional in all series. Base steel 13-inch Rally road wheel (below, left) could be ordered with trim ring. SE got Hi-Tech Turbo 14-incher but couldn't be ordered with 13-inch Turbo alloy spoked wheel.

trim rings for the Rally wheels, 13-inch Turbo finned alloy wheels for the Sport Coupe, a wheel-lock package, cruise control, power windows with or without door map pockets, electric outside mirrors, a dealer-installed engine cover shade that protected the luggage compartment, tilt steering column, a leather-wrapped steering wheel, heavy-duty radiator for cars with air conditioning, and a lot of minor items.

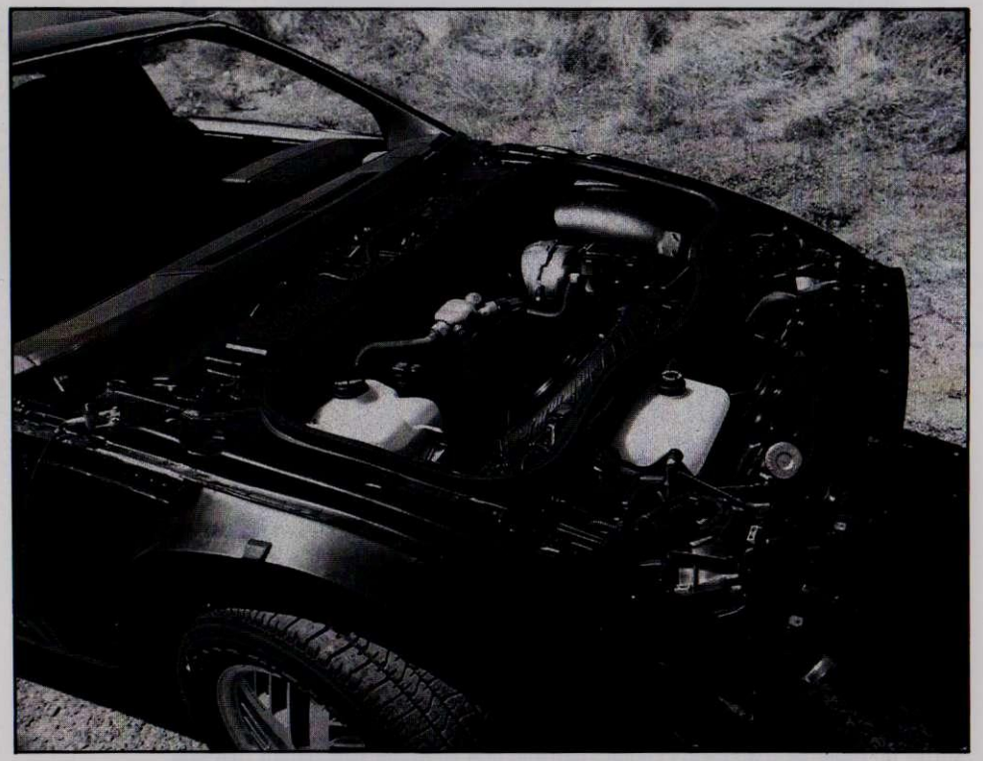
As much as possible, the Fiero became a do-it-yourselfer's car. A handy driver's manual, supplied with each car, gave easy-to-read information and guidance. All systems in the front compartment—brake master cylinder, power brake booster, hydraulic clutch reservoir, radiator coolant recovery tank and cap, a/c condenser, windshield-washer reservoir, heater and headlamp motors—were easily accessible for service. There was even some space up front for the optional removable sunroof or other small cargo.

Around back, under the engine deck, the sparkplugs, aircleaner, dipsticks for oil and automatic transmission, and other service items were likewise easy to see and get at. So were the fuel filter and cooling-system thermostat; everything, that is, except the oil filter. Both the engine and transmission were removable from underneath the car for major service, and the entire stainless-steel exhaust system came out as a single unit. Inside the cockpit, the rear panel of the instrument cluster came off for access, the fuses rested in a handy swing-down block below the i.p., and the heater core was accessible from under the right side.

The Enduraflex body panels didn't ding or dent, of course, but even more serious damage was fairly easy to repair. If a fender got torn, it would usually suffer no more than an easily fixable hairline crack. Major rips meant that you drove to your local Pontiac dealer, bought a new fender or other body panel in the appropriate color, went home, and put it on yourself with handtools. And if the



For 1984 only, Fiero's engine cover grille was cast magnesium. Two golfbags or 5 upright sacks of groceries fit into the 5.65-cu.-ft. rear storage compartment.



Mini-spare wheel was initially supposed to be aluminum, but production Fieros got a steel version instead. Spare and receiver/dryer leave front trunk tight for space.

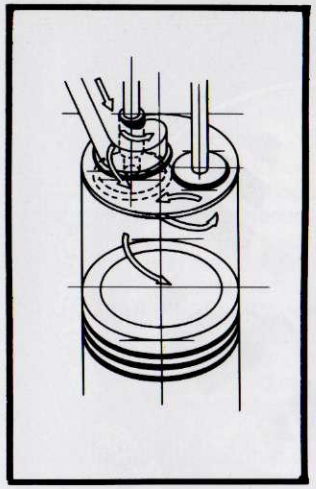
space frame got damaged, it could usually be straightened or parts of it repaired without affecting the body panels.

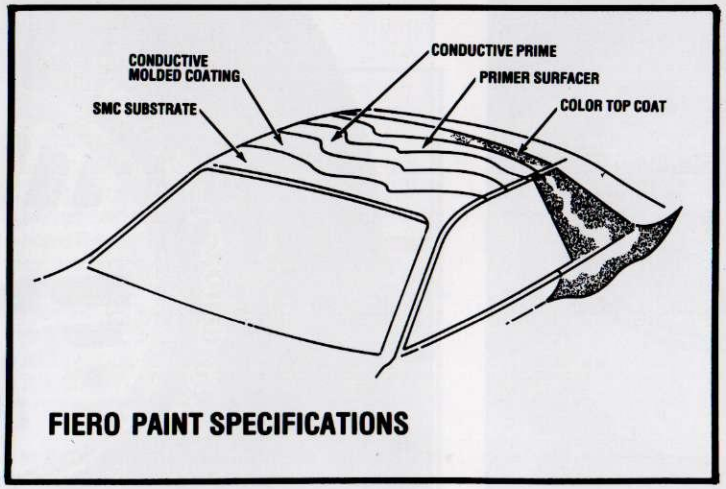
The 5.65-cubic-foot trunk behind the engine had been planned specifically to hold five standard grocery bags side by side. Or two 12-inch-diameter golfbags. Or three soft garment bags. Or one good-sized suitcase and a couple of smaller ones. John Schinella's studio even designed some soft luggage for the Fiero, but the supplier didn't come through, and this option was dropped before introduction. In a pinch, you could put one soft garment bag behind each seat, with some legroom sacrifice, plus another in the 0.2-cubic-foot front compartment, provided you didn't have the sunroof panel up there.

September 1983 issues of *Motor Trend* and *Road & Track* carried cover stories on the Fiero, with *Car and Driver* also giving it considerable space that month. "With the sole exception of the 1984 Corvette," wrote *Motor Trend's* Tony Assenza, "no car in recent memory has generated as much pre-introduction speculation and anticipation as this one has." MT praised the car lavishly, particularly its handling, steering, fuel economy, seats, and interior.

"The Fiero made quite a hit around here," continues Assenza's test. "Pontiac's stock went up tenfold in our book. If any criticisms could be leveled at the car, however, they would take the form of asking Bill Hoglund to install a 5-speed transmission and find some more horsepower in the 2.5-liter or install something like a V-6 or a turbo 1.8. Something on the order of 130-150 hp would be very nice. And while he's at it, maybe widen the brake pedal by an inch or so to the right for easier heel-and-toe."

Road & Track's impressions were similarly favorable. "The potential market for the Fiero is vast; with an expected price tag of $9000-$10,000 it should appeal to a wide spectrum of buyers wanting unique styling, good handling and a luxury interior, for commuter or pleasure driving," said the magazine, unaware





Fiero's upgraded 2.5-liter X-Car engine got swirl ports (left), while paint went on in 5 coats. A clearcoat over color layer isn't shown in center diagram.

that the Fiero's soon-to-be-announced price would be considerably lower than $9000.

Car and Driver's Don Sherman called the Fiero, "...a true sports car...a thrill to look at, a joy to ride in, and a ball to drive." He also noted, perceptively, that it represented, "...an ideal blank canvas for future alterations," adding that, "...nowhere else can you buy the true exotic look for less than ten grand." His major complaints centered on a combination of the low revving, unsophisticated engine and wide-ratio, economy-geared 4-speed, a lack of precise steering feel, and kickback to the wheel on rough roads.

C&D's full test appeared in its December issue. "The Fiero is the right car at the right price at the right time," enthused Rich Ceppos, adding that the loaded SE test car cost only $10,761. "Not at all bad," he wrote. "And everywhere we went, folks would overtorque their vertebrae to catch a glimpse of our blazing-red test car as we whisked by. We'd leave it in a suburban shopping-mall parking lot for five minutes, and there'd be people pressing their noses against the side glass. This kind of attention is normally lavished on Ferraris.... In fact, the Fiero is one of those rare cars that appears to be more expensive than it really is....

"The quality of every last panel on our test car was beyond reproach," continues Ceppos. "The finish was so lustrous you could comb your hair while looking into it.... The dash, the door panels, and the central tunnel covers are all sculptured from soft, low-sheen vinyl into shapes that suggest an Italian exoticar's interior." The following month, *Car and Driver* named the Fiero one of its Ten Best Cars for 1984.

February brought *Motor Trend's* Car of the Year issue, in which the Fiero finished a handsome second to the all-new Corvette. It placed first in MT's fuel-economy evaluation and second to the Vette in 60-0 braking; also captured top subjective honors for styling and quality. In all, it beat out such heady competitors as the Mustang SVO, Daytona Turbo Z, and the Continental Mark VII LSC.

As a road car, the stock 1984 Fiero supplied fun for every type of driver, but with only 4 cylinders and 4 speeds, it barely hinted at its potential.

All 1984 Indy Pace Car replicas used the Fiero's 92-bhp Four, retrimmed with special graphics, silver aircleaner and rocker cover, plus red ignition wires.

Pace Cars' standard Hi-Tech Turbo alloy wheels were painted white, with red lug nuts and trim. Tires were P215/R60-14 Goodyear Eagle GT's.

Bruce MacDonald's *101 Ways* master PR plan, you'll remember, called for a Fiero Indianapolis pace car to help publicize the marque. Sure enough, on 16 Nov. 1983, there one stood. It turned out to be important in two ways: 1) It became the first 4-cylinder Indy pace car since the 1912 Stutz, and 2) it ended up being the fastest Indy pacer ever to that time, with a top speed of 144 mph.

Developed under the supervision of Pontiac Motorsports engineering manager, John G. Callies, the three actual event pace cars were powered by a 2.7-liter Super Duty version of the Fiero's standard Four. Pontiac engineers Tim K. Petersen and Terry L. Satchell did the engine and chassis work, respectively, with special aero body parts designed in John Schinella's Pontiac Exterior II studio. The three cars' suspension systems, powertrains, and all-vented-rotor brakes were well reinforced to handle the engine's 232 bhp and 210 lb./ft. of torque. Added cornering grip came via Goodyear Eagle GT tires in sizes 205/50VR-16 front and 225/50VR-16 rear, mounted on special Centerline polished alloy wheels measuring 16x7 fore and 16x8 aft.

The new nosepiece, low and smoothly rounded, made the pace car look like it had no bumper, but one was hidden above the central air intake, set off by faired-in parking lamps. The nose plus side skirts and a large rear wing helped lower the actual pace cars' Cd from 0.41 to 0.35. Above the roof stood a functional airscoop with an aircraft-type strobing signal lamp built into its trailing surface. This low-drag lamp subbed for the usual Indy pace-car light bar. Not generally known was the fact that these three cars had experimental power steering and brakes with electric/hydraulic assist.

Marketing called for 2000 Fiero SE-based Indy pace-car replicas to be offered through Pontiac dealers nationwide, starting in Apr. 1985. Except for the roof scoop, these replicas looked very much like the real thing. They had the same special body components, same white-over-silver paint scheme, red accents, spoiler, and gray leather upholstery with red cloth inserts. Standard equipment included white 14-inch Hi-Tech Turbo wheels with red trim, electric outside sport mirrors, the NP-5 leather-wrapped steering wheel, and a top-line UU-6 sound system with AM/FM stereo cassette, 5-band graphic equalizer, and built-in digital clock. Most Indy pace-car replicas used the 4-speed M-19 gearbox and 4.10 axle, but some had the automatic. All came with the standard 2.5-liter engine, with a silver rocker cover, silver aircleaner, black logos, and red ignition wires. More about the Fiero Indy Pace Car at right.

Later in 1985, another pace car was readied for the 17 June PPG CART Indy-car race at Oregon's Portland International Raceway. Except for the slightly different white-over-silver 2-tone paint with bright *blue* accents, this vehicle was essentially the same as the true Indy pacers. It even had the same 232-bhp, 2.7-liter Four and the full Super Duty aftermarket package of high-performance parts. The car was especially appropriate because CART-series sponsor PPG was (and still is, as of 1986) the sole supplier of paint for production Fieros.

As it turned out, 1984 Fieros were built for nearly 18 months, from July 1983 almost through the end of calendar 1984. Startup of 1985-model production got delayed until the first of the year, largely due to last-minute work on the V-6 engine option and the pace-car lookalike Fiero GT. The result was a stunning 1984 production total of 136,840 cars, 67,671 of which were SE's, 2000 of *those*

The Real Indy Pace Car

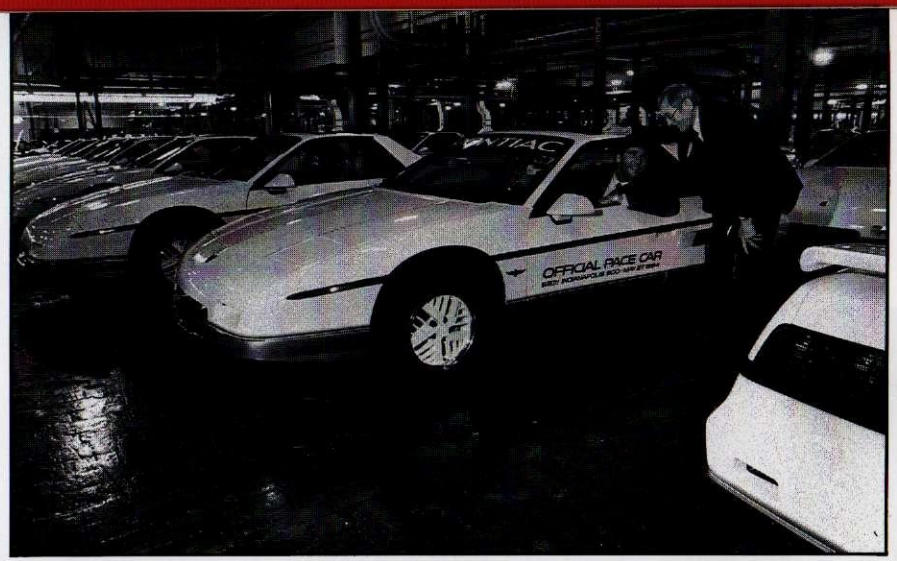
The official 1984 Indianapolis 500 Fiero Pace Car design evolved in John Schinella's Pontiac Exterior II studio, with strong backing from chief engineer Jay Wetzel. Says Schinella, "Jay opened the door for us on that car, and we came up with the new front and rear, the graphics, the quad exhausts, and the whole philosophy. That project paved the way to the GT for the next year, and the Pace Car also paid for the GT tooling."

To power the trio of actual Fiero Indy Pace Cars, John Callies's group built three slightly detuned 2.7-liter Super Duty engines. These put out 232 bhp at 6500 rpm and 210 lb.-ft. of torque at 5500 rpm on premium pump gasoline. Major pieces from the catalogue included SD-4 blocks, heads, and forged steel crankshafts.

Capable of 140-mph laps, these three identical vehicles became the speedway's fastest pace cars ever. Even with their fairly tall 3.66:1 final gearing, they could accelerate from zero to 60 mph in 7.2 seconds and to their 144-mph top speed in just over half a mile, the length of Indy's straightaway. Their aero noses and windtunnel tuning yielded a Cd of .35 along with a 15% reduction in forward lift and a 250-pound rear downforce

thanks to the special rear spoiler. All three pacers were streetable, loaded with every Fiero option except a/c, cruise, and rear defogger. Their rack-and-pinion power steering had a 15:1 ratio (versus 19.2:1 stock) and, like their brakes, was electrically assisted. Suspension mods included special Delco-Bilstein gas shocks, shortened springs (stiffened in the rear), and full-tread Goodyear GT's on polished aluminum Centerlines.

John Callies, thanks to his engineering/racing background, did all the on-track testing himself and then personally drove the principle pace car on race day. And if anyone thinks the privilege of providing pace cars for the world's best-attended and -watched motorsports event is easy or inexpensive, consider this: In addition to the engineering, the design effort, and then building the three actual race pace cars, Pontiac also had to provide another 140 Pace Car replicas, free of charge, for use by Indy drivers, officials, the press, and VIP's—plus another dozen or so as contest giveaways. The factory then produced the 2000 replicas for sale to the public. □

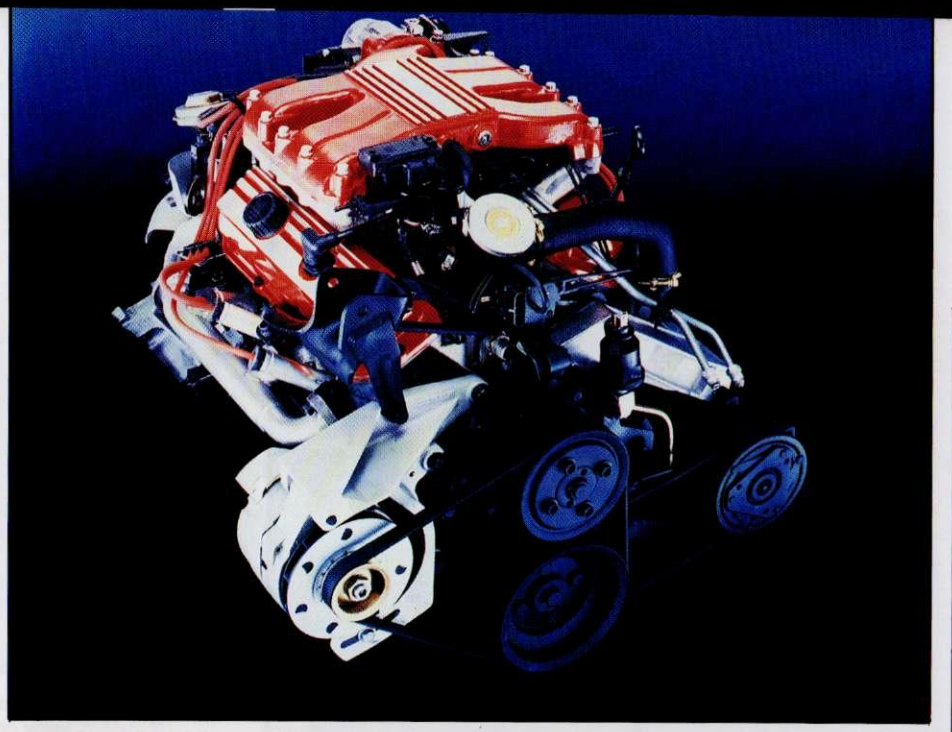


Pontiac supplied 3 actual 1984 Indy Pace Cars plus 140 replicas for the race. Shown are raceway president J.R. Cloutier (r) talking to Tony Hulman George.

being Indy pace-car replicas. Calendar-year sales came to 22,591 in 1983 and 93,485 in 1984.

Considering that Pontiac's first-year *goal* was only about 80,000 cars—28,000 more 2-seaters than anyone had ever sold before in this country—it's safe to say that the Fiero's initial performance was a rousing, surprising, resounding success. □

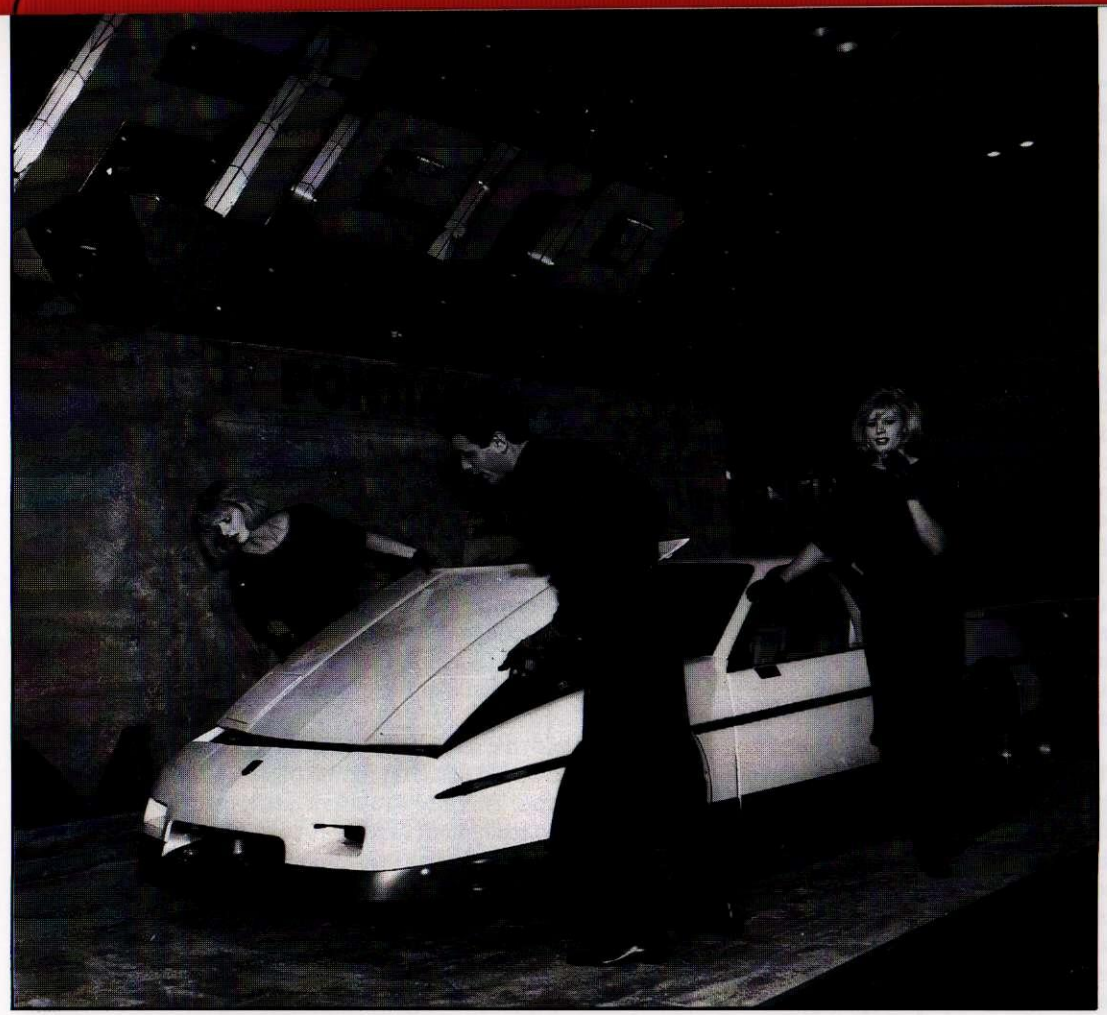
Nearly identical to the actual 232-bhp Indy Pace Cars, PPG's first Fiero pacer used polished alloy wheels and had blue instead of red color accents.



For 1985, Fiero added GT series with 2.8-liter V-6 engine. The GT used '84 Indy Pace Car aero nose and came with considerable standard equipment, including power windows, WS-6 suspension, AM/FM stereo cassette deck. The V-6 got a special ram-tuned MPFI manifold.

Chapter 8

1985-1987: Approaching Perfection



During Fiero's early years, demonstration teams—one consisting of identical triplets (right)—would install and remove plastic Enduraflex panels at auto shows.

AND YET SOME CRITICS MANAGED to find fault with the 1984 Fiero. How much and what depended on their expectations and experience. The most common peeve that first year was lack of performance, not just from the engine—which was lively enough at lower rpm—but from the powertrain as a whole. The primary problem was the mating of an engine that ran out of breath above 4000 rpm with lazy, wide-ratio, economy-geared transaxles.

The 3-speed automatic was decent enough for those who chose it. Its low-speed torque multiplication got things rolling off the line and, after that, owners of automatic-equipped Fieros were more interested in convenience than performance anyway. But the 2.5-liter Four with 4-speed left many drivers grumbling. This combination seemed to run out of steam no matter which gear you were in. Then you'd upshift into a deep hole before the revs would climb high enough so the next gear could find some legs. The gap between the 1.24:1 third and 0.81:1 overdrive fourth was especially frustrating (even more so with the Fuel Economy Leader's 0.73:1 high).

Clearly, either the engine needed more revs or the transmission needed one more gear. A small, low-torque engine always wants five fairly evenly spaced ratios in a manual box: a short low gear to launch the car, a tall fifth to cruise it quietly and economically on the freeway, plus three in between for flexibility. And compounding the tranny problem was a balky, imprecise shifter.

The 1985 Fieros hit Pontiac showrooms in Jan. 1985, this time with four distinct series: Coupe, Sport Coupe, SE, and GT. The '85 Fiero's important additions consisted of a V-6 engine, a standard 5-speed transaxle for the Four,

and the new GT series. Of these, the most impressive had to be the Chevrolet-built, 2.8-liter V-6: standard in the GT and optional in the SE only.

Ron Rogers's Fiero engineering team had been grooming the V-6 for some time. One reason this powerplant didn't make 1984 production was that it wasn't a simple drop-in addition. The car and the engine needed considerable modification to come together. Then, too, Rogers didn't want a carbureted version of the V-6. He held out for GM's 1985 MPFI (multi-point fuel injection) system, which necessitated a special intake manifold for the Fiero's low but revamped-for-1985 rear deck.

Derived from the 130-bhp V-6 found in Pontiac's 6000-STE sport sedan, this engine in the Fiero delivered 140 bhp at 5200 rpm. Why the 10 additional horses? "We did our own intake manifold," Rogers explains. The Fiero's 1985 V-6 intake manifold has been best described by *Motor Trend's* Ron Grable, an engineer, race driver, and MT staff member. Grable notes that the Fiero couldn't use an existing intake manifold because the engine would be too tall to fit under the Fiero's rear deck. The V-6, in fact, necessitated a new decklid for all 1985 Fieros. This revised decklid had a clearance bubble at its forward end.

"In addition," Grable writes, "the engine designers were working on a tuned-length ram-air program to optimize the individual port fuel injection system. The result was a [new] manifold in three pieces. First, a cast-aluminum base plate fits down into the 60-degree V-6. Next there's a crossover runner section. And on top is the plenum/upper-runner casting.

"Together these three pieces form a tuned-length intake system—fed from the plenum—that produces maximum torque [when it resonates] at 3600 rpm. The intake runner length necessary to resonate at 3600 rpm is quite long, so it was necessary for the engineers to fold everything up to make it fit, requiring the runners to double back underneath the plenum on their way to the individual cylinders. Viewed from the front of the engine in cross section, it looks like an octopus with tangled tentacles."

Ron Rogers adds that,"...we also used speed/density control for the fuel injection instead of Chevy's mass airflow sensor. Mass airflow uses a meter on the aircleaner intake to measure the amount of air passing through and, from that, calculates what the fuel should be for the right air/fuel ratio. Speed/density does this by measuring ambient air pressure and throttle setting and then makes a calculation. There were cost and reliability advantages in going to speed/-density."

Unlike conventional port fuel injection (PFI) or what GM calls *sequential* fuel injection (SFI), the Fiero V-6's multi-point fuel injection (MPFI) sprays fuel from all six injector nozzles at the same time, one burst per engine revolution (two bursts per cylinder firing). Most hardware for GM's MPFI and SFI systems are the same, including the high-pressure fuel pump, fuel rails, nozzles and, in most non-Fiero applications, the mass airflow sensors and plenums.

The V-6 meant modifications to the car, as mentioned. "When you put the V-6 in there," says Ron Rogers, "it occupies a different space. We were having temperature problems with lines being too close to the exhaust manifold. We also had to duct air in, around, and out of the engine compartment. We tried to keep the rear luggage compartment as cool with the V-6 as with the Four, and that required different shielding and ducting."

These cooling considerations reopened the airscoop debate. Rogers relates that his group considered twin vertical scoops for the V-6, the second one for cooling the engine compartment. But there wasn't enough flow to make it worthwhile. His engineers also ran into problems with pressure buildup and ducting. "We ended up," he says, "with airscoops *under* the V-6 car, with shields and ducts...to get a cooling path that would take air in underneath, flow it over the engine, and reverse it back out the bottom."

Pontiac chief engineer Jay Wetzel, however, advocated the more aggressive-looking twin scoops. He had them fitted, in fact, on most of his turbocharged and high-performance test cars. "We wanted those bumped-out scoops," he states, "because they were styling cues to put a little more muscle in the car. But we backed away from that in favor of a larger version of [the production side vent] because we found, especially with bigger tires, that we were getting stone chipping on their leading edges. The scoops also got full of mud and plugged enough so you'd lose power."

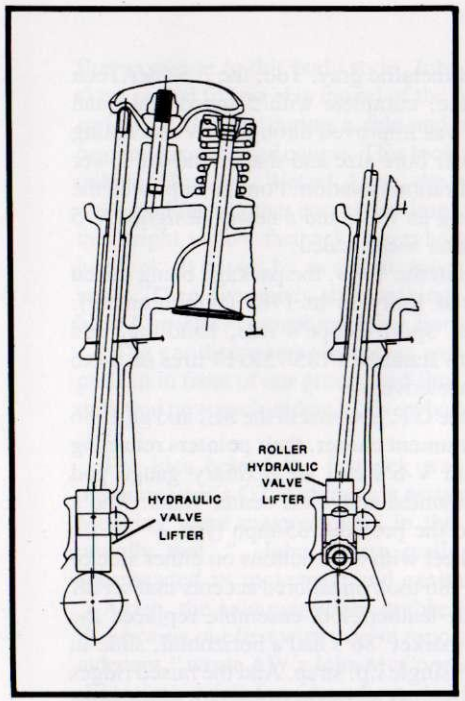
To answer the other half of the performance question, Rogers's group was also working hard to adapt a 5-speed transaxle to the 4-cylinder Fiero. GM had used an Isuzu-built 5-speed in existing J-Cars (Sunbird, Cavalier, etc.), and this adapted nicely to the Four. But the V-6 needed a different 5-speed—one that could handle the added torque.

For that application, Pontiac joined with the respected Getrag organization in Germany to co-develop a high-torque, 5-speed transaxle for the 6000-STE and other fwd performance cars. The good news: That unit would bolt neatly onto the Fiero V-6. The bad news: It wouldn't be ready until June of 1986, 18 months later than planned. Various problems arose, including synchronizer ills. These had to be remedied before Pontiac sublet the Getrag transaxle's manufacture to Muncie Power Transmission Products in Indiana. In any case, development glitches held back the Muncie-built 5-speed until mid-1986.

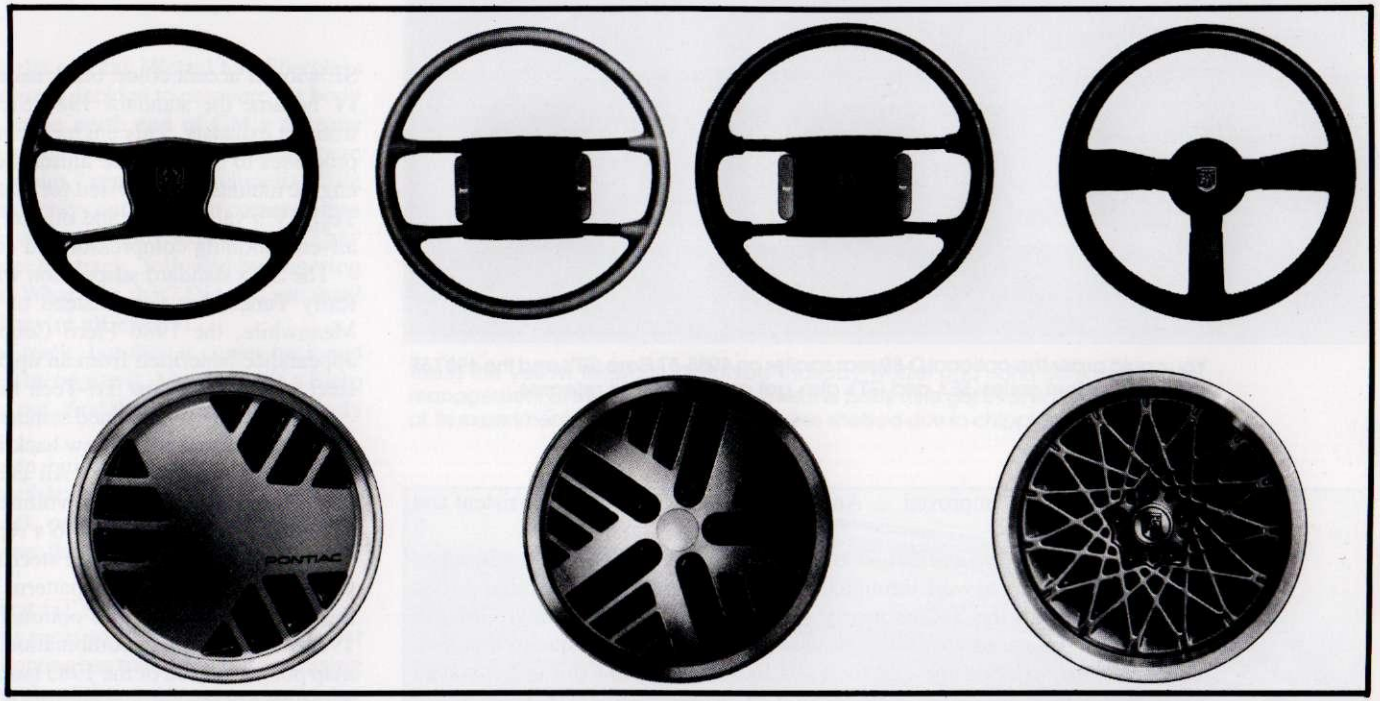
Back in 1985, though, before the V-6 5-speed appeared, the Fiero V-6 with 4-speed posted a 0-60 time of 8.5 seconds, according to Pontiac, or about 2.5 seconds faster than the previous year's Four/4-speed. Furthermore, the 4-speed V-6's EPA estimates ran to 22/26 mpg under 1985's more realistic rating system. The standard 2.5-liter Four, now called the *Tech IV* engine by GM, averaged 25/35 mpg EPA with its new roller lifters and the Isuzu 5-speed. Roller lifters, which reduced friction, contributed slightly to those figures.

The 1985 Fiero GT took up where the 1984 Indy Pace Car replica left off. The GT came only with the V-6 engine, P215/60R-14 Goodyear Eagle GT tires on 14x6-inch Hi-Tech Turbo wheels, and the WS-6 Special Performance handling package as standard equipment.

Externally, the 1985 GT looked very much like the 1984 Pace Car replica, but with a choice of colors: red, white, black, or gray metallic, all with medium-gray metallic lower body accent and, of course, minus the Indy decals. The '85 GT had the same aero front end, side rocker skirts, plus a specific rear fascia with quad trumpet exhausts. The rear wing was optional. Even with its notchback roof line, the Fiero GT's slippery bodywork parted the air with a Cd of .35. Compare this with the 1984 Sport Coupe's .38 and the fat-tired 1984 SE's .41.



1985 Fiero's 2.5 Four went to roller lifters to reduce friction and noise.



For 1986-87, two new optional 4-spoke steering wheels appeared: N-36 without leather and NK-4 with leather (top, center). Horn button flanked hub in both. New Tri-Tech wheelcover and 1986 GT's diamond-spoke wheel were also added.

Across-the-board engineering changes in the 1985 Fiero included a lighter-weight clutch and clutch lining, considerable suspension and shift-linkage tuning, and the addition of a tap-up/tap-down feature, in one-mph increments, for the optional cruise control.

To elaborate on 1985 suspension improvements, Pontiac increased jounce travel and redesigned the Fiero's front control arms to cut the car's turning circle by a good 18 inches. Around back, both roll steer and jounce steer were significantly reduced by relocating the mounting points of the adjustable lateral links. Rear spring rates were increased just enough to carry the V-6's extra weight, with shock valving retuned to reduce pitching over certain road surfaces. The GT, as noted, had the WS-6 package as standard equipment, but you could order the WS-6 for the SE and Sport Coupe as well. Standard suspension under the SE was the Y-99 Special Rally package, with P195/70R-14 steel-belted tires, 14x6-inch Hi-Tech Turbo alloy wheels, revised suspension geometry, plus recalibrated shocks, springs, and bushings. The Y-99 was optional for the Sport Coupe.

Those two series plus the SE got a slower 21.7:1 steering ratio to reduce turning effort, while the GT kept the previous year's 19.2:1 ratio. All 1985 V-6 cars had new instrument graphics plus an oil-pressure gauge that replaced the 1984 voltmeter. A low-charge warning light replaced the oil-pressure telltale in all cars, which now also came with coat hooks. A new Touch Control premium AM-stereo/FM ETR casette radio (UT-4) was added to the option list. Too, lighting for all 1985 sound systems was changed to warm red to match the rest of the instrument cluster.

Anxious to sample Fiero performance and handling with the new V-6, all three major buff books carried 1985 GT road tests in their Nov. 1984 issues. Zero-to-60-mph acceleration ranged from *Car and Driver's* 8.2 seconds to *Road & Track's* 8.4, with quarter-mile times spanning 16.0-16.5 seconds at 84-85 mph. Skidpad figures were consistently in the neighborhood of .81-.84g. This put the Fiero's roadholding capabilities in a league with the Ferrari Testarossa and Porsche 928-S but still below the Corvette's .91g.

Motor Trend's Ron Grable wrote, "Impressive figures can't begin to describe the feel of this engine.... It's turbine smooth, responsive and happy at its work.... This is obviously a car for driving, designed by people who know how to drive.... Twisty roads are the Fiero's forte."

Road & Track added, "Ahh...happiness is a Fiero with V-6 power. At all speeds but idle, the V-6 Fiero was quieter and virtually vibration-free compared with the inline 4. The V-6 engine makes even the automatic transmission a joy to drive, and, yes, the manual transmission (still no 5-speed) shift effort and

You could order the optional D-80 rear spoiler on 1985-87 Fiero GT's and the 1987 SE but not on other series. SE's and GT's also got power decklid releases.

precision have been improved.... And we found the GT to be a consistent and predictable handler."

Rich Ceppos of *Car and Driver* echoed, "The 2.8-liter V-6 is handicapped somewhat by having to work through the same old 4-speed manual transaxle that was introduced on the X-Cars nearly six years ago. Unfortunately, GM still doesn't have a 5-speed gearbox stout enough to handle the torque of this V-6. Shame, shame." Ceppos praised the 1985 Fiero's improved shifter but wasn't too pleased with the GT's WS-6 suspension. "Creased pavement in the middle of a fast sweeper sets the GT hopping and sends shock waves back through the steering wheel.... The upshot is that the Fiero is not yet ready to take its place among the world's better road cars."

Perhaps the most telling observation came from C&D's engineering editor Don Sherman: "What we have here," he Counterpointed, "is a sports car on the installment plan. Last year we got the looks. This year comes more power. Pontiac claims the check's in the mail for the rest of the parts we'd like to see." How right he was!

The 1986 Fiero line, introduced on 12 Sept. 1985, arrived minus the GT. Or the GT initially *appeared* to be gone. But wait! There it still stood: rounded nose, four big pipes out back, optional wing. For '86, though, Pontiac called the GT the SE.

Apparently the Pace Car-based 1985 GT was really an interim series. The *real* Fiero GT, with its sexier, Ferrari-like flying-buttress roof line, taller rear deck, and larger wall-to-wall tail lamps, got delayed until mid-1986. Yet the marketing people who make such decisions renamed the 1985 GT the 1986 SE while the GT designation was handed to a completely different car—the 1986 fastback. John Schinella's designers and others at Pontiac wanted to see the fastback called the GTU or GTP in honor of the Fiero's increasingly successful IMSA racing career. But Pontiac marketing director Louis G. Wassel explains that they thought using GTU or GTP might be misleading. "To call it a GTU or GTP means you've got an all-out sports car. Those letters designate sports-car classes in IMSA racing, and the GT isn't really that type of automobile."

The most noticeable difference between the 1985 GT and the 1986 SE was the SE's lower accent color: black instead of metallic gray. Too, the 2.5-liter Tech IV became the standard 1986 SE engine, complete with 5-speed and quad trumpet exhausts. This engine, though, was improved through new machining processes to ensure more uniform cylinder bore size and shape, and the lower engine mounts were revised for better vibration isolation. Pontiac improved the Tech IV's valve-cover and oil-pan sealing as well, and a newly designed V-5 air-conditioning compressor and condenser were added.

The SE's standard suspension was again the Y-99, the package being called Rally Tuned this year instead of Special Rally as in 1985 (same content). Meanwhile, the 1986 Fiero Coupe and Sport Coupe's ride, handling, and appearance benefitted from an upgrade to standard P185/75R-14 tires on 14x6 steel wheels with new Tri-Tech full wheelcovers.

The V-6 engine remained standard in the GT, optional in the SE, and all 1986 Fiero V-6's came with a new backlit instrument cluster, their pointers returning to zero for the first time. All cars with V-6's had an auxiliary gauge pod containing oil-pressure and voltmeter mounted above the center vents. And a 120-mph speedometer in V-6's replaced the previous 85-mph type.

The SE got a new 4-spoke steering wheel with horn buttons on either side of the center pad. Upholstery patterns for 1986 took on tailored accents that set off the Pallex fabric; also an optional suede-leather/cloth ensemble replaced the 1984-85 fleece/suede combination. Up-market '86's had a horizontal, slide-in map pocket instead of the 1985 base car's single i.p. strap. And the raised ridges at the base of the vertical console now extended rearward to restrain loose items on the flat forward portion. The giveaway in telling a 1986 Fiero from earlier models is the high-mounted third stop light.

AM radios (UL-5 and U-63) were still standard in all series and could be deleted or upgraded for credits ranging from $56 to $373. The Fiero offered six sound systems in all, the top being the UT-4 AM-stereo/FM ETR with cassette, seek/scan, and digital clock. If your car had a/c, you could further order the optional UQ-6 speaker system that included two 5.25-inch subwoofers in tuned-port enclosures, while sail-panel speakers replaced the previous headrest units for easier serviceability.

On 3 Jan. 1986, the wraps finally came off the new fastback Fiero GT. Pontiac made its announcement on that date, but actual cars wouldn't become available for at least another month. Like the 1985 GT coupe a year earlier, the fastback GT arrived when Fiero sales were down a bit, so it helped spark showroom traffic when it appeared.

In essence, the fastback grafted new upper rear quarters, quarter windows, decklid, grilles, rear fascia and tail lamps, emblems and body side moldings onto the 1985 GT. It kept 1985's V-6 powertrain, its optional and functional rear wing, and most other components. Interior and exterior colors were shared with the 1986 SE (except for lower accents), as was the standard auxiliary gauge cluster and upholstery selections. Exclusive to the fastback were a leather-wrapped, 3-spoke Formula steering wheel and, most important, the special WS-6 suspension with new 15-inch diamond-spoke wheels and Goodyear Eagle GT tires: 205/60R-15 front, 215/60R-15 rear.

An interesting sidelight to the fastback GT story involves GM management's

first exposure to this body style. John Schinella and Jay Wetzel had fiberglass skins pulled from a clay model of the fastback and decided to premiere the body style as a flashby during a ride-and-drive at the north end of GM's Arizona proving ground road course. This took place in Feb. 1984. "We're standing there talking: Hoglund, Wetzel, Lane, the whole group," reminisces Schinella. "We were evaluating other cars at the time, and suddenly, out of a tight corner comes this bright yellow fastback. Everybody sees it, but nobody says a word. They just look. It passes by us and disappears down the track, followed by lingering stares. Then everybody starts talking: Wow! What was that? Did you see that? New Corvette? Something from Europe? They're all excited.

"The car disappears to another part of the track, but then it comes back and pulls in in front of our group, and finally they recognize it. My gosh, it's a Fiero with that new back end on it! Everybody flips out. And that's what sold that body style."

The idea behind the fastback was to keep building from the SE and the previous year's GT. Schinella's assistant chief designer, John Cafaro, and Bob Menking were major movers in the fastback program. Schinella points out proudly that, "...John Cafaro really became the godfather of that car and spearheaded its movement and excitement."

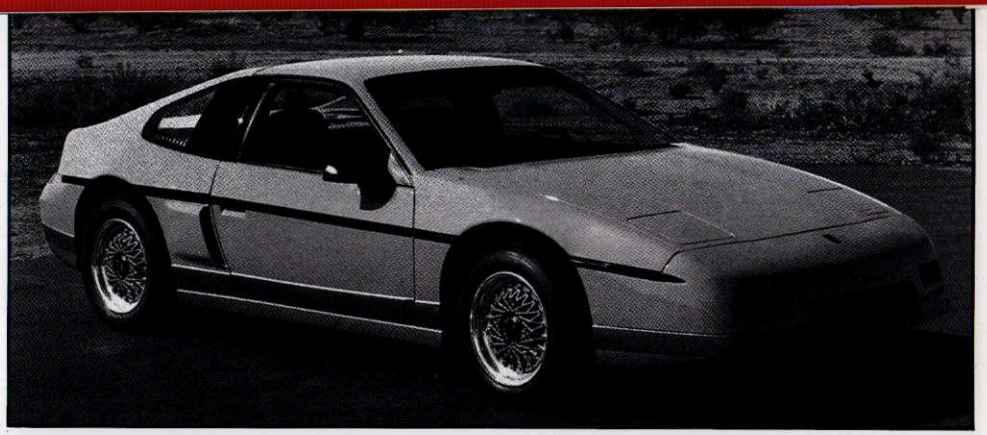
Again, the auto magazines grabbed the first GT fastbacks they could. *Auto-Week* came out first with a drive report. "This car is so good-looking it's almost indecent," wrote AW's John McCormick. "Pontiac has transformed a promising shape into a full-form knockout. With or without the optional rear wing, the 1986 Fiero GT is simply the best-looking U.S. car you can buy." Unfortunately, McCormick found the fastback's ride, handling response, weight, rear visibility, handbrake location, and high-mounted shift lever less to his taste, although he did report a very quick 7.8-second 0-60 time.

Soon afterward, both *Motor Trend* and *Road & Track* came down hard on the fastback GT. MT's John Hanson commented, "...the supposedly all-new...GT fastback is little more than a design studio exercise in the versatility of Enduraflex body moldings." He repeated the oft-heard and mostly deserved complaints about the 4-speed gearbox, suspension, and less than state-of-the-art steering. *Road & Track*, in its annual *Sports & GT Guide*, was even less charitable.

When the Muncie/Getrag 5-speed finally became available in June 1986, Pontiac began installing it as a running upgrade in all subsequent GT's. Thus both the 4-cylinder car and the V-6 carried 5-speeds as their standard gearboxes.

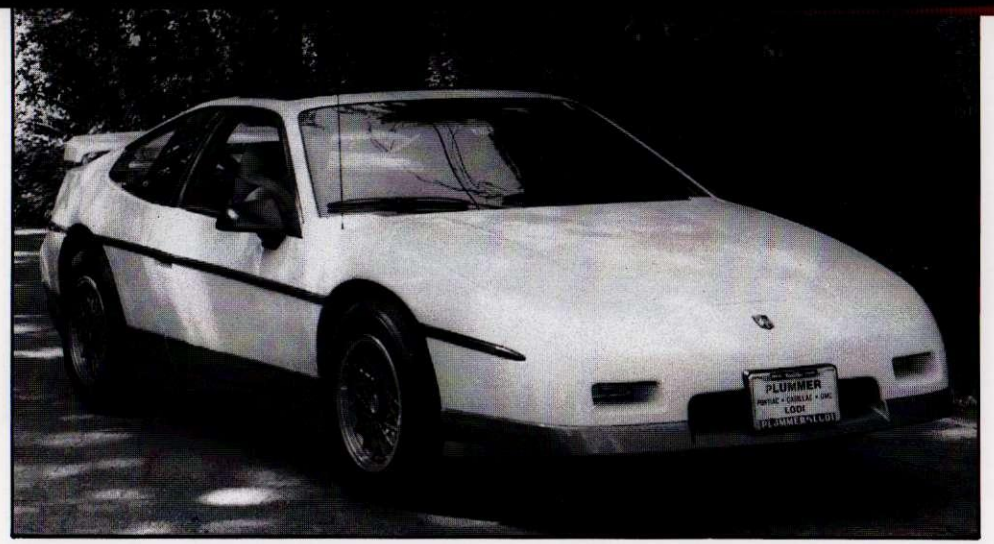
Engine refinements became the big news for 1987. The V-6 with 5-speed remained standard in the GT and optional for the SE but wasn't available for the Sport Coupe or base Coupe. The 1987 V-6 did get improved combustion efficiency and sealing as well as reduced friction and weight, but there was a decrease in rated power due to what Pontiac explains only as "more current data."

Meanwhile, the standard 1987 Tech IV 2.5 saw a power increase—to around 100 bhp at 4800 rpm—plus other significant refinements. Most of the power gain came from more flow through the TBI and a new ram-tuned manifold. A distributorless ignition system also helped. This direct-fire ignition used a



This is the yellow fastback prototype that Jay Wetzel and John Schinella ran by management at Mesa in Feb. 1984. While the body style got overwhelming approval, its experimental, vertical air intakes were shelved due to chipping and clogging.

In June 1986, the GT became available with 5-speed Getrag gearbox, which now complemented the V-6, wide 15-inch Goodyear Eagles, and WS-6 suspension.



At a base price of $12,999, fastback 1986 Fiero GT led the line as an affordable exoticar. It now had the looks, performance, economy, and reliability.

The 1986-87 GT's standard Pallex cloth interior included carpeted lower door halves and map pouches for carrying tapes and other small items.

Muncie, which builds the Getrag 5-speed in this country, improved shifter action. Buyers could also order the THM-125 automatic in the GT.

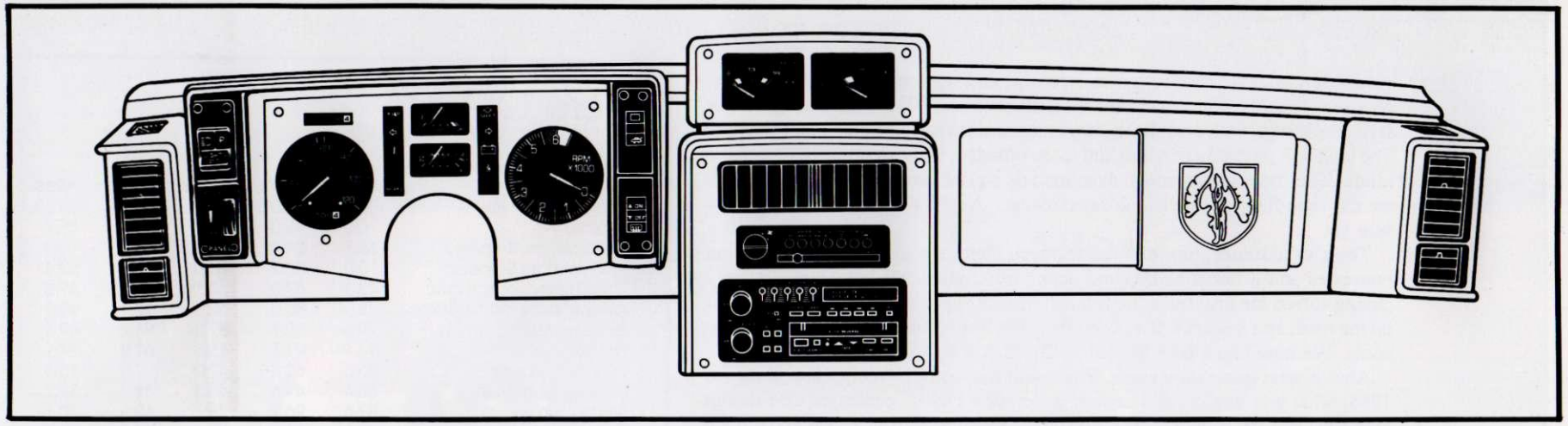
notched reluctor ring on the end of the crankshaft along with a magnetic pickup on the block. As each notch rotated past the pickup, it triggered a highly accurate ignition pulse. In addition to accuracy, this system was engineered to improve longterm reliability.

Other changes to the Four included a single serpentine belt for easier serviceability, lighter pistons and valve gear for less noise, and a new engine-control computer. Rated torque increased from the previous 134 lb./ft. to 140. Although I've seen no figures to date, 0-60 acceleration should be about 11.5 seconds with the 5-speed and 12.5 with the automatic.

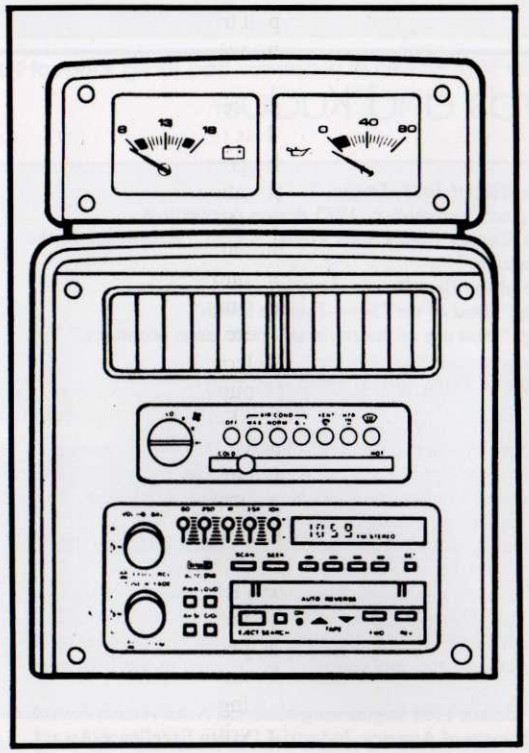
Both the 1987 SE and GT remained basically the same as their 1986 counterparts, but the Coupe and Sport Coupe got fresh front and rear styling. This upped their overall length by approximately two inches and improved their Cd from .38 to .36. Base tires on the Coupe and Sport Coupe were upgraded to 195/70R-14 on 14x5.5-inch steel wheels with Tri-Tech wheelcovers. The familiar 14x6 Hi-Tech Turbo alloy wheels continued as a Sport Coupe option, while the Y-99 Rally Tuned suspension again came standard on the SE and optional on the Sport Coupe. Finally, as before, the GT had an exclusive on the 3-spoke Formula steering wheel, WS-6 suspension with 15x7-inch diamond-spoke alloy wheels, and the same 205- 215/60R-15 Goodyear Eagle GT tires fore and aft. Incidentally, 1987 Fieros with tan interiors and 14-inch wheels had their wheels or wheelcovers painted gold.

The 1987 fuel tank grew from 10.2 gallons to 11.9, and other '87 interior changes included open i.p. map pockets for the Coupe and Sport Coupe, a new sunshade screen with the optional sunroof, and a special Lear-Siegler driver's seat was due later in the model year. This seat, like the Corvette's, promised an inflatable lumbar bladder plus adjustable side wings. I understand it'll be optional in both the 1987 GT and SE, but since I'm writing this in the summer of 1986, I can't say for sure.

Of future Fieros, I'm pretty sure that 1988 models will get an all-new

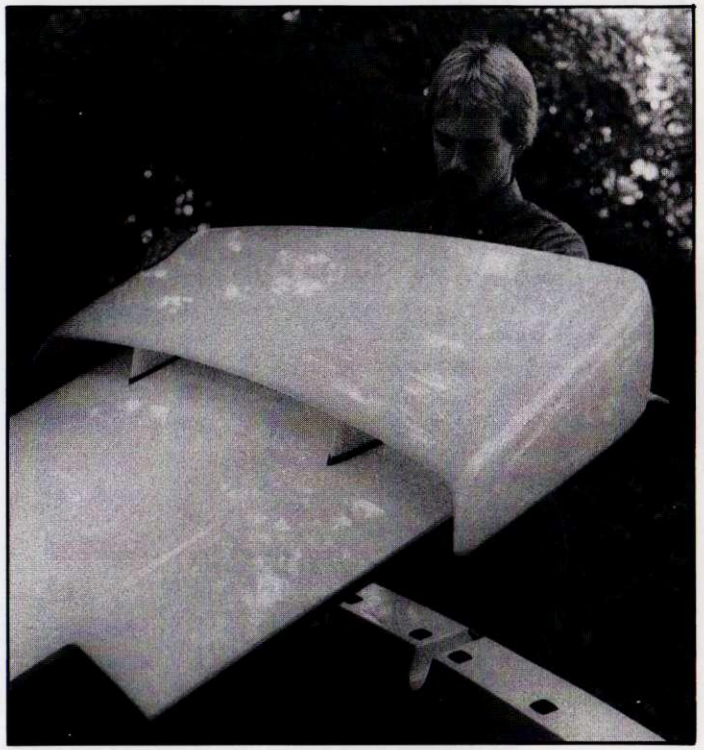


Fiero's instrument panel underwent subtle changes throughout the car's first four years but remained basically the same. The 120-mph speedometer marks 1986-87 V-6's.



Voltmeter and oil-pressure gauges stand atop center console of 1986-87 Fieros with V-6 engines.

Removable glass panel for optional sunroof stores in Fiero's forward compartment.



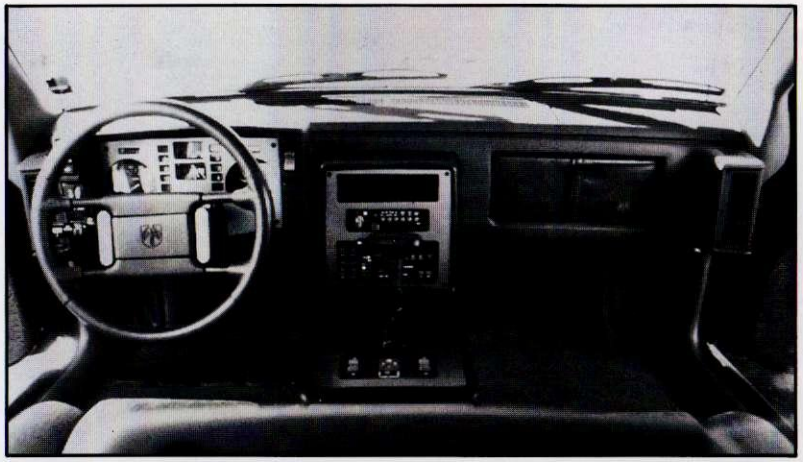
Balance springs help raise one of the industry's largest decklid spoilers.

suspension system, electric power steering, and big transaxle changes to improve shift quality. Then, barring huge market upsets, 1989 should bring a major styling redesign, with completely new exterior skins and an equally new interior. The look will probably be softer and more rounded, in the current GM dreamcar idiom. The 1989 models might even include a glass hatch over the engine, like the Corvette Indy or Buick Wildcat showcars. Note that I say *might*. No one's sure yet.

There's the rumor, too, of a full fastback Fiero, not just the sort with flying buttresses and a horizontal engine deck. Hulki Aldikacti talks about already having solved the problems of a full hatchcover over a mid engine. "That car is on the road, and it works. It's coded P-II, it's truly a hatchback, and the engine cools. We now know how to cool it. But that'll be for the next generation."

Aha! A next generation Fiero. When will that come? "We're now doing [in 1986] what you might call a second-generation Fiero," confesses GM design vice president Irv Rybicki. "It's a different-looking car, but you'll know it's a Fiero. It's really something else; it'll help keep the Fiero going strong."

John Schinella's studio has been working on, among other things, taking in



One of the 1987 Fiero's major changes isn't visible, but it consists of enlarging the fuel tank inside the console from 10.2 to 11.9 gallons.

engine combustion and cooling air from high-mounted side scoops—an idea they experimented with for the 1986 GT. "For 1989," he beams, "with a major facelift, we've got all the intakes up high, finally. We've been trying to manage the air from the top ever since the beginning. If it's higher, it's cleaner."

Engineer Ron Rogers, who later went to GM Corporate Engineering, recalls working on the next-generation Fiero as far back as 1984, about the time the first production cars got on the road. "Design Staff and GM Research were doing a lot of structure work for us, and a number of outside suppliers—Alcoa, Owens-Corning, 3M—were working with us on advanced concepts: different ways to

Fiero Options

Percentages by model year

	1984	1985	1986	1987	1988
Engine, 4-cylinder	100.0%	55.0%	45.3%	60.5%	54.3%
Engine, V-6	0.0	45.0	54.7	39.5	45.7
Transmission, 4-speed	56.7	21.8	21.3	0.0	0.0
Transmission, 5-speed	0.0	31.2	28.6	45.4	52.4
Transmission, automatic	43.3	47.0	50.1	54.6	47.6
Wheels, alloy	78.0	85.0	69.8	62.1	99.9
Air conditioning	79.3	82.7	89.3	93.2	89.3
Tinted glass	94.1	97.5	75.5	61.8	71.9
Windows, power	45.3	62.5	42.0	7.0	13.3
Door locks, power	30.4	41.6	43.3	36.9	33.2
Tilt column	87.6	96.2	74.7	60.5	70.6
Cruise control	40.3	53.2	52.4	40.6	49.6
Sunroof	50.2	61.3	61.4	35.8	36.6
AM/FM stereo radio	31.8	32.3	22.8	36.8	15.5
AM/FM stereo cassette	42.6	42.6	46.8	44.0	68.3
AM/FM stereo cass w/eqlr	0.0	23.4	28.0	16.7	15.4

Fiero Awards and Kudos

Magazine awards

- Time Magazine: "The Best of 1983, Design."
- Plastics World: First place, automotive, 1983 design competition.
- Modern Metals: 1983 Casting Competition Grand Award. "Excellence in the field of magnesium casting."
- Car and Driver: "One of the Best Cars in America, 1984."
- AAA Michigan Living: "Best of the '84s—Pontiac Fiero."
- Materials Engineering: "Best use of materials and fabrication processes," Top Twenty First Award.
- Consumers Digest: Hall of Fame Special Merit Award.

Other awards

- The Wheel Society: New Product of the Year (1983).
- Los Angeles Auto Expo: Design of the Year Award (1983).
- New Product Development Conference: 1984 New Product of the Year.
- Detroit Auto Writers Group: American Car of the Year (1984).
- Society of Plastics Industry, Reinforced Plastics/Composites Institute: Exhibit Award and Grand Design Award, first place.
- Society of Plastics Engineers, Plastics-in-Automotive Div. for spoiler on 1984 Indy Fiero and 1985 Fiero GT; also 1984 Grand Award to Pontiac Motor Div.
- International Magnesium Assn.: Honorary award for Pontiac Fiero engine grille, "...making it the largest cosmetic application of magnesium in the U.S. automotive industry."
- American Society for Metals: 1985 Engineering Materials Achievement Award.
- Industrial Designers Society of America: Industrial Design Excellence Award.

GT fastback glides past camera in its new-for-1987 color: medium red metallic.

Blue-for-1987 Fiero Sport Coupe shows off restyled front end, without black bumper pads. Plastic body skins make facelifts easy and relatively inexpensive.

The 1986-87 Fiero's overhead console incorporates twin map lights, dome light, and a slide switch to alter the intensity of the Performance Sound system.

Hulki Aldakacti confers with CPC advanced vehicle engineer John Knierlemen on what might be the next-generation Fiero. Front end appears to be one large piece.

do space frames, different ways to do the modular approach to the vehicle, handling air management, things like that."

Things like a full fastback, perhaps? "There was a fastback version, yes," says Rogers. "The P-II is both a concept and a vehicle, so we were trying to do both. What's the best structure or space frame? We're looking for alternate ways to build it. And the right materials. As I recall, we had space-frame designs down to about 30 pieces, compared with the 273 of 1987. We also got significant weight reductions and improvements in structural frequencies. We even played with a convertible that still met our structural goals."

Meanwhile, what about the market for future Fieros, given the increasingly tough competition among 2-seaters? Pontiac's director of market planning Ed Benson sums it up this way: "We see the 2-seater market stabilizing at about 4-5% of the industry total as we move out over time. This means we'll be looking at 450-550,000 cars per year. And Pontiac will feel comfortable if we can hang onto a 15-20% share of that. For the past several years, we've been running a life-cycle plan for each of our cars, and we just finished planning the Fiero out to the 1991-92 timeframe. We feel very good about the car's prospects."

"In my opinion," Bill Enockson echoes, "Fiero is the one car in our lineup that can really hold its own against foreign competition, especially the Japanese. It just keeps meeting them head-on." □

For 1987, all gold-colored Fieros came with either golden alloy wheels or gold-painted Tri-Tech wheelcovers. This is an '87 SE prototype with decklid decals.

Base 1987 Fiero takes in cooling air under nose. All series except SE get a smooth, convex rub strip, while SE's consists of a 2-channel ribbed molding.

Fiero Spotter's Guide

To tell one year from another, look for:

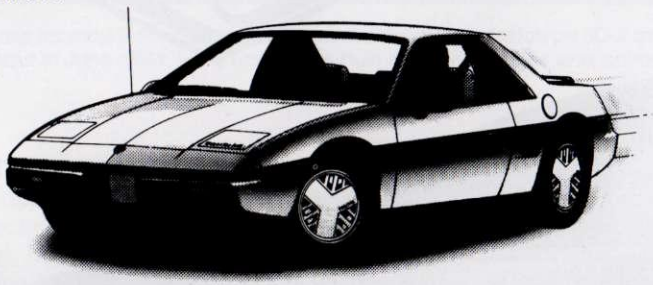
1984: No rear deck hump. All cars are 4-cylinder. Voltmeter in tach. SE has 2-tone cloth seats with bold vertical stripes. Indy Pace Car this year only.

1985: Rear deck hump added. GT gets Indy Pace Car nose and V-6 but has notchback roof, gray lower body trim. Oil-pressure gauge replaces voltmeter in tach. Base car has map strap added on passenger side of i.p. GT and V-6 cars have 85-mph speedometer, no auxiliary gauge cluster. SE and GT get 2-tone cloth seats without stripes.

1986: Center stop light added. No more 13-inch wheels. SE has rounded nose with notchback roof, black lower body trim. GT gets fastback roof, gray lower body. V-6 cars get 120-mph speedometer and auxiliary gauge cluster. Stereo speakers move from headrests into sail panels.

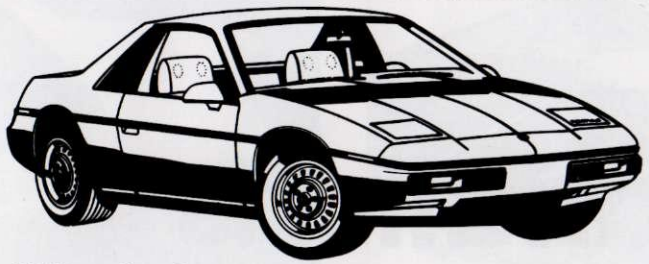
1987: No more 2M4 or 2M6 decklid decals. Body-color Pontiac logo replaces debossed version. Base cars lose black bumper pads.

1988: Formula and T-top options bow. Alloy wheels standard. Formula and GT available with black or gold diamond-spoke alloy wheels. Goodyear Eagle GT+4 tires replace Eagle GTs. Camel interior and bright yellow exterior paint available.

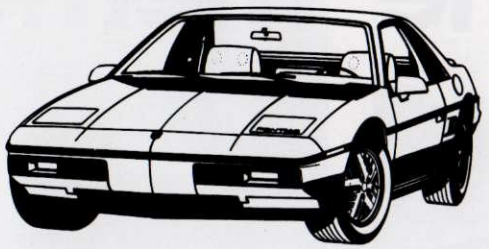


1986 base Fiero with Tri-Tech wheelcovers

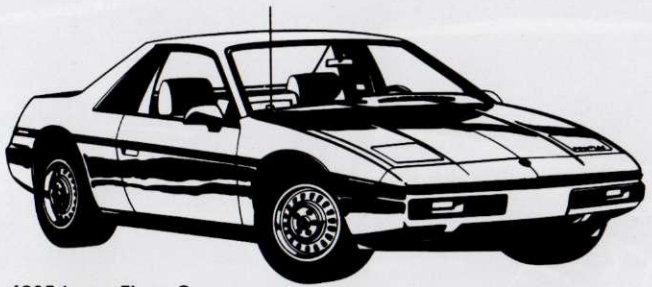
Early 1986 Fiero SE



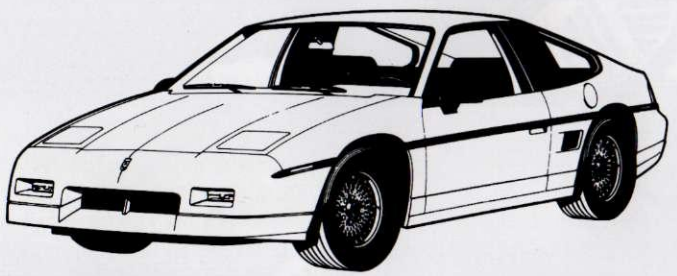
1984 base Fiero Coupe



1984 Fiero SE



1985 base Fiero Coupe



1986-88 Fiero GT fastback

Chapter 9

Variations on the Theme

As the basis for most Fiero competition cars that followed, prototype SD-4 made its press debut in June 1983. Tube frame was built in three sections and covered by DGP fiberglass body. The SD-4 engine displaced 2.7 liters and delivered 272 bhp, could power the car to a 5-sec. 0-60 and 160-mph maximum.

NOT SINCE THE VOLKSWAGEN BEETLE has there been an automobile so ripe, so *perfect* for modification as the Pontiac Fiero. Even when the car first appeared, every enthusiast this side of heaven could see its potential for tinkering, hop-up, accessorizing, and customizing. In its few short years of production, an amazing array of aftermarket equipment and custom-bodied Fieros have come on the scene.

The car seems to invite experimentation in three vital areas. First, the steel space frame can cope with great gobs of power and torque, *provided* you blend in the right drive-line and suspension mods. Two, the venerable Tech IV Four makes a simple, inexpensive starting point for serious engine builders. And third, this car's bolt-on body panels just beg for easy creative replacement.

Actually, the first modified Fiero arrived as the 1984 Indy Pace Car (see Chapter 6). Even before Pace Car replicas went on the market, though, Pontiac engineer John G. Callies—along with Tim Petersen and Terry Satchell—got the assignment to turn the Fiero into a full-blooded race car. Callies's work has formed the basis for the Fiero's string of racing successes (Chapter 10).

"It was in Sept. 1982," relates Callies, "a year before the Fiero launch, when we got the go-ahead from Bob Dorn. He knew we were coming out with the 2.5-liter Four, an engine that—politely put—wasn't going to be a barn burner. So Dorn asked what we could do on a performance basis to enhance the engine's image. At that point we had absolutely *nothing*: no performance parts at all in the 4-cylinder range.

"Nor were we out in the open with racing. I was a product engineer at the Arizona proving ground, working on performance and idea cars. We'd been messing around in Grand National and Trans Am racing in, you might say, an undercover way, and I'd also been involved in amateur racing for a number of years. But here was an opportunity to bring this car, the Fiero, out in the open and really run strong. Our mission was to quickly get the Four into a form to win races and help Pontiac's image; also to see what we could do for the individual performance buff at the same time."

Obviously, the first thing Callies's tiny group had to do was design a block, head, and crank. They got those components designed, did the tooling, and received the first parts for testing within half a year. "Once we had some pieces," explains Callies, "we had to start developing them, and the only way to get that done in time was to go oval-track racing. That's where our Super Duty engines first showed up—on the NASCAR Dash circuit [for small sedans], and that's where we started getting feedback on what was working and what wasn't." At that time, Callies hired an outside company, Vanderley Engineering, to start doing dynamometer work. Owner/engineer Paul Vanderley had been racing for some 25 years, and he provided a lot of help.

Amazingly, the little Pontiac engine, in its first year of aggressive factory engineering backing and while still under development, managed to win the 1983 NASCAR Dash (formerly International Sedan) series with Richard Mash.

Here's the fiberglass body used by most Fiero race and pace cars—the Stage III by DGP.

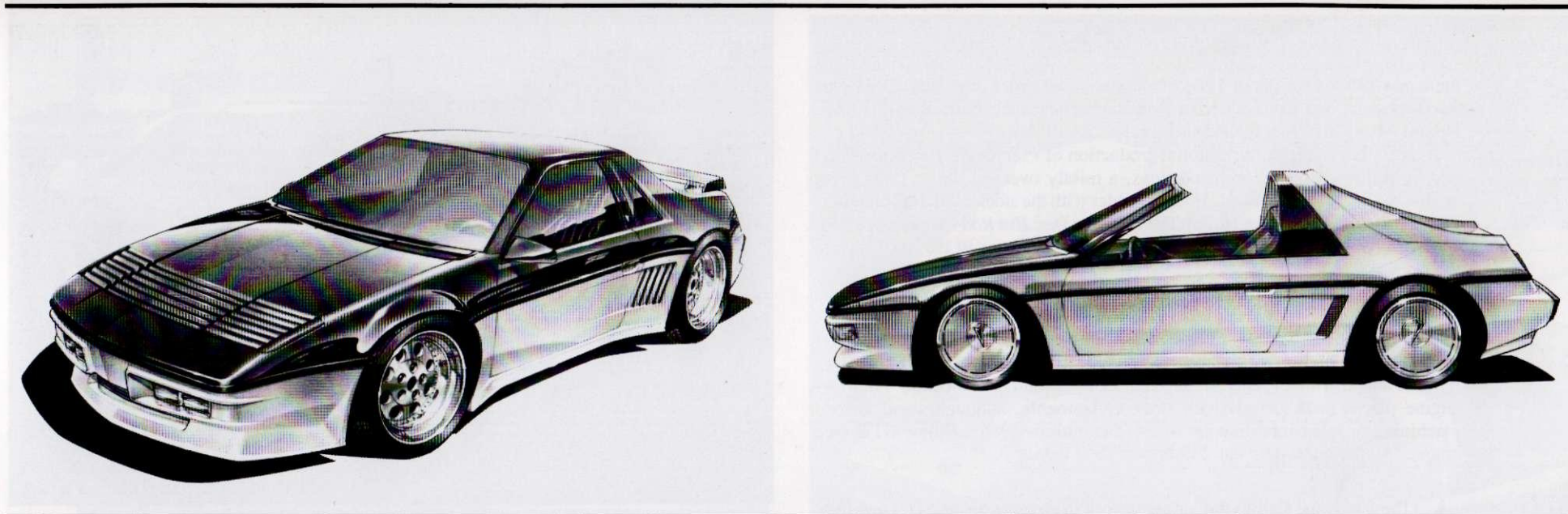
One of several PPG pace cars, this extensively modified Fiero led the 1986 CART series for Indy cars. Built under Pontiac supervision, it ran the SD-4 engine.

Diversified Glass Products (DGP) also offers its earlier Stage II fiberglass competition body, which preceded the Fiero's aero nose. DGP and Pontiac designers worked together to make sure both bodies resemble production cars. They also balanced Cd, lift, and downforce. Most sanctioning bodies don't allow the over-roof snorkle.

This wasn't in a Fiero but rather in a Sunbird. Callies was delighted. "Datsun had been the reigning champ for the prior four years, so the Sunbird win gave us quite a bit of encouragement. The engine was working well."

I asked him whether there was any crossover from existing parts, since the 2.5 began life essentially as half of Pontiac's venerable 301 V-8. "No, there really wasn't," he responded. "We found the 301 cam designs and most other parts didn't work, plus we were kind of limited. The sanctioning bodies—SCCA and IMSA—said we had to have production pieces fit on the racing engine. All water-passage and bolt-hole locations, ports and so on, had to relate directly to a production assembly. This made the job extremely tough. They were afraid we were going to have a ringer when, in fact, we were kind of pulling off the impossible by doing this racing engine in such a short time. Since then, though, we've moved away from sticking strictly to stock cylinder-head/port locations."

Then, too, Callies and crew had to come up with a lot more than just the Super Duty engine. They also had a whole new transaxle to do. "Luckily we were able to work with Webster Gear Co., which has turned into a great partnership. We also had to come up with a suspension design and all the bodywork, plus get sanctioning approval in advance. I was busy hustling around the country getting IMSA and SCCA together on our concept, which they finally agreed would be an approved package provided we did it exactly the way we said we would. And while that was going on, Terry Satchell was heading up the chassis work, and John Schinella's design studio was laying out the body."



Artist Duane Kuchar suggested several possible body treatments for 1984 Fiero. These drawings led to *Car Craft* magazine's project car (next page).

A show version of Callies's Fiero SD-4 (Super Duty Four), as his prototype racer was named, stood ready for inspection at Pontiac's West Coast press preview in June 1983. Take it from one who was there: Even though the show SD-4 wasn't ready to be driven, it made quite an impression on the assembled magazine writers and editors.

Motor Trend's sister publication, *Sports Car Graphic,* had the SD-4 on its Oct. 1983 cover, with a very complete story inside, including a smaller piece covering the "Super Duke" engine. "Move over, Corvette," proclaimed the writers, "you've got company!"

The SD-4's tube-frame chassis was computer-designed and built up in three separate sections: front bay, driver's compartment, and engine/rear suspension bay. Suspension consisted of upper and lower control arms with racing coil-over shocks front and rear. Lateral toe links, swaybars, and big disc brakes helped keep things under control at both ends.

A fully shrouded Modine radiator in the nose was connected to the engine by cooling lines running along the passenger side of the rollcage, and a giant 29-gallon fuel tank ran longitudinally down the center of the cockpit. Extra-wide fiberglass body panels, made by Diversified Glass Products (DGP) in Pontiac, Mich., were designed to cover the car's huge Goodyear racing slicks on 16-inch Centerline wheels *and* to be easily adaptable to bolt onto a street Fiero. Those same body pieces would later be available from DGP individually or as a complete set.

With 272 bhp from a slightly stroked 2.7 liters of displacement, predicted performance ran to the 5-second range for 0-60, 10.8 seconds for the quarter mile, and a top speed of 160 flat out, all of which the eventual car beat. Estimated cost of a complete racer came to about $28,000 versus $110,000 or more to duplicate one of the rotary-powered Mazda RX-7's that had dominated the IMSA GTU (under 3.0 liters) road-racing class for several years.

Pontiac's first goal with its racing program was to bolster the division's competition image. The idea was to help racers and aspirants to build competitive Fiero-based cars through a factory parts program and make professional engineering guidance available. As a side effect, anyone who wanted to partake of racing parts and panels could do so, up to and including putting together a full IMSA- or SCCA-qualifiable vehicle.

For those who went the full route, Callies suggested starting with the 225/-50VR-16 Goodyear Eagles on 16x8-inch wheels in back and 205/VR50-16 on 7-inch wheels up front. If plans included a hot engine, the SD-4's Super Duty clutch, transaxle, axle shafts, and other components were recommended, all of which would bolt right on.

These parts, instructions, and all else needed to build a ground-up SD-4 or a milder street car could be found in *Pontiac Performance Plus*, a magazine-like catalogue originally available in Dec. 1983 and subsequently updated. Officially intended for "those enthusiasts involved in sanctioned motorsports," it's equally useful for people interested in modifying Fieros to any degree. The catalogue contains photos, blueprints, detailed how-to's, styling and aero information, aftermarket supplier lists, and part numbers. Articles include Pontiac's motorsports heritage plus descriptions of modifying 4-cylinder engines of up to 3.3

liters and 375+ bhp. As of 1986, the book's mail-order price was $3.95 plus $2.75 postage and handling from *Pontiac Performance Plus*, Box 07130-F, Detroit MI 48207. Ask for Publication No. 85-PPP-1.

John Callies oversaw the editorial production of *Pontiac Performance Plus*, and by following his recommendations, a mildly tweaked, basic 1984 street engine would use the SD head, Hooker header with the stock catalytic converter, Edelbrock manifold, and a Holley TBI injectors (see *Hot Rod* Magazine, 8/86). This resulted in roughly 200 bhp and quarter-mile times in the 14.7-second range.

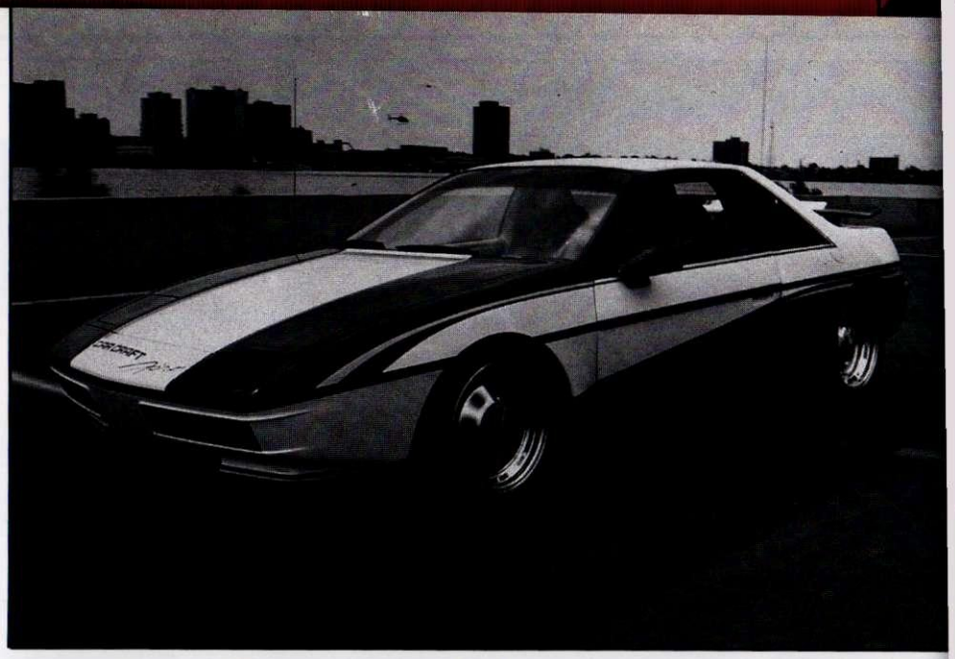
Callies's first 2.7 full-race SD-4, by contrast, cranked out 272 bhp at 7600 rpm. It used the Super Duty block, head with extra-large valves, Edelbrock manifold, Hooker header, fully counterweighted forged 5140-alloy stroker crank, Chevy high-performance rods, Crane roller cam, MSD Extra-Duty ignition and distributor, and Pontiac/Kinsler electronic fuel injection. All SD-4 engine pieces interchanged with stock components, although some needed machining or other modification to fit. The current 1986 3.0-liter GTU race engine, by the way, puts out 335 bhp at 7500 rpm.

At the same time Callies did his early work in Arizona on the SD-4 and Indy Pace Cars, Pontiac Engineering in Michigan had been modifying other pre-production Fieros. Jay Wetzel and his engineers tossed turbocharged 1.8-liter Fours into three different experimental Fieros, trying to find a possible alternative to the 2.8 V-6. The 1.8 turbomotor, straight from the J-Car Sunbird, amounted to a gutsy, fuel-injected, ohc, 150-bhp charmer. "We built them with the snorkle over the back, using the Indy Pace Car/GT theme," says Wetzel. "That package was really fun to drive. You could buzz through the gears, rev it to 6800, and it was very responsive."

But then Pontiac saw the market shift away from economy and toward performance. The 1.8 without a turbocharger didn't have the punch of the 2.5, and if Pontiac chose just the 1.8 *turbo*, it would be too expensive for the base econo/commuter car. More important, there really wasn't enough production capacity in the Brazilian plant, where the 1.8 is built, to provide engines for both the Sunbird and the Fiero. So Pontiac decided to go with just the 2.5 for the first year and bring the MPFI 2.8 V-6 along for 1985 in the GT. One of those experimental 1.8 turbos still exists, though, in Pontiac's unofficial museum of special Fieros.

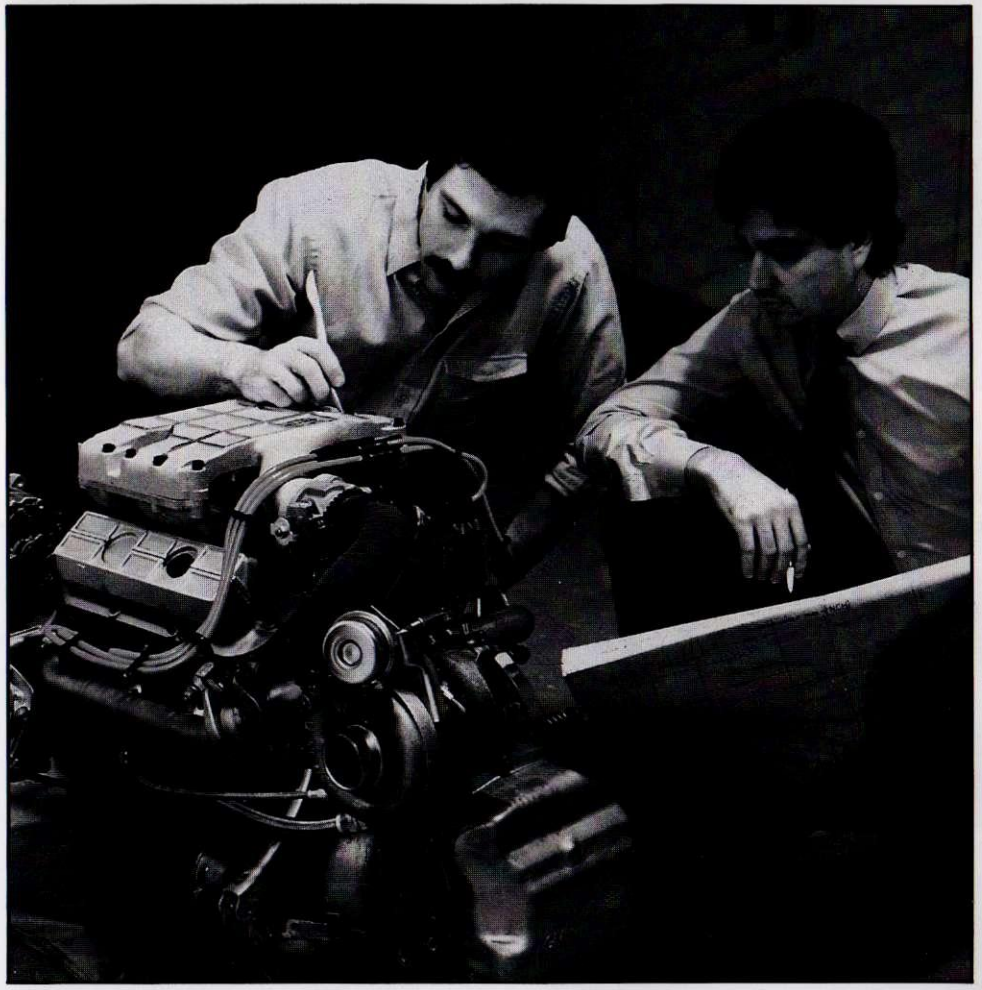
Then came a wild, fire-breathing *aluminum* 2.9 V-6 turbo that Tim Petersen took on after he left Callies's group. This was a special development project based on the Chevy-built 2.8 V-6, but with the block cast in aluminum and punched out to 2.9 liters. That engine could deliver around 220 bhp.

Pontiac built two Fieros with the 2.9 in them. Petersen's team painted one car red and the other black, and put over-roof scoops on them. "We were looking at how far we could take the Fiero; what was the ultimate," reports Ron Rogers. "And that was *the most awesome* car I've ever driven! We dropped the engine in it at the proving ground, took the car out, and the very first time down the track, our 0-60 was something like 6.2 seconds. *Very* respectable. We were looking at that and trying to decide whether we had the possibility of developing this 2.9 into the quickest production car in the world. As I recall, the Aston Martin held



CC's project Fiero used Super Duty engine parts and Herb Adams VSE suspension. Its styling treatment led directly to DGP's Stage II fiberglass competition body.

International Research markets—among many body, chassis, and engine goodies—a turbo kit, with or without intercooler, for the Fiero's 2.5-liter Four.



Pontiac engineer Tim K. Petersen put together a pair of the hottest streetable Fieros ever. Both ran turbocharged, intercooled, aluminum-block, 2.9-liter V-6's that delivered around 220 bhp and could turn 0-60 mph in an easy 6.2 seconds. John Schinella designed a tail-lamp tiebar that said *Porsche Eater* for these two cars, but after Pontiac entered an engine-research agreement with Porsche, those signs had to come off. At right, John Cafaro (r) and Bruce Penberthy work on the 2.9's turbo/injector graphics.

that distinction at the time, and it did 0-60 in 5.8 seconds. Since we were getting 6.2 right out of the box, we stood a chance."

But the project withered for a number of reasons. Former Pontiac general manager Bill Hoglund says in retrospect, "We should have done it, but there was a great deal of corporate conservatism at that point, and the aluminum 2.9 turbo just had too much power. But it was a dynamite engine; really fun to drive." Parenthetically, a Pontiac 6000-STE with an identical 2.9 installed broke its crankshaft one evening when Hoglund was driving it home.

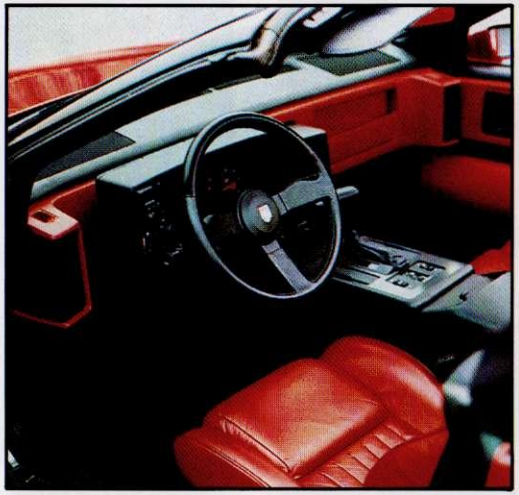
"Originally that 2.9 Fiero said *Porsche Eater* on the back," relates John M. Sawruk, manager in charge of Pontiac's motorsports and special products. Jay Wetzel had John Schinella design the *Porsche Eater* logo, but it had to come off when Pontiac called on Porsche for other powertrain proposals. In any case, Sawruk recalls the dyno output of this turbocharged aluminum 2.9 V-6 as around 235 bhp rather than 220. Sawruk adds that, even among the engineers who built it, there were serious misgivings about marketing a car this hot. "When you get to a 6-second 0-60 car," he comments, "there are a lot of people out there I'd rather didn't drive it. We honestly talked about including, in the price of the car, mandatory lessons at a professional driving school. We would have insisted that the buyer complete the course before taking delivery."

In addition to official Indy Pace Cars, SD-4's, and various fire breathers, Pontiac built a trio of open-air concept cars to test the feasibility of future roadsters and convertibles. First came a gold-colored Fiero roadster, developed in John Schinella's studio and introduced at the same West Coast preview as the SD-4. Like the SD-4, the roadster captivated the writers and editors, and the car showed up in many of their articles. John Sawruk explains that this roadster,

Pontiac chief engineer Jay Wetzel enjoys himself during the Fiero convertible's first showing, Sears Point raceway in Northern California, summer of '83.

Same car, different nose, side sculpturing, and paint as it appeared in late 1984. It has no actual top; was built strictly for the auto-show circuit.

A second convertible was designed and built by Pontiac Engineering to test the side-opening rear deck.



Red leather interior complements exterior. This car does have a fully operational manual top, uses production doors and door skins, including the Fiero's standard roll-up windows.

with its twin-hump top boot but no actual top, has been painted and modified several times.

"I'm sure that 20 years from now, people will think there were three different cars," Sawruk smiles. "The roadster was originally shown in gold with the standard front end. Two weeks later at the East Coast press preview, the color had been changed to pearlescent yellow. Since then, the car has been updated with the GT fascia and a 2-tone gold paint job."

Next came a handsome red convertible with 1986 Fiero GT styling. "That car was built at Pontiac Engineering," Sawruk says. "The rear compartment opens from the side, then you manually fold the top down to stow it, close the decklid, and put the boot on." Third member of the trio is a silver convertible with a removable, *folding* hardtop that stows in the trunk, also built at Pontiac Engineering. "This car wasn't finessed," John Schinella contributes. "It's a quick concept idea of an inexpensive convertible."

One other interesting concept car put together by the engineers was a stretched Fiero 2+2. "That rendition was never styled," Jay Wetzel explains. "It was strictly an engineering exercise to show the package size in case we ever wanted to expand the Fiero space-frame concept to include a tight 4-seater. It's shorter than the Firebird, but the wheelbase is longer because of the mid-engine configuration."

Another engineering experiment, this convertible boasts a *folding* hardtop that telescopes into itself and stows beneath a section of the rear deck. GM holds patents on this concept and wanted to see how it would work on a car with a structural space frame. No production versions are currently planned.

As a further test of space-frame versatility, Pontiac stretched the wheelbase of a Fiero and made a 2+2 out of it. Tight rear seats are for kids only. Another interesting idea is the flush rear quarter window that extends over the roof. This could be combined with a conventional sunroof.

John Sawruk, who is also Pontiac's unofficial historian and curator of a growing collection of Pontiac concept and historic vehicles, concedes that the Fiero 2+2's rear seats are suitable only for children. As of mid-1986, Pontiac's Fiero collection included the first production Fiero built, one of the three actual 1984 Indy Pace Cars, one of the trio of 1.8-liter turbo Fieros, all three convertibles, the 2+2, and a wild *Car Craft* magazine project car built in 1984 with the cooperation of Pontiac's engineering and PR departments. Not on the official list but still very much together is one of the two 2.9-liter, aluminum-block V-6 turbo test cars.

Before getting to the Fiero's many aftermarket suppliers, let's stop a moment and look at the *Car Craft* project car. Pontiac loaned an early pilot-production Fiero to CC and, upon completion, deemed it good enough to give it a permanent home in its vehicle collection. The *Car Craft* project car began as a series of custom Fiero concept drawings by designer Duane Kuchar (CC, 12/83). Some were practical, others far-out, but all showed the car's potential as a rolling showcase for aftermarket hardware.

Suspension development was assigned to former Pontiac engineer Herb Adams, who now specializes in handling kits that he sells through his own

mail-order firm (Herb Adams VSE, 100 Calle del Oaks, Del Rey Oaks CA 93940). Adams replaced the 23mm front swaybar with a 25mm bar and added a 32mm rear bar, both mounted with adjustable rod ends, for flatter and more neutral handling. He also put solid metal bushings in the rear lower control arms, cut one inch from the springs, and fitted adjustable Koni shocks set at their softest rate all around.

Adams further removed the steering damper and reduced front caster to 1.5 degrees (from 3.0 stock) and set camber at 0.5 degrees negative. This helped steering response but did add some vibration. Herb provided P225/VR50-16 Goodyear Gatorbacks on 16x8.5-inch front and P255/VR50-16 on 16x9.5-inch rear Centerline 500 wheels to give better handling without much ride compromise, and skidpad adhesion went from .79g to a laudable .91g (CC, 2/84). Tires and wheel sizes were subsequently changed, according to the magazine.

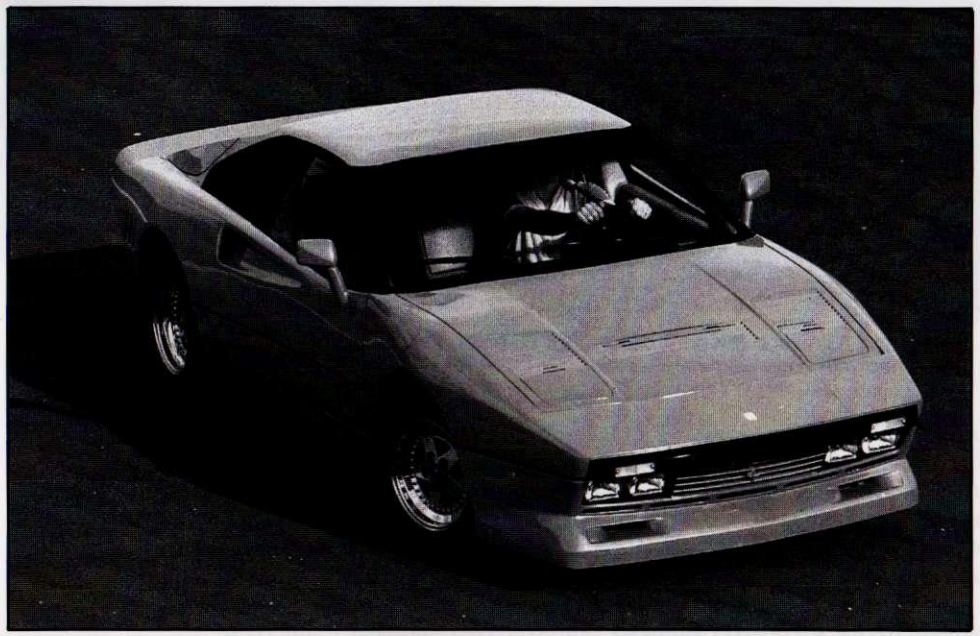
Next came the Super Duty engine and drivetrain treatment. With help from Callies and HO Racing in Lawndale, Calif., the car suddenly became a 200-bhp street sleeper with functional a/c and cruise control. CC editors turned a 14.81-second, 91.23-mph quarter mile versus 17.71 and 74.83 for the stock Fiero (CC, 4/84).

Finally, *Car Craft* had DGP produce Kuchar's exterior design in fiberglass, including wide fender flares for even larger tires, simulated side scoops, a big rear wing, etc. These panels became DGP's Stage II Fiero kit. The ultimate installment on this car appeared in CC's Oct. 1984 issue.

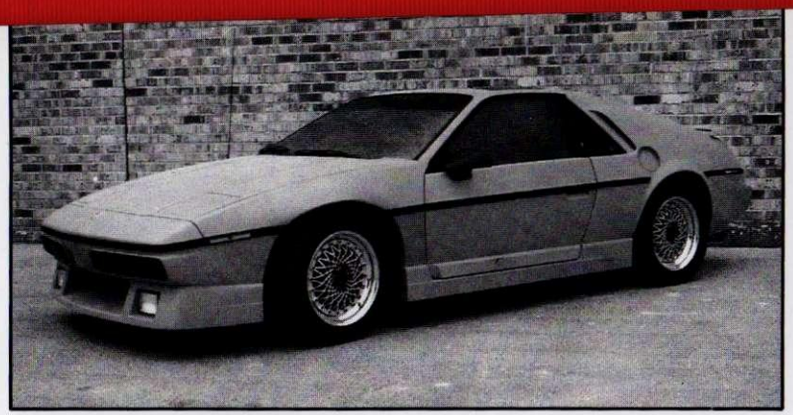
Soon afterward, *Car and Driver* tested a Callies-built, DGP-skinned, SD-4 street Fiero, along with an all-out IMSA GTU racing version, and published the results in its June 1985 issue. We'll save the race car for Chapter 10, but the bottom line on the 2.7-liter, 180-bhp, multi-striped street version was a 6.3-second 0-60, 14.7 e.t. and 93 mph in the quarter, 131 mph flat out, and .82g on the skidpad. This car had experimental electric power steering, which C&D said helped response, and a tighter rear suspension "to tame its lift-throttle oversteer."

DGP's president, Bob Birchmeier, had worked with Callies's engineers and Schinella's designers from the beginning of the Fiero's performance program in 1982. DGP clay modeled the original, handbuilt SD-4 prototype race-car body that GM aero tested in its Design Staff windtunnel. Birchmeier pulled DGP's molds directly from that clay.

Diversified Glass Products probably produces more Fiero custom body panels than any other aftermarket manufacturer. DGP's current street kits range from Stage I front and rear spoilers plus rocker skirts to the full racer look in Stage III. This last was designed for production ride height but looks a lot lower. It includes a GT-based nose, front airdam, fenders, rockers, quarters, rear bumper, and rear spoiler. Installation takes about 40 hours. Optional pieces include the over-roof snorkle and a blade-type rear spoiler. DGP also makes body panels that let you duplicate the GT fastback look on any model Fiero. The interaction between DGP, Pontiac, and Centerline resulted in P225/VR50-16's on 8- and



The Fiero's customizing potential appears limitless. Among suppliers of total body conversions, one of the most dramatic has to be this replica of the 1984 Ferrari GTO by Alden Thomas in Oregon. All body panels bolt directly to the stock mounting points and require no bonding or fiberglassing.



International Research offers two fastback kits for the Fiero Sport Coupe and SE. These again use stock mounting points.

Zimmer Quicksilver (top) stands on stretched V-6 Fiero space frame, costs about $45,000. Canadian Cimbria Viper (above) retails for around $30,000.

9-inch wheels fore and aft, respectively, to properly fit the bodywork. DGP's address is 2475 Brown Rd., Pontiac MI 48055.

Naturally there are plenty of other companies making Fiero total body kits and parts. Kamei of Box 426, North Haven CT 06473 offers front and rear spoilers and rocker skirts, as does the Low Look Co., 19 East Av., W. Nyack NY 10994.

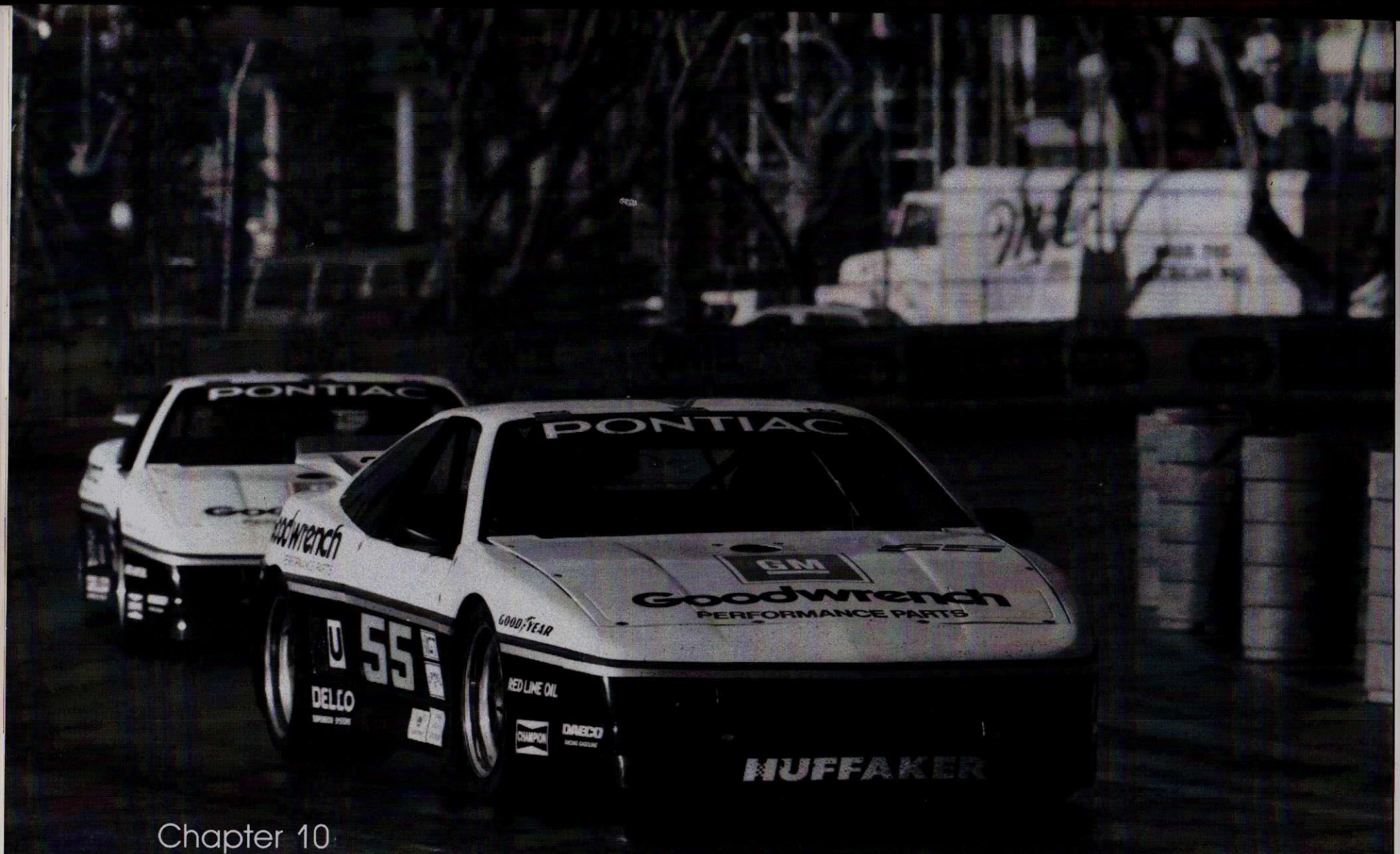
Meanwhile, E.R.C. Products Inc. (phone 800/338-3511) advertises easily installed urethane sail panels for an angled fastback look. And International Research Assoc. Inc., 8030 Cessna Av., Gaithersburg MD 20879, sells a handsome fastback conversion kit and, as of mid-1986, is developing a catalogue of Fiero parts and accessories, including turbocharger kits for both the Four and V-6. Phone 800/367-8423

The ultimate conversion, of course, is a total custom based on the Fiero's steel space frame. Alden Thomas Motorcars Inc., 4115 Donald, Eugene OR 97405 provides a full replica of the 1984 Ferrari GTO, with panels that bolt directly to the stock mounting points, requiring no bonding or fiberglassing. Another company planning a totally redone body is the Cimbria Group of British Columbia, Canada. Cimbria hopes to build and sell the Viper sports car, an exotic custom with full fiberglass body and redone interior. Base price is said to be around $30,000, and distribution will be through Canadian Pontiac dealers.

Then there's the latest endeavor from Zimmer Motor Cars Corp. of Pompano Beach, Fla. Zimmer makes mostly neo-classics. Their most recent offering, though, is the V-6 Fiero-based Quicksilver luxury 2-seater at $44,950.

We've already touched on the Cars & Concepts "Skylite" T-top conversion. This includes an air deflector molding, integrated glass panel locks, and protective storage pouches that tie down inside the trunk. Call C&C at 800/227-7016. As of mid-1986, the T-roof sold for about $1000 installed. There's also a new Targa kit from Auto Dyne at $1295, with a removable top panel that stores on the factory luggage rack. Auto Dyne's address is 1515 Fort St., Lincoln Park MI 48146.

Since the aftermarket parts business tends to be fluid, we suggest checking ads in recent car magazines to find out what's available at any given time. You might also contact the various Fiero clubs. We know of three at this writing: the Worldwide Fiero Club, 301 Pennington-Lawrenceville Rd., Trenton NJ 08638; the Fiero Owners Club of America, 1941 E. Edinger Av., Santa Ana CA 92705; and the National Fiero Assn. Inc., Pontiac Plaza, Box 554, Englishtown NJ 07726 *or* Box 5687, Lynwood WA 98036. Have fun! □



Chapter 10

Fiero Goes Racing

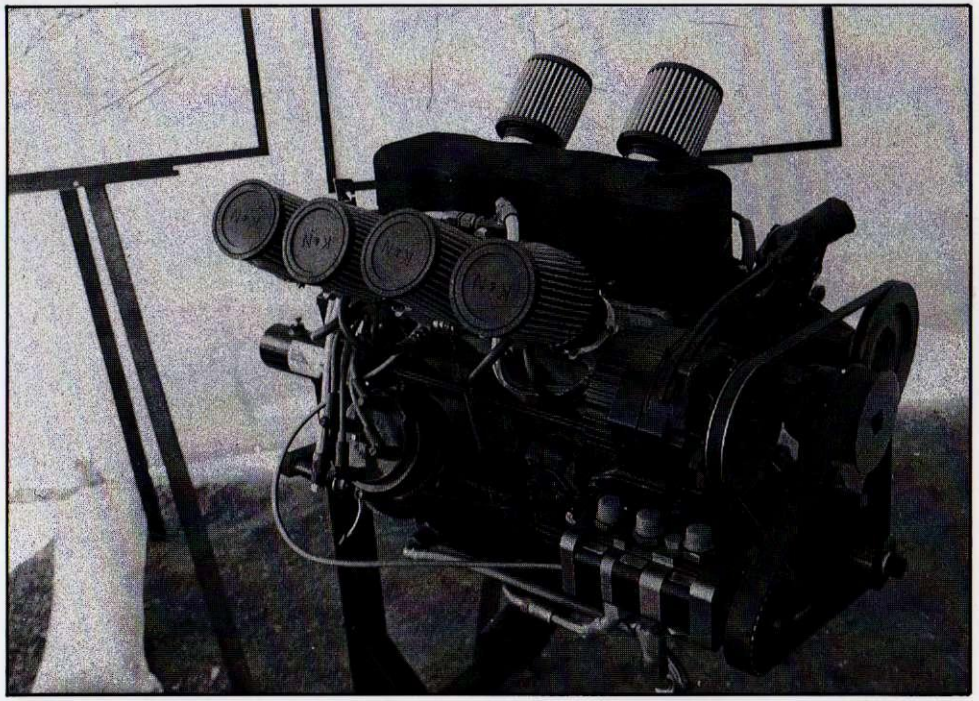
GM modelers apply clay over an actual DGP Stage II body to create Stage III. Female molds are taken from the clay, then fiberglass gets laid up inside molds.

PONTIAC HAD BEEN RACING UNDER THE TABLE, so to speak, until Bob Dorn gave John Callies the go-ahead to develop all these competition goodies for the Fiero-to-be (see Chapter 9). This was back in Sept. 1982. Dorn, a former amateur road racer himself, could see the possibilities and publicity value of a race-winning Fiero program. He convinced Bill Hoglund of the benefits of winning races and then turned the program over to Callies.

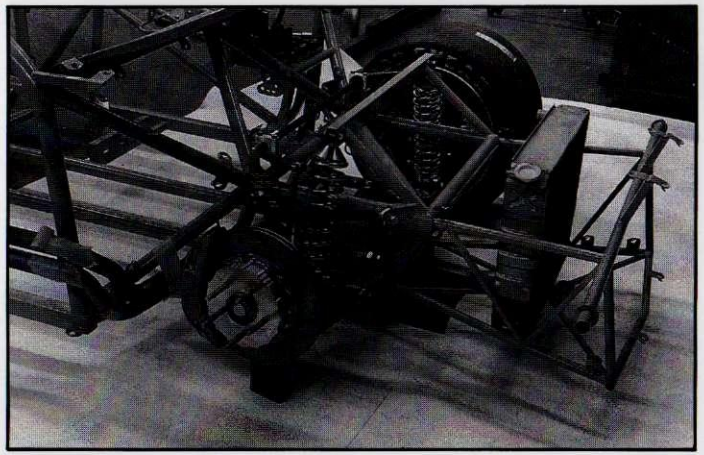
Thus was born Pontiac's motorsports engineering technical group, headquartered at GM's Arizona proving ground. With enthusiastic help from suspension engineer Terry Satchell and engine wizard Tim Petersen, Callies's tiny team quickly put together the necessary Super Duty mechanical and body parts. The first Fiero SD-4 racer was shown to the press in June 1983. That particular car was for demonstration purposes only, but by October, the first running prototype stood ready to be tested by Huffaker Engineering at Sears Point in Northern California. "That test," remarks Callies, "was a good experience, but disappointing. The car didn't handle the way we thought it should."

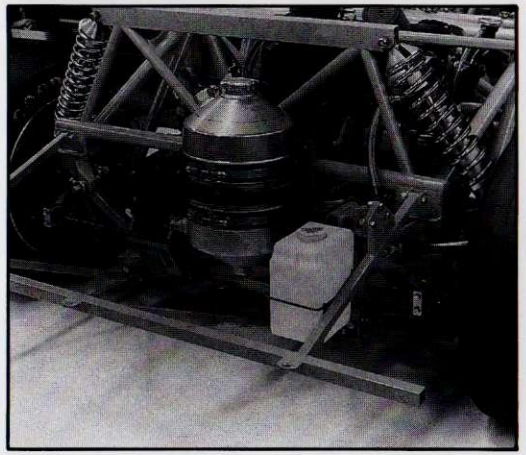
One of the test drivers, Atlanta-based Clay Young, had gotten 1984 sponsorship from Dole Fresh Fruit, thanks to the efforts of Richard L. (Dick) Emerick. Young took the Huffaker car home to Atlanta with him and, together with Callies and chassis experts Baird & Trivette Racing of Norcross, Ga., began suspension development for the next scheduled test at Daytona in November. Baird & Trivette suggested some good changes. "We all interacted on testing and doing the car," says Callies. "It was now at least semi-comfortable getting around the track. Terry Satchell did a great design job, and we were now moving into the normal development of any car."

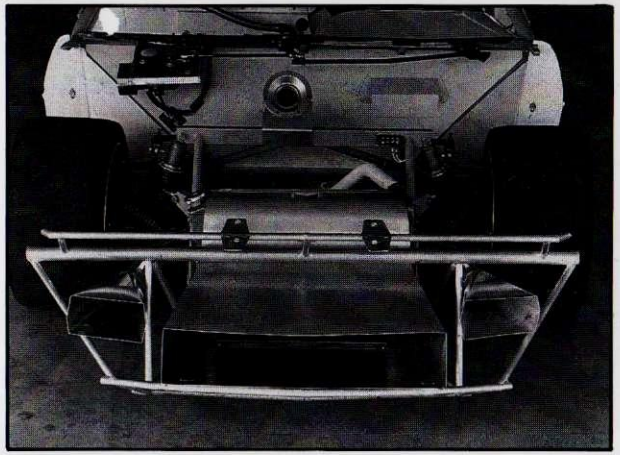
The Fiero's first competition appearance came at the Daytona 24-Hour, traditional opener for IMSA's road-racing season. This early-February event pits man and machine against speed and time. Durability means an awful lot to



Early Super Duty Fiero engines had plenty of power but lacked durability in road racing. Callies's group had to make dozens of revisions between events.







Although Fiero race cars look nearly stock, they're nowhere near it. They use tube frames, entirely different suspension, large tank out back for dry-sump oiling (center), aluminum ducts up front (right) would direct air through radiator and onto brake rotors. Due to extreme heat buildup, brakes needed extra cooling air.

Dole-sponsored GTU begins to go together in foreground while PPG Fiero pace car, which uses many of the same mechanicals, gets serviced on lift.

winning the grueling 24-Hour at Florida's high-bank-oval-plus-infield Daytona International Speedway. Many teams, especially those with new, unproven vehicles, generally choose to sit this one out so they can prepare for the shorter early-season races that are easier on budgets and equipment. But not the Fiero team.

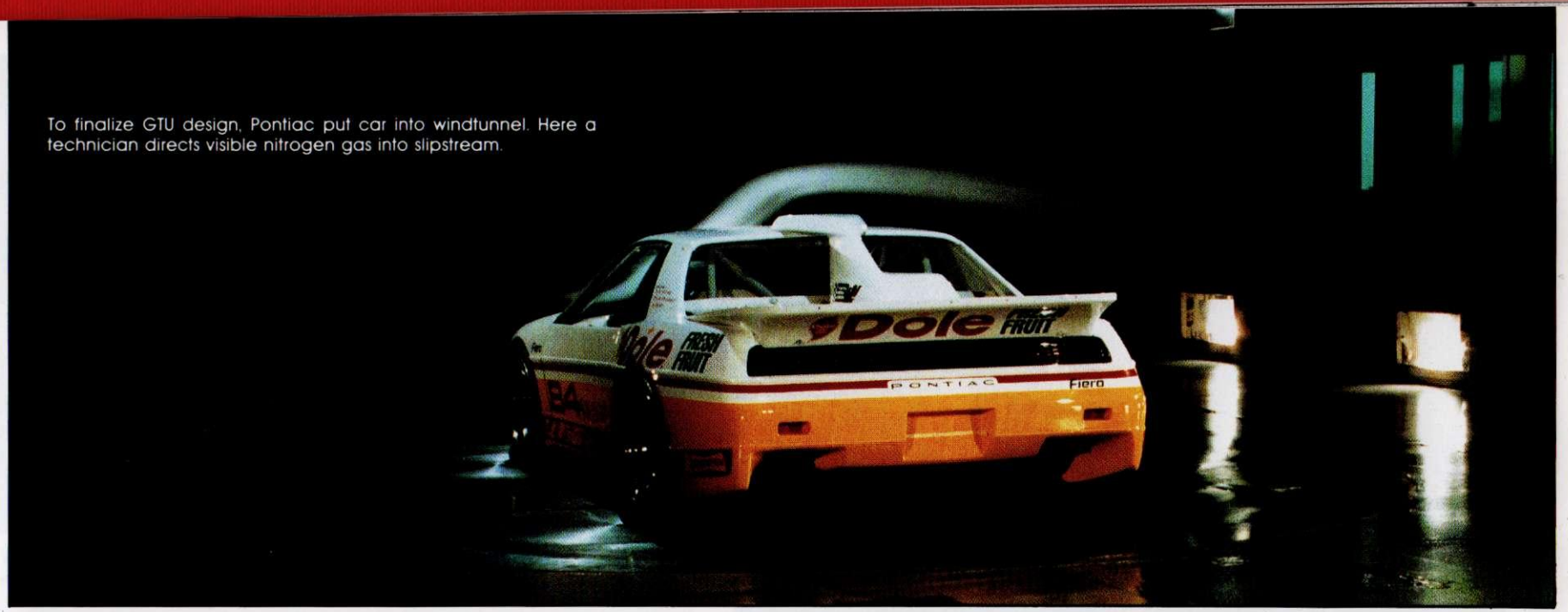
"We knew that running the Daytona 24-Hour was incredibly difficult for our first IMSA effort," states Callies, "but we decided that the pressure of going out racing and having to make the next race was better than sitting back, testing and testing and testing and *then* making our debut. We realized our chances of finishing were nil, but we felt that going racing would push the project ahead through self-imposed pressures.

"Because we'd already had such success with the engine in other forms of racing, I figured we'd probably have transmission problems. This was still a brand-new transmission. Or we'd run into problems with the axles, the uprights, or the car in general. I hadn't figured on engine problems, though. As it turned out, we had nothing *but* engine problems!

"What we learned in a hurry was that the harmonics of a 4-cylinder road-racing engine, where you're running up and down through the worst vibration range several times a lap, lap after lap, just destroyed parts right and left. I think we made it 2-1/2 hours into that 24-hour race before we started pitching cam gears through the cam cover. Road racing is different from running on an oval. On oval tracks, you run up and sit within a 400-rpm range between maybe 7200 and 7600 rpm. In road racing, you're all over the rev range. Also, all in-line Fours have a second-order shake force. Ours is severe because we have such a large displacement."

The Fiero's problems that first year all had to do with durability. Callies went through six redesigns of cam gears. "We finally got the cam gear fixed; then we started breaking valves until I figured out how to put a rev kit in it," says Callies. "About that time, I finally got our aluminum head finished, and that gave us a power increase. Then we started breaking pistons, after which we were breaking connecting rods; then flywheels began falling off. It was just a nightmare. If you plotted that first season on a graph, our power curve went up very steeply and our durability curve fell at just about the same rate. It was just incredible. I'll bet we redesigned and built at least 42 different pieces. I was taking the red-eye home every Sunday with a bag of broken parts over my shoulder."

Callies's engineers would all meet in his office at 7:00 on Monday mornings, but with the next race only two weeks away, the time pressures were so fierce



To finalize GTU design, Pontiac put car into windtunnel. Here a technician directs visible nitrogen gas into slipstream.

that they couldn't do all the analyses needed to find out why certain things broke. "You'd look at the parts, do what you could, and hipshoot it from there," Callies continues. "That really put a load on us. On the other hand, we did in nine months what would normally take three years."

While the IMSA Fiero always qualified well, it failed to finish its first four races: the Daytona 24-Hour, the Miami street race, the Sebring 12-Hour, and a shorter sprint race at Road Atlanta. "A rocker arm broke. That was another problem. What was interesting, though, was that in all but one of those races, we were leading when we went out," Callies observes.

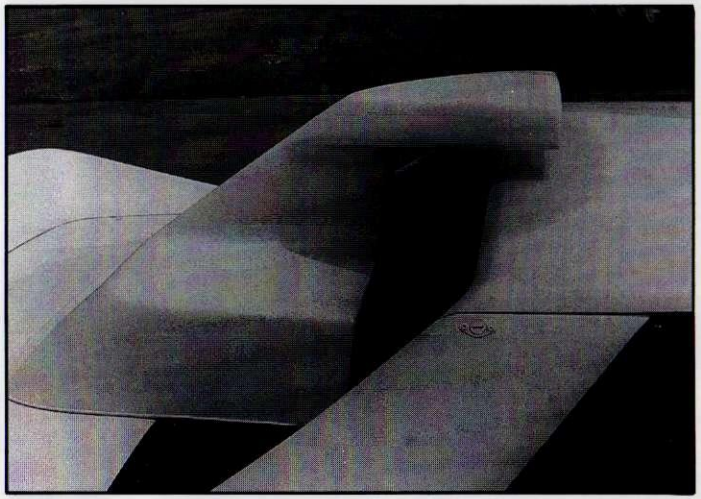
Then Clay Young came home a strong second in the first race the car ever finished. This was at Sears Point. The good showing lifted everyone's spirits, but the Fiero's luck didn't last, because the race at Charlotte Motor Speedway turned out to be a heartbreaker.

Young was a lap ahead of second place when he came in for the last driver change. The next driver got in, and Callies told him, "All you have to do is go slow and stay out of trouble. Well, he went right down to the first turn and hit the wall!" Even so, the car finished third.

The Fiero's first outright win—the first *ever* for an American marque in 12 years of IMSA GTU (Grand Touring *Under* 3.0 liters) class competition—finally came at Michigan International Speedway, 40 miles from Detroit. And it broke Mazda's long dominance, whose factory-backed RX-7's had been seriously challenged only by big-bucks Nissan and Toyota teams.

Then the Fiero scored again at the very next race at Watkins Glen. Clearly, Young's Dole Fiero was now a threat to be taken seriously. "The thing is," Callies points out, "that we did this on a shoestring. We didn't tie up any Pontiac personnel, and there really wasn't any budget." The smallness of the organiza-

Because Dole management wanted to know what Fiero GTU would look like, Schinella and Cafaro rendered these views.



DGP's aftermarket roof scoop picks up fresh air and gives a slight ram effect into aircleaner.

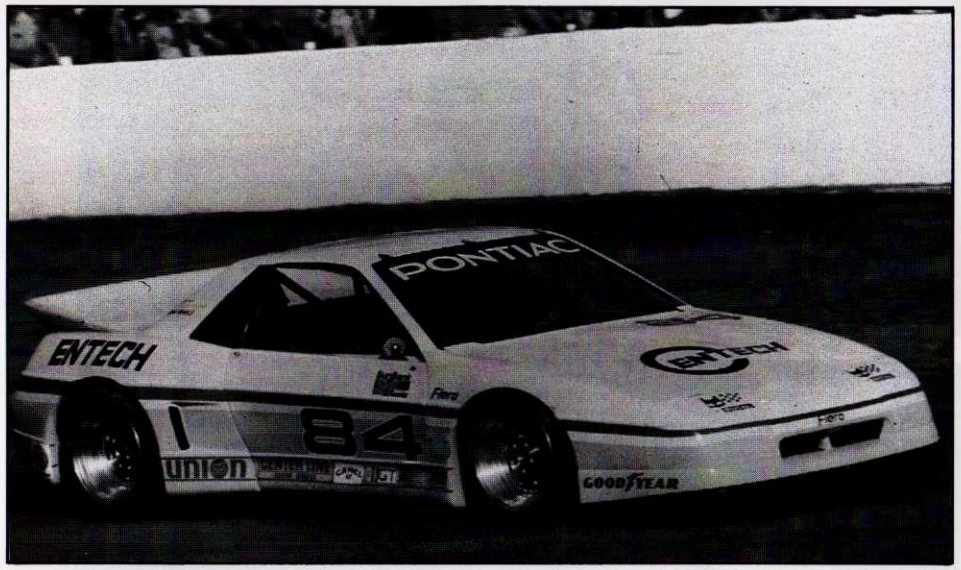
Fiero GTU's no-nonsense interior houses 29-gallon fuel cell inside aluminum center console. Ten-grand tach dominates instrument cluster. All needles point straight up if everything's normal.

tion had its advantages. "When you have a big committee," observes Callies, "decisions can't get out the other end. In our case, it was really easy to say, Okay, it broke. We're 70% sure this is why, so let's fix it this way. You can make those decisions in 15 minutes, and you're off after the next problem."

Ed McLean, Pontiac's motorsports manager and team liaison, put together a new GTU team package for a limited schedule of 10 races in 1985, with STP as the sponsor. Bob Earl was named the driver of the STP Fiero fielded by Huffaker Engineering. STP's vice president of racing, Ralph Salvino, better known as The Godfather, considered this an ideal way to extend the relationship between Pontiac, Richard Petty, and IMSA.

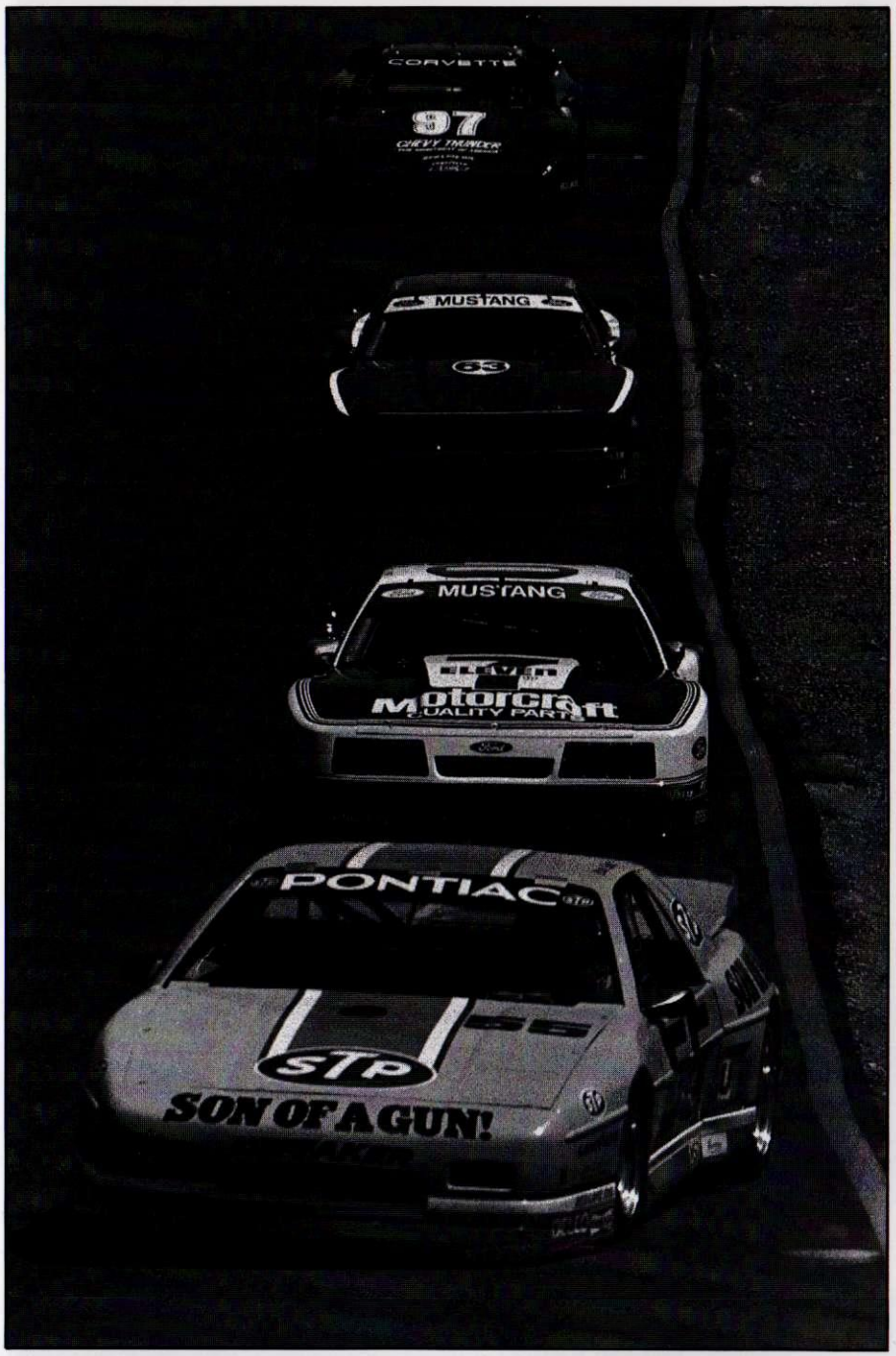
So the 1985 season brought the highly experienced Huffaker organization into the series with the STP Fiero, while Clay Young returned with backing from Entech, the engineering/drafting firm that helped develop the Fiero in the first place. Young looked good leading the internationally televised Miami race until his Fiero's transaxle failed just two laps from the end. Huffaker's bright yellow STP Son of a Gun! racer was driven by Bob Earl, an open-wheel ace and former instructor at Sears Point's Bondurant Driving School. Earl didn't join the circuit

Clay Young in the Dole Fiero GTU won two races in its maiden year, 1984.



With new Entech sponsorship, Clay Young's GTU Fiero galloped to an early lead and eventual victory in the Mid-Ohio IMSA race in June 1985.

Pontiac's motorsports engineering mastermind John Callies (right) talks strategy with Tommy Riggins, a Firebird driver for the Dingman Brothers racing team.



Bob Earl in the STP Fiero GTU leads two Mustangs and a Corvette at Sears Point International Raceway on his way to winning his third 1985 race in a row.

until the fifth event, at Riverside, Calif., where engine problems plagued Huffaker. Earl then won the sixth go at Laguna Seca, starting from last place and passing 36 cars. He also won the seventh, at Charlotte.

A fifth place at Lime Rock was followed by a DNF (did not finish) at Mid-Ohio, where Young scored a record-breaking win. Then Earl came back with a solid win at Watkins Glen. With 10 races run out of 17, the score stood at four each for Fiero and Mazda plus one each for Porsche and Toyota.

Earl's STP Fiero was clearly the hot new GTU star: three victories out of six races entered; three out of four that he finished. With a chance at the manufacturer's title, Huffaker fielded a second car, this one piloted by 3-time SCCA amateur champ Terry Visger. Visger got off to a flying start at the 28 July go at Portland International Raceway. Result: a new qualifying record and a flag-to-flag win for the STP Fiero No. 55, Bob Earl driving, followed by the elated Visger's No. 50 in second place.

"Our racing program is really coming together," Huffaker said after the Portland race. "We've really done our homework... When you bring two cars to the track and place 1-2, what more could you want?"

The STP Fiero was equipped with Huffaker's latest 3.0-liter Super Duty engine, which reportedly barked out more than 300 bhp. "We wanted to see what the big motor would do here in Portland," added Joe Huffaker. "The track has a long straightaway, and the turns are relatively wide. The big engine has a lot more torque, and we thought it might give us the edge we needed. Of course, there's a tradeoff, since IMSA makes us carry about 200 pounds of weight to offset the displacement."

Next came Sears Point again, which was now Huffaker's base of operations and Earl's home track. Fieros captured another pole position, set a new track record, and craftily won the race, but it wasn't easy. Charging hard for the lead against Chris Cord's Toyota late in the race, Earl managed to pressure Cord into a spin just four laps from the end. That made three wins in a row now or five in the last seven starts. Visger brought his car home fourth at Sears.

Earl later told reporters, "This win was a lot of work. I was sideways too often and got the tires too hot; also started getting tired in the middle of the race. I didn't even get a drink out of my water bottle, I was so busy. But I wasn't going to back off."

Road America came next—a 500-mile event at Elkhart Lake, Wisc. Here, Earl shared his ride with rock star John Oates of Hall & Oates. Even though he was now in second place for driver points, solidly in contention for the season title, choosing Oates as a co-driver wasn't as risky as it sounded. Oates had shown considerable promise, and his racing experience included some European events. He also trained in the car for two days at Sears Point. "John surprised us all with his quickness and smooth technique," instructor Earl ventured afterward. "I know we'll have an excellent chance of winning again."

But in the race, disaster struck when third gear broke, sending Oates crashing into the guard rail. That put an end to No. 55's day and, for all practical purposes, Bob Earl's chance at the championship. Neither Young nor Visger scored points that day either, so the manufacturer's title seemed suddenly out of reach.

Bob Earl teamed with Huffaker Engineering to consistently put Fiero out front. At Road America, co-driver John Oates (bottom, left) ran into mechanical problems.

Earl's teammate, Terry Visger, driving the GM Goodwrench No. 50, leads a Mazda RX-7 through downtown Miami. Bob Earl won this event (see photo opposite).

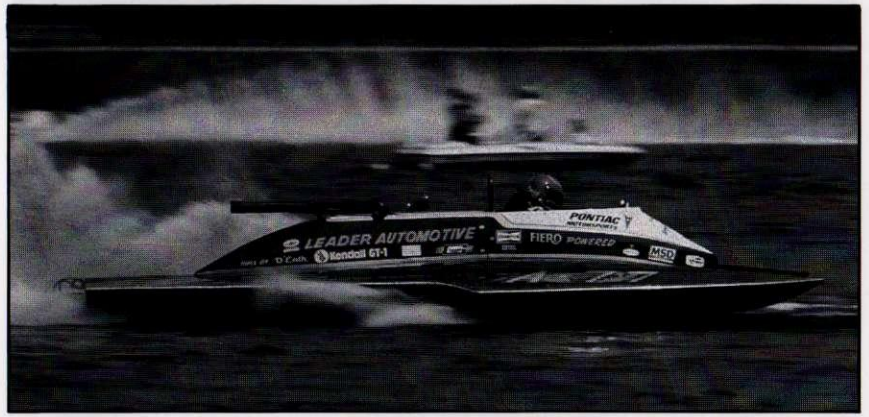
The STP Fiero started from the pole once more with another qualifying record at Pocono, Pa., but an overheated engine dropped it to eighth at the end. A DNF at the second Watkins Glen event, followed by a convincing win on a tight temporary course through the streets of Columbus, Ohio, left Earl too far back in the standings to have a chance at catching the top two drivers. The team skipped the final event that November at Daytona to begin preparing for the 1986 season.

Final 1985 driver standings saw Mazda's Jack Baldwin in first place, followed by Cord, Mazda driver Amos Johnson, and Earl. And Visger, although he entered only six races, finished a creditable 10th in points. The Huffaker-prepared STP Fiero had tallied an impressive six wins for the season to Baldwin's five and Cord's three. Pontiac finished a respectable third in manufacturer's points behind Mazda and Toyota.

John Callies credits Joe Huffaker and Bob Earl for getting the Fiero racing program going strong. "Joe was doing their engines and was also at the track, running the car. He knew what he had to do to keep his engines together and keep track of things. What was fortunate...the products we'd developed during the previous two years gave the basis to which Joe could add his experience to make the thing work. And I can't say enough about Joe's preparation and Bob Earl's driving."

Clay Young's development car appeared as a test report in *Car and Driver* for June 1985. Zero-to-60 performance came in at a stunning 4.0 seconds, with a quarter-mile time time of 12.3 seconds at 112 mph, a top speed of 161 mph, and a skidpad number of 1.16g. Those phenomenal figures show how potent a full-race 1985 IMSA GTU car—with its 2.7-liter SD-4 engine putting out an estimated 275 bhp at 7500 rpm and 250 lb./ft. at 6500 rpm—really is.

Meanwhile, important things were happening in other forms of motorsport. The Pontiac SD-4-powered Felster & Naber hydroplane took a prestigious American Power Boat Assn. inboard national championship in Aug. 1985 at the



Meanwhile on water, Doug Felster won the APBA modified hydroplane class championship near Dayton, Ohio, piloting a Fiero SD-4-powered inboard.

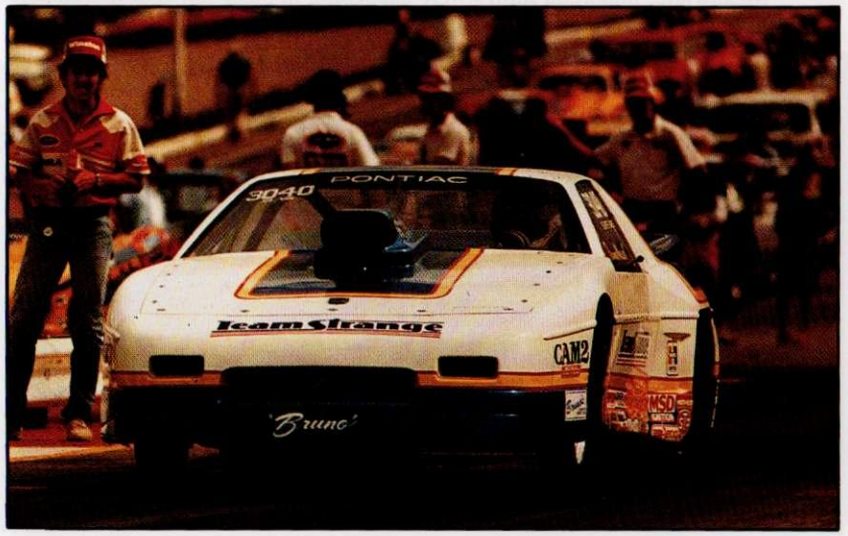
In the shadow of Miami's historic customs house tower, Bob Earl scores a decisive Grand Prix win in the Goodwrench GTU Fiero, Mar. 1986.

Larry Morgan's front-engined quarter miler (shown here and at right) runs a 3.0-liter SD-4 pumping out 370 bhp. The former Super Stock champ took the 1985 NHRA Competition Eliminator title at that year's Keystone Nationals.

Hydrobowl, near Dayton, Ohio. Driver Doug Felster set a new record of 86 mph on the 1.66-mile course during qualifying, finished second and first in preliminary heats, then literally ran away to victory in the 12-boat final race. His 250-bhp SD-4 bested 26 others in the 2.5-liter, production-based class, including both Fours and V-6's from the likes of BMW, Alfa Romeo, Ford, Renault, and Datsun.

In drag racing, Bruno Massel's Team Strange V-8-powered Fiero took Best Engineered Car at the March NHRA Gatornationals at Gainesville, Fla. Larry Morgan spent most of 1985 developing his SD-4 Fiero—sponsored by Castrol GTX, Team Nationwise, and the Rod Shop. This car, powered by a front-mounted, 370-bhp, 3.0-liter Super Duty engine, won the Competition Eliminator title on 15 Sept. 1985 at the NHRA's Keystone Nationals in Columbus, Ohio. As of mid-1986, his best e.t. was a 9.72 seconds at 134.41 mph.

Incidentally, bodywork for these quarter-milers also came from Diversified Glass Products. Doors, nose, and hood are the same as IMSA competition



Bruno Massel's 9-second, 454 V-8-engined Team Strange Fiero uses a tube chassis, DGP body panels, ATI Powerglide trans, has won several Best Engineered awards.

Bobby Unser Jr. storms up Pikes Peak in the 1985 Predator Hillclimb. His car carried stock Fiero body panels over a full Wells Coyote single-seater chassis.

Robert (Doc) Aranosian of Clarkston, Mich., campaigned the Van-Allen Racing Team Fiero in the SCCA's Pro-Rally open class during the 1984 and '85 seasons.

pieces. Only the four fenders are different. DGP president Bob Birchmeier points out that his company's body panels have been updated to incorporate the 1986 GT fastback look. This represents a fairly drastic change, since the fastback stands two inches higher in the rear deck area.

Huffaker and Earl returned to IMSA GTU with a new GM Goodwrench-sponsored Fiero fastback for the 1986 season. They skipped the Daytona 24-Hour this year but entered the Miami street race on 1 March. The engine was overheating when Earl crossed the finish line. "I found out later that the radiator was blocked with paper," Earl told *On Track* magazine after the race. "The gauge was pegged at 240 degrees the last two laps. I couldn't go as fast, and I was having to make some real brave moves in traffic." He finally beat Roger Mandeville, the hard-charging Mazda driver, to the checkered flag by a mere two seconds.

That got 1986 off to a roaring start, but there was even more excitement 10 days later when Pontiac unveiled the result of a top-secret collaboration between Callies's motorsports engineering department, Schinella's design studio, and the respected British racing firm, Spice Engineering Ltd. The result was a brand-new, Entech-sponsored land rocket called the Fiero GTP, to be entered in the highly competitive Camel Light division of IMSA's high-tech GTP prototype class.

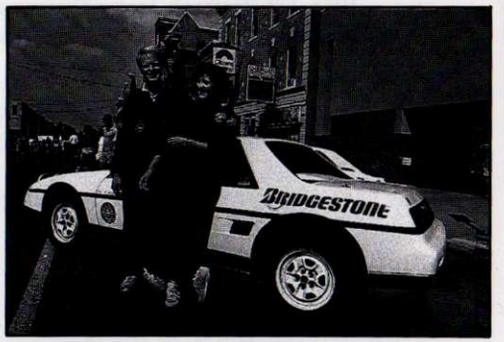
"Byron Warner, Pontiac's chief engineer, really got that program started," reports John Callies, "My responsibility was to have a Camel Light car that resembled the street Fiero GT. That's the only way we could sell the program. I looked at five or six manufacturers of race cars and ended up with Spice because of the people there, especially Jeff Hazel and Graham Humphries. They were busy winning the 1985 European C2 championship at that time, but they wanted to interact on a cooperative basis with the aerodynamic development and finite-element analysis that we could do.

"Our part included the entire underbody and tunnel design work, the body design, aerodynamics on top, and making our 4-cylinder powerplant work properly in a tub chassis without its being a structural member, which was kind of a nightmare. Also, at the same time, designing a car that would allow other powerplant uses if desired to get into higher classes of racing.

"The car is brand new from the ground up. Everything: uprights, axles, tub, bodywork...there isn't one part that was ever produced before. That's where

Susan and David Jesse's SCCA Pro-Rally production-class mount lifts a wheel rounding a tight corner.

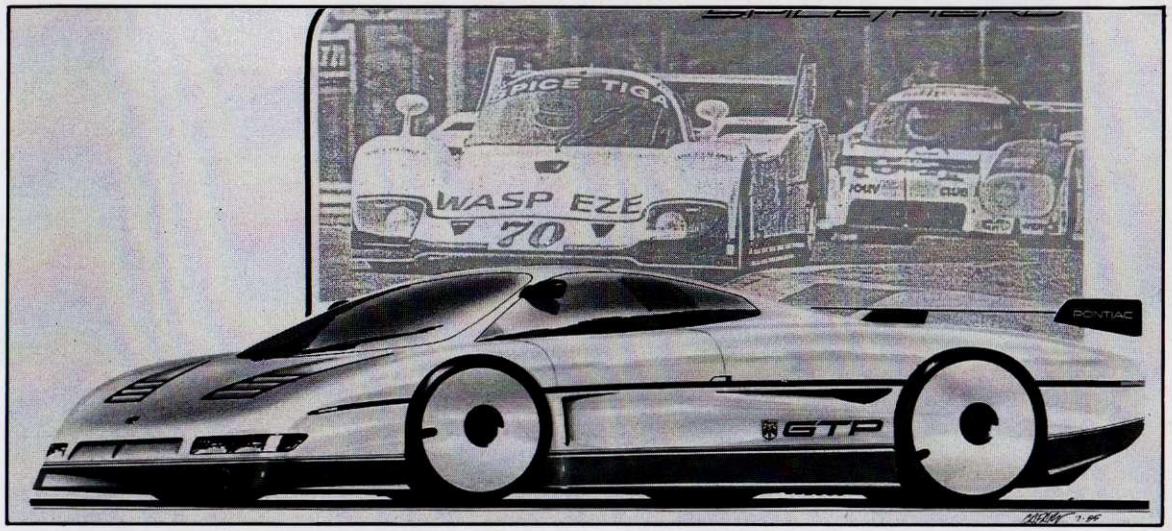
SCCA Pro-Rally contenders Doc Aranosian (left) and Susan and David Jesse pose for record shots. Fiero No. 75 was a project car sponsored by donations from 1500 Pontiac assembly workers. It ran just before the 1985 Detroit Grand Prix, driven by Tom Walker. At right are Glenn Beardsley and Laura Hire in Pro-Rally.



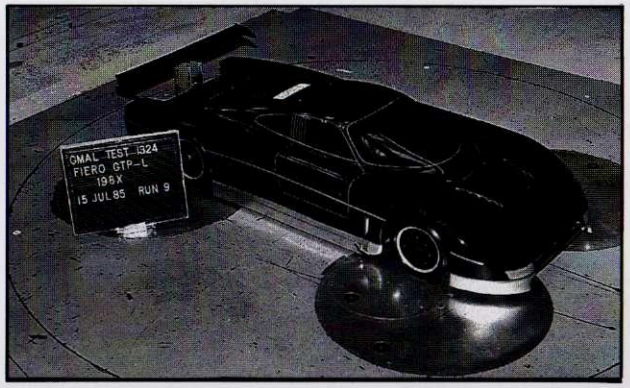
Graham Humphries came in. Graham has been in Formula One as well as other types of racing, and he's always done a great engineering design job."

To style the GTP's body, Schinella assigned assistant chief designer John Cafaro, who'd also shaped and detailed Clay Young's original GTU car. Cafaro's work on the GTP took him to England twice. He remembers the experience this way: "IMSA and FISA specify certain things in a race car that you have to adhere to. Callies has a good eye for making things look good, and we worked on the GTP together. The first trip I took to England, Spice Engineering had a scale model that they'd done from one of my sketches—a very loose interpretation of the design. The model didn't look anything like the GTP car turned out, but they tested it in the windtunnel at Southampton University, and then we took the scale model back to our hotel, and right there in the lobby is where I did a rough pencil sketch over the package...a totally new silhouette of the car; completely different. We did an all-new body side.

"The first model they'd done looked like a Porsche 956. The philosophy that Callies and I, along with Graham Humphries, worked out was more like a Ford



John Cafaro supplied initial designs for Fiero GTP, including one with twin roof snorkles, fin-mounted wing.



John Callies dwarfs Fiero GTP scale model and is dwarfed in turn by the cavernous size of GM's windtunnel. These preliminary tests checked efficiency of ground effects, air exhausts in hood, and rear-wing angle.

Probe—very smooth and clean. Then Spice did another scale model over in England and shipped it here to the States, and we looked at it with Chuck Jordan, Dave Holls, Stan Wilen, John Callies, and Max Schenkel."

Shinella takes up the narrative at this point: "I organized a review when we got the model from England, and we all knew there were a couple of little things that needed minor adjustment. Chuck asked Schenkel how the aero was, and Schenkel, our aerodynamics engineer, said it was excellent; better than anything out there. So Chuck suggested a few little changes and asked if they'd hurt the aero, and Schenkel said no. So Chuck said, Let's do it; go for it!"

Back to Cafaro: "We then brought the model over to a job shop in Sterling Heights called Three-D Design. They took my modifications, modeled them in wood, we refined it some more, and finally we came up with the Indy Pace Car paint scheme: white over silver; all pristine and looking very much like the GTP does today.

"That's when I made my second trip to England to look at the full-sized model, which Spice was doing there at their shops at the Silverstone circuit. They'd pretty much interpretted the scale model verbatim, and I was very pleased with it. They did the full-sized model in Bondo and wood instead of clay; very different from how we do it. We made a few more minor adjustments to conform with the IMSA and FISA rules—window openings, door size, ground clearance, vision requirements, headlights; things like that. Callies and Humphries and I worked all that out. And that was it. I never saw the car again until it ran over here."

GTP cars are the highly exotic, super-expensive, 800+-bhp flagships of the IMSA Camel GT circuit, and Camel Light is a class within GTP for smaller, lighter cars with 3.0-liter maximum displacement and an 1800-pound minimum weight. Most are constructed by builders like March or Argo and powered by rotary Mazda engines, Porsche Flat Sixes, Buick V-6's, or even Ferrari V-8's. But John Callies figured that a state-of-the-art, ground-effects chassis, combined with the latest 330-bhp, 3.0-liter SD-4 engine, campaigned by the right team and driven by the right hot shoe, would be competitive.

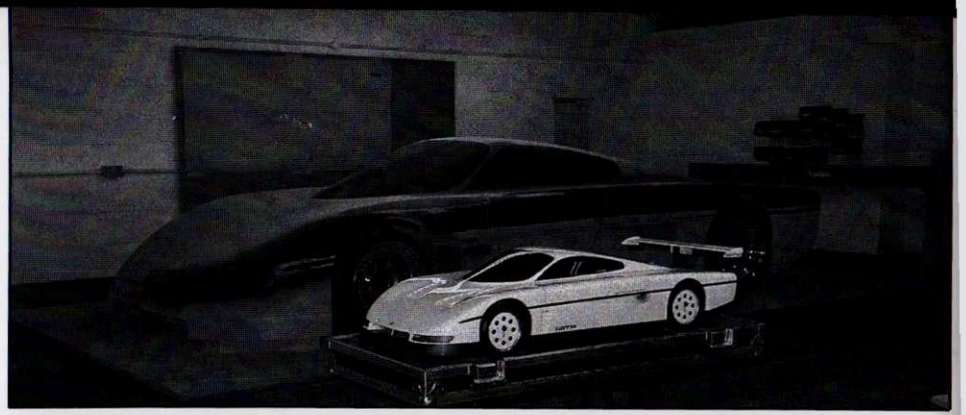
Callies got the green light on the Fiero GTP in July 1985 and had the car ready just eight months later, in Mar. 1986. The car stood 172.3 inches long on a 105-inch wheelbase, was 71.8 inches wide, and just 40.5 inches high. It weighed only 1650 pounds, so 150 pounds of ballast had to be strategically placed inside the chassis to make the 1800-pound minimum. Suspension was state-of-the-art Formula One, with front pushrods and rear rockers. The car carried Goodyear 16-inch racing slicks on 16x10- and 16x13.8-inch modular wheels.

Its monocoque chassis used lightweight aluminum honeycomb, with upper sections of carbon fiber composite. And its carbon-reinforced Kevlar body boasted a frontal area of just 16.9 square feet and a Cd of .298. This is an astonishingly low figure for a ground-effects race car that uses fat tires, wings, and underbody airfoil surfaces to press itself down toward the track at speed.

The U.S. Spice Engineering team, headquartered in Atlanta and managed by

Pontiac Winners Circle

In Feb. 1986, Pontiac Motorsports launched a monthly racing newsletter, *Pontiac Winners Circle,* intended for both serious racers and fans alike. PWC carries the latest tech information on Super Duty and aftermarket equipment, tips on how to use them in off-highway applications, monthly race results, and car features. A one-year subscription costs $12 from *Pontiac Winners Circle,* Box 3213-F, Ontario CA 91761.



Going by Cafaro's model, Spice Engineering in England scaled up the GTP full size. Cafaro, seen penning in the air outlets, went to England twice.

Jeff Hazel, with crew chief Julian Randles, set out to capture IMSA's Camel Light championship beginning at the 6 Apr. 1986 Road Atlanta race. The car they developed became the Entech Fiero GTP. Meanwhile, in Northamptonshire, England, Spice's parent organization pursued its second straight European Group C2 championship with an otherwise identical Cosworth-powered version of this same vehicle. Bob Earl came aboard as the Entech GTP's test and development driver and, later, as primary pilot. Gordon Spice and Ray Bellm shuttled back and forth between the U.S. and Europe, taking turns at the wheel.

Was the Entech GTP competitive? Earl qualified it on the pole with a new Camel Light class record at Road Atlanta. He also led the race until electrical problems sidelined him. "When the car went out, I was cruising with a 45-second lead," said Bob Earl after the race. Doing double duty, Earl also started the Huffaker-prepared GM Goodwrench Fiero from the pole of the GTU race. The Fiero No. 55 led flag to flag for its second straight win. Teammate Terry Visger suffered clutch problems, dropping him to 12th by the finish of the Atlanta event.

Next race, Riverside, saw both classes—GTP and GTU—combined for a 6-hour enduro, so Spice and Bellm handled the GTP, while Earl and Dominic Dobson shared the No. 55 Fiero, with Visger and Don Roberts in the second team car. Again, Earl became the fastest GTU qualifier, but a slipping clutch forced him out while Visger and Roberts finished a strong second to a Mazda.

After only two dozen practice laps, the Entech Fiero GTP Camel Light took the pole and set a new Road Atlanta lap record of 109.046 mph its first time out. The same car, driven by Bob Earl and Ray Bellm, is shown here winning the 1986 Charlotte go, the car's second victory and two in a row!

Fiero GTP has a bonded aluminum honeycomb chassis beneath Kevlar skins and uses carbon fiber for the complex front tub. Its 3.0-liter engine delivers 330 bhp.

Spice and Bellm, meanwhile, managed to lead the Camel Light by one lap and 10 seconds at mid-race, only to lose a half hour in the pits working on electrical problems, and finished seventh.

At Laguna Seca, Earl again chauffeured both cars. "I'll be tired Sunday night," he predicted, "but this is something I want to do. I want to drive both cars, put them both on the pole, and I'd like to win both races."

Sounded like a good idea, and Earl almost pulled it off. First, he set qualifying records in both classes. Then he brought the GTP Fiero its first victory in only its third start, setting a new race-lap record in the process. But he dropped out of the GTU race with engine trouble after just 16 laps. Visger, meanwhile, finished fourth, while Clay Young in a new V-6-powered Fiero, ran competitively in the GTO class until mechanical problems put him out.

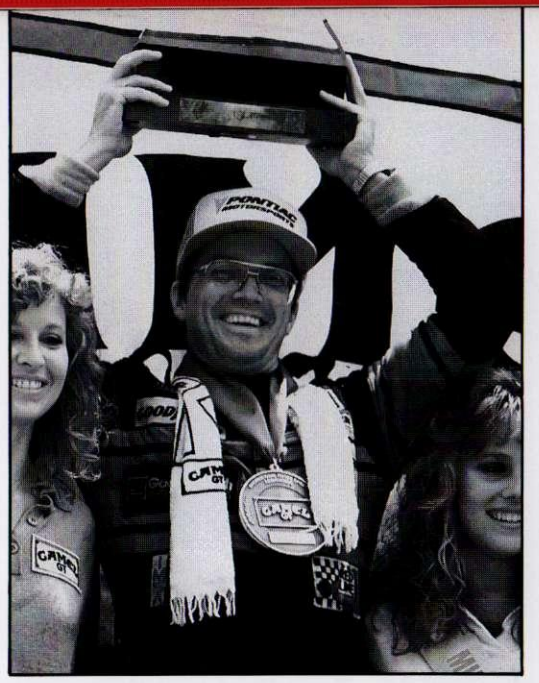
That same weekend, Spice and Bellm won at Silverstone, England, in the European car. It marked the first time any "Pontiac" had ever won a race in

Fiero Motorsports Wins

9/15/84—Clay Young, Dole Fiero, MIS, IMSA GTU.*
9/30/84—Clay Young, Dole Fiero, WG, IMSA GTU.
3/17/84—Bruno Massel, Team Strange Fiero, Best Engineered Car, NHRA Gatornationals, Gainesville, Fla.
5/5/85—Bob Earl, STP Fiero, LS, IMSA GTU.
5/18/85—Bob Earl, STP Fiero, CMS, IMSA GTU.
6/8/85—Clay Young, Entech Fiero, M-O, IMSA GTU.
7/6/85—Bob Earl, STP Fiero, WG, IMSA GTU.
7/28/85—Bob Earl, STP Fiero, PIR, IMSA GTU.
8/4/85—Bob Earl, STP Fiero, SPIR, IMSA GTU.
8/11/85—Felster & Naber, Inboard National Championship, Dayton, Oh., 2.5-liter Modified Hydroplane Class, APBA.
9/15/85—Larry Morgan, Castrol/Nationwise/Rod Shop Fiero, Reading, Pa., Competition Eliminator, NHRA Keystone Nationals.
10/5/85—Bob Earl, STP Fiero, Columbus Grand Prix, Columbus, Oh., IMSA GTU.
2/1/87—D. Bell/Earl/Kline, IMSA GTP, Sunbank 24 Hours of Daytona Beach, Fla. (3 records; pole; 116.8/1:49.7).
3/1/87—Bob Earl, IMSA GTO, Miami GP.
4/12/87—Kline/Bell, IMSA GTP-L, RA.
4/26/87—Kline/Bell, IMSA GTP-L, Riverside GP.
4/26/87—Doc Dixon, #1 Qualifier NHRA Super Gas, Southern Nationals.
5/3/87—Doc Dixon, Competition Eliminator (138.8 mph, 9.67 sec), Indianapolis.
5/3/87—Kline/Bell, IMSA GTP-L, LS (also track record & pole).
6/7/87—Bell/Kline, IMSA GTP-L, Mansfield, Oh. (pole record 99.07/1:27:258; also lap record 96.67/1:29:38).
6/7/87—Terry Visger, IMSA GTU, Mansfield, Oh. (pole).
6/14/87—Spice/Spain/France, First in Class, French Grand Prix, Le Mans, France.
6/21/87—Terry Visger, IMSA GTU, W. Palm Beach, Fla.
6/28/87—Terry Visger, IMSA GTU, Gainesville, Ga.
1985 Season—Manufacturer's Award for the Ultra-Stock class of the Mickey Thompson Off-Road Championship.
3/2/86—Bob Earl, Goodwrench Fiero, Miami Grand Prix, Miami, Fla., IMSA GTU.
4/6/86—Bob Earl, Goodwrench Fiero, RA, IMSA GTU.
5/4/86—Bob Earl, Entech Fiero GTP, LS, IMSA Camel Light GTP.
5/4/86—Gordon Spice & Ray Bellm, Spice Fiero, Silverstone, England, European C2 class champion.
6/1/86—Larry Morgan, Castrol/Nationwise/Rod Shop Fiero, Bowling Green, Ky., Competition Eliminator, NHRA SportNationals.
6/7/86—Bob Earl, Goodwrench Fiero, M-O, IMSA GTU.
8/3/86—Larry Morgan, Competition Eliminator, CMD.
9/1/86—Bob Earl, IMSA GTP-L, Watkins Glen, N.Y.
6/28/87—Doc Dixon, NHRA Competition Eliminator, Montreal, Canada.
7/5/87—Durst/Brockman, IMSA GTP-L, WG.
7/12/87—Doc Dixon, NHRA Competition Eliminator (125.73 mph, 9.6 sec.), Summer Nationals.
7/26/87—Terry Visger, IMSA GTU, PIR.
8/2/87—Terry Visger, IMSA GTU, SPIR.
8/16/87—Jim Rothbarth, IMSA GTP-L, EL.
8/23/87—Bruno Massel, NHRA Competition Eliminator, Cedar Falls, Ia. (151 mph, 8.9 sec) and Super Competition (139.75 mph, 8.9 sec).
9/6/87—Bell/Kline, IMSA GTP-L, San Antonio, Tx.
Sept. 1987—IMSA GTP-Lights Manufacturers Cup, 9 wins in 16 events.
9/7/87—Bob Earl, IMSA GTO, Lime Rock, Ct.
10/4/87—Doc Dixon, Competition Eliminator, Ennis, Tx. (138.68 mph, 9.41 sec).
10/4/87—Rothbarth/Morgan, IMSA GTP-L, Columbus, Oh.

Notes: APBA=American Power Boat Assn.; CMD=Central Michigan Dragway; CMS=Charlotte Motor Speedway; EL=Elkhart Lake; IMSA=International Motor Sports Assn.; LS=Laguna Seca; MIS=Michigan International Speedway; M-O=Mid-Ohio; NHRA=National Hot Rod Assn.; PIR=Portland International Raceway; RA=Road Atlanta; SPIR=Sears Point International Raceway; WG=Watkins Glen.

*First IMSA GTU win ever by a U.S. car.



Earl and Bellm (l&r) congratulate each other on the GTP's second 1986 win at Charlotte, while Earl and the girls celebrate his GTU victory at Mid-Ohio.

Europe and, together with a second-place finish in the car's debut at the Monza, Italy, season opener, it put the team solidly in front of the pack to repeat as Group C2 champs.

The Charlotte race brought more of the same, with a convincing win of six laps over second place in Camel Light. Drivers were Bellm and Earl. Earl had a DNF in GTU due to a broken transmission input shaft, and Visger placed third. Next, at Lime Rock, Earl brought the GTP Fiero in third, losing a lap after team manager Julian Randles was knocked down in the pits and injured by another car. (There was no Lime Rock GTU race.) Suddenly, at roughly mid-season, the GTP effort looked like a title contender, but the favored Huffaker GTU team was falling behind. A new transmission gearset was designed for Mid-Ohio, and Huffaker brought the GTU Fiero into the winner's circle with Earl driving. This marked three wins in six races! Whatever happened after that, it promised to be an exciting and interesting 1986 season—one that still remains to be finished as this is written.

On the ovals, Super Duty-engined cars remained dominant in NASCAR's Dash series, with defending champ Mike Swaim ahead in early-season points and fellow Pontiac pilot Hut Strickland tied for second. On the drag strips, Larry Morgan continued to set records with his SD-4 Fiero, because at the NHRA Gatornationals that year, he was quickest qualifier of the 48 cars in Competition Eliminator, only to lose due to a broken transmission in the finals. Even so, Morgan wound up winning the NHRA SportNationals in May 1986.

Beyond the promotional value, you might ask why an automaker like Pontiac is mixing it up out there on the race course, especially among IMSA's exotic GTP-class racers. "There are a number of similarities between production and motorsports vehicles," answers Pontiac general manager Mike Losh. "Our intent is to apply the knowledge gained on the track into use for future production vehicles."

John Callies adds, "I think the biggest thing is showing people that we can have interaction between racing and future production cars. GM Research is terribly interested in what we're learning and doing, and they'll probably use some of it in cars of the Nineties. While most people at GM initially believed there wasn't much to learn from racing, they're now seeing that we can learn a lot.

"The sealing process for axles that we developed for the GTU car, for example, is going into the GM-10 performance car. Through our transmission development, we've provided a way for engineers to make gear selections in test vehicles to try them out before choosing ratios for production transmissions. There's also our magnesium engine-block program, which might have applications in the future.

"What we're doing primarily right now, though, is supporting and building Pontiac's image for the future. You know it takes a good, strong three years to develop any competitive racing program. I'd say we've done pretty well with what we've put together and, as a result of what we *have* accomplished in this short time, we have people looking at us now, going, Wow—there's something to be had here! In 1985, Pontiac scored 106 victories." In other words, the racing effort backs up the contention that Pontiac does indeed build excitement. □

Chapter 11

1988: Saving the Best For Last

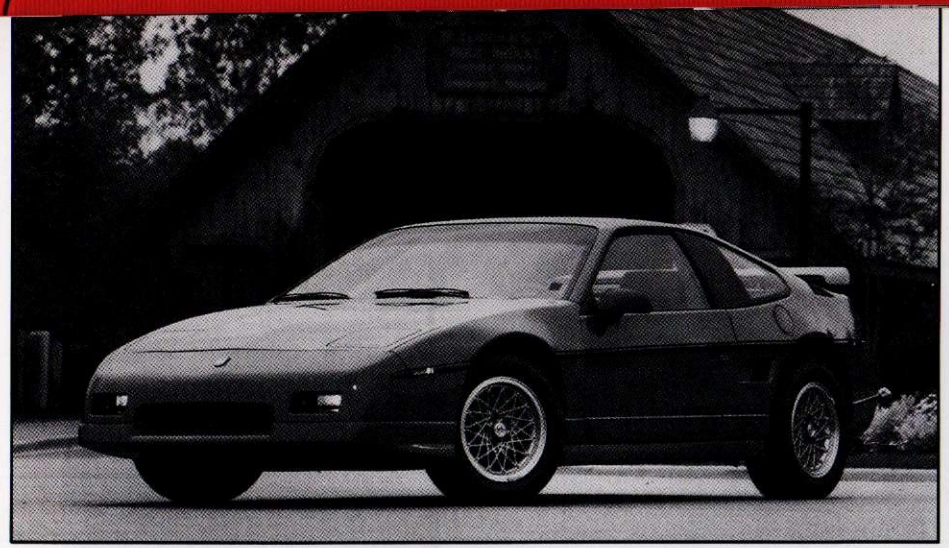
Fiero Formula debuted in 1988 as a new $2000 option package, contained much of GT's equipment, sold 5475 copies.

The year 1988 saw the Fiero reach its highest level of development and then, suddenly, in that same year, it was all over. In one sweep, Pontiac made the Fiero perform and handle with the world's most capable sports cars; the fulfillment of an engineering concept with a future. And then came the announcement: The Fiero would be discontinued after 1988. It didn't make sense at first, but then slowly the reasons dawned.

Every enthusiast magazine that tested a 1988 Fiero agreed that here, finally, was a car worthy of the look. *Motor Trend* called this newest Fiero "the best one thus far," citing its entirely revised suspension as the main contributor. Rich Ceppos in *Car & Driver* wrote, "Not much fazes this car anymore. It's a pleasure to hurry it down a 2-lane. The clocks reveal that it knows how to sprint, too. It was the quickest car in this test from 0 to 60 mph (7.9 seconds) and through the quarter mile (16.1 seconds at 82 mph), and it had the highest top speed (123 mph). It also posted the best finishes on the skidpad, through the slalom, and on the road course." The 1988 Fiero GT's competitors in this test were the Toyota MR2 and Honda CRX.

Pontiac's WS6 suspension improvements, standard on the GT and the new Formula, elevated the 1988 Fiero's handling to the level of the best sports cars on the market: Ferrari, Porsche, Corvette, and Lotus. Fiero drivers no longer had to make excuses for their cars' cornering prowess. Here's basically what the Fiero's 1988 suspension changes amounted to.

In the rear, Pontiac tooled up an entirely new subframe that shared nothing



1988 GT fastback still dominated Fiero lineup. The V-6 had better crankshaft counterweighting to lighten bearing loads and increase engine durability.

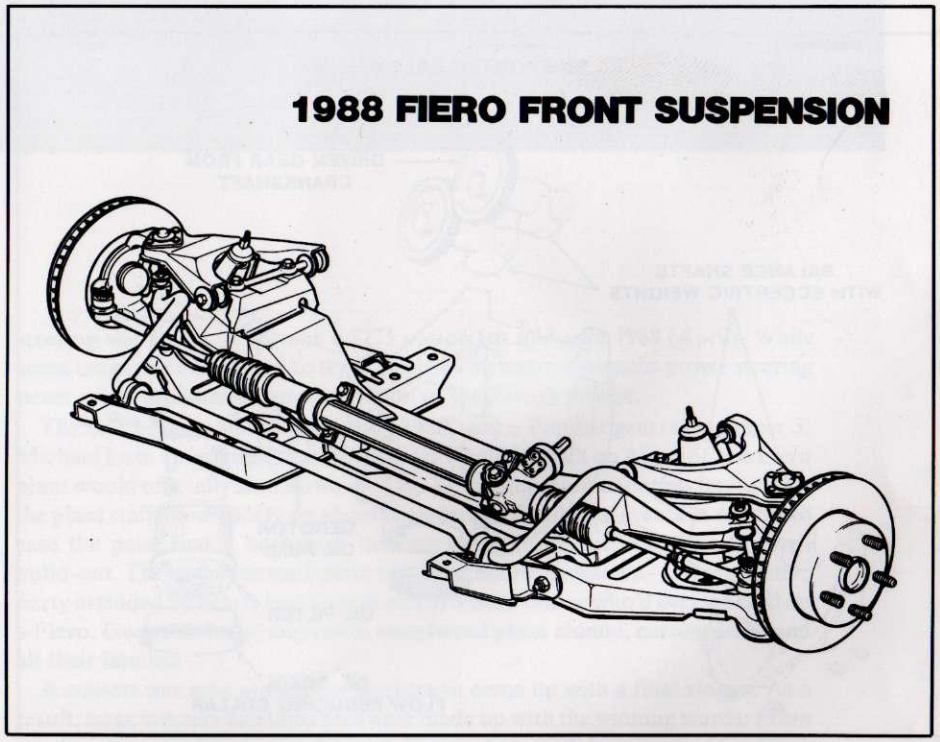
Previous SE and Sport Coupe were eliminated for 1988, and the base Fiero was called simply the Coupe. The Coupe shared the rest of the line's standard and optional mechanical upgrades.

with the 1987 design. The '88 subframe came with totally different suspension attachment points. The rear suspension itself was a 3-link design that had separate adjustments for each individual component that, theoretically at least, could be tuned for specific race courses. There was a 22mm rear stabilizer bar for greater roll stiffness on V-6-engined models. In addition, the Fiero's 1988 WS6 rear suspension gave lower spring rates for less impact harshness.

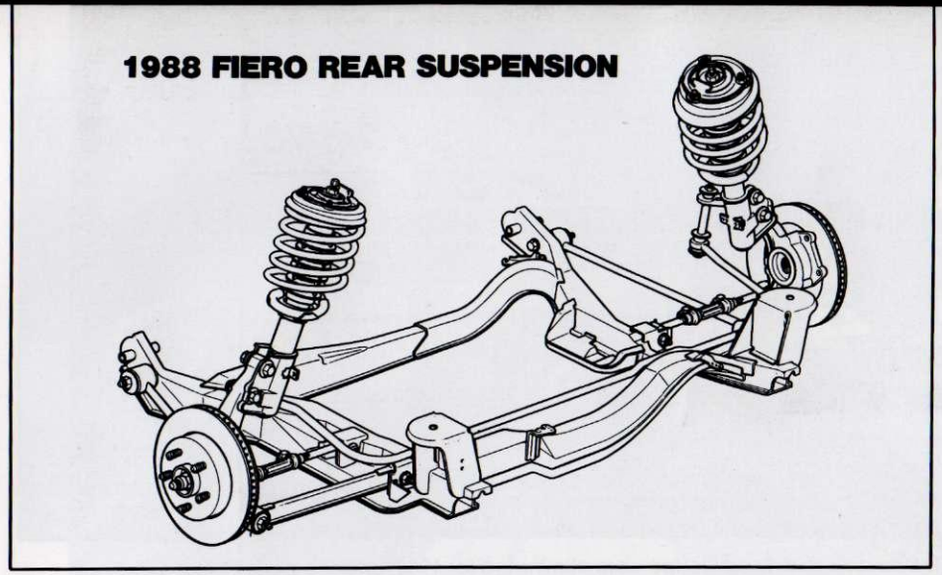
Up front, Fiero engineers got rid of the steering damper assembly to help eliminate the earlier "numb" steering feel. Apparently this worked, because auto writers praised the Fiero's steering for a change. Thirty percent shorter front spindles (90mm to 46mm) gave a 30% shorter scrub radius. Kingpin angle angle went from 7.5° to 6.0°, and upper control arms were 214.2mm instead of the previous 177mm. All cars with the WS6 suspension also received a 22mm front stabilizer bar. Tires were now Goodyear Eagle GT+4s instead of straight GTs, although sizes remained the same.

Other major 1988 changes included the elimination of the Sport Coupe and SE series. The 1988 base series became simply the Coupe. Next up was the new-for-'88 Formula, technically a $2000 option package (W66) on the 1988 standard Coupe. The Formula, of which 5475 were sold in 1988, included much of the Fiero GT's equipment: the 2.8 V-6, 5-speed, WS6 suspension, 15-inch black diamond-spoke alloy wheels, the GT+4 Eagles, twin exhausts, and rear spoiler. The Fiero GT itself again represented the top of the line.

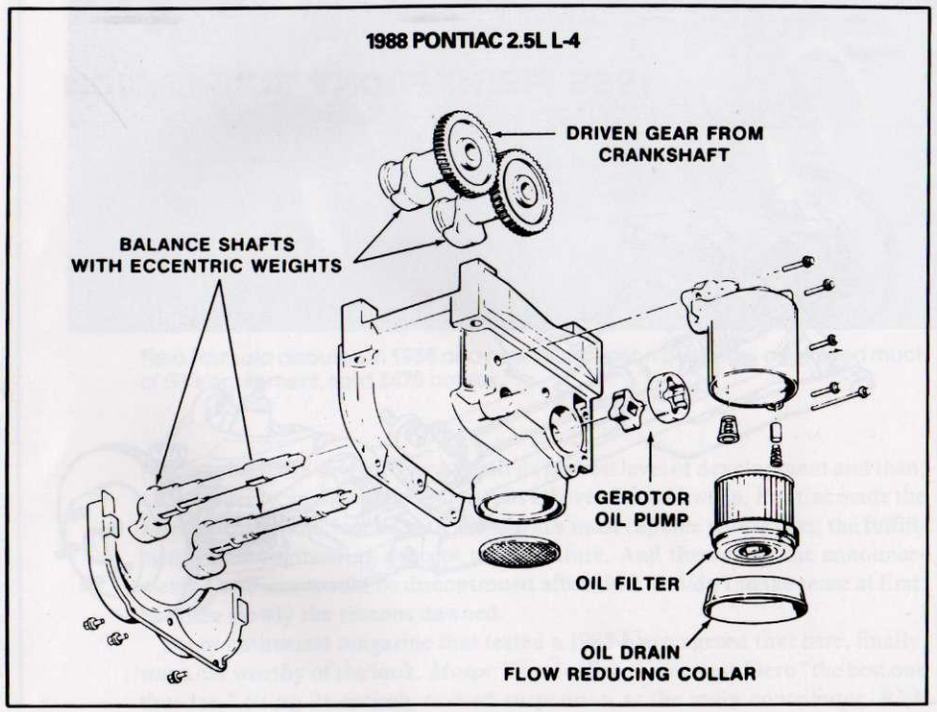
Both Fiero engines were upgraded for 1988. The 2.5-liter Four received twin, counter-rotating balance shafts to help smooth out secondary torsional vibrations. These were two eccentrically weighted shafts that lay below and parallel to the crankshaft. They were driven at twice crankshaft speed by a gear that also drove the oil pump. In addition, the 2.5 received 40% stronger connecting rods, lighter alloy pistons, and more efficient injector solenoids.



Front suspension received longer upper control arms, shorter spindles, and WS6 now came with 22mm front stabilizer bar.



Around back, Fiero got an entirely new subframe and 3-link suspension that shared nothing with previous models. Individual suspension adjustments could be tailored to specific race courses.

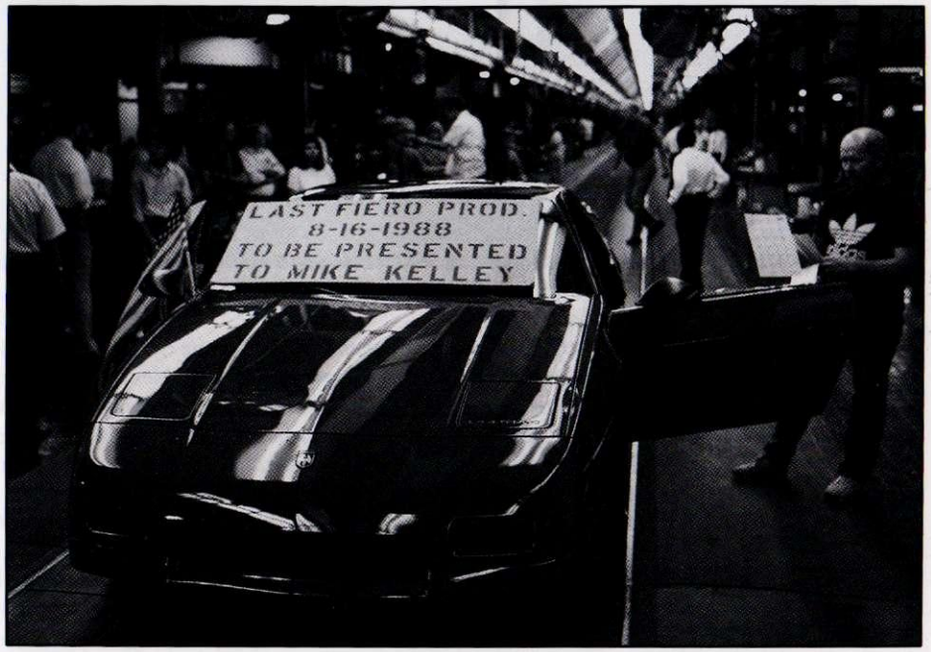


Twin balance shafts, similar to Porsche and Chrysler, made 4-cylinder 2.5 run smoother, and other improvements helped lubricating system.

Over in the V-6 engine compartment, the 2.8's improvements included better crankshaft counterweighting that eliminated the need for balancing the flywheel, vibration damper, and front pulleys. The main advantages here were fewer machining operations and lighter crank bearing loads for greater engine durability.

Improvements seemed to be extending into the future as well. One Fiero project involved an experimental aluminum spaceframe devised by Alcan Automotive Structures of Canada. Alcan, with cooperation from Entech and GM's CPC Group, had the aluminum spaceframe pressed in the same dies and in the same gauges as the Fiero's conventional steel structure. Two Alcan Fieros were built in 1986, both using special bonding adhesives that completely eliminated welding. The aluminum spaceframes weighed 68% less than their steel counterparts. They also boosted torsional stiffness by 42% and bending stiffness by 54%. The Ferrari 408 and Jaguar XJ220 prototypes used this same aluminum technology.

One of the two Alcan Fieros went into durability testing and was driven 36,000 miles at the GM Proving Grounds (equivalent to 100,000 miles elsewhere) with nary a squeak or rattle. The other was assigned to Pontiac engineer Terry Satchell for further development. Satchell updated the suspension to 1988



The final two Fieros off the line were given to employees in a drawing. Both were red GT's. Mike Kelley won this last one.

Mike Kelley and Louis Manley kneel between their freshly assembled GT's during final plant ceremonies on 16 Aug. 1988. Many of the people shown in this photo were also in the first Fiero group shot taken in 1983.

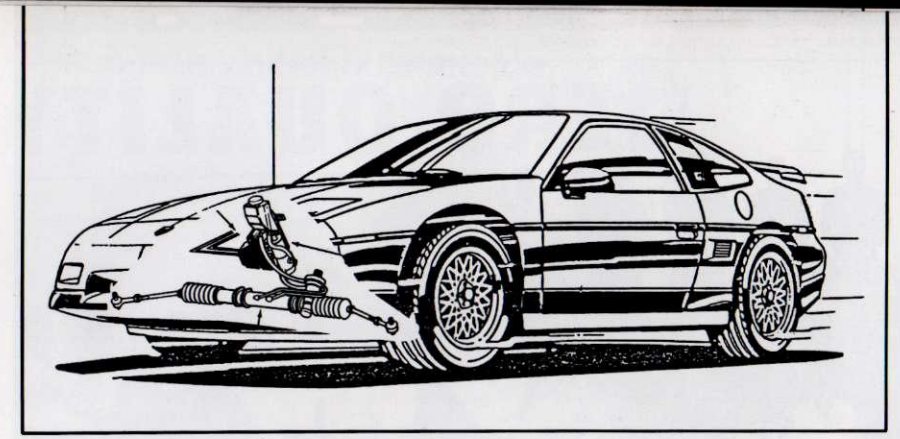
specs and dropped an Oldsmobile Quad 4 engine into it. He later invited members of the press and GM management to drive this car.

Everyone came away awed. The dohc Quad 4, which was easily tweaked to 190 bhp, turned the Fiero into a veritable rocket. Not only that, but the engine compartment and the Getrag 5-speed needed *no* alterations to accept the Quad 4! It dropped right in with the merest rerouting of hoses and wires. Says Satchell: "It surely was a pleasant car. The Quad 4 just brought the Fiero alive. It was more like a sports car. The engine could rev, you could use the gears, it was balanced; a nice overall package."

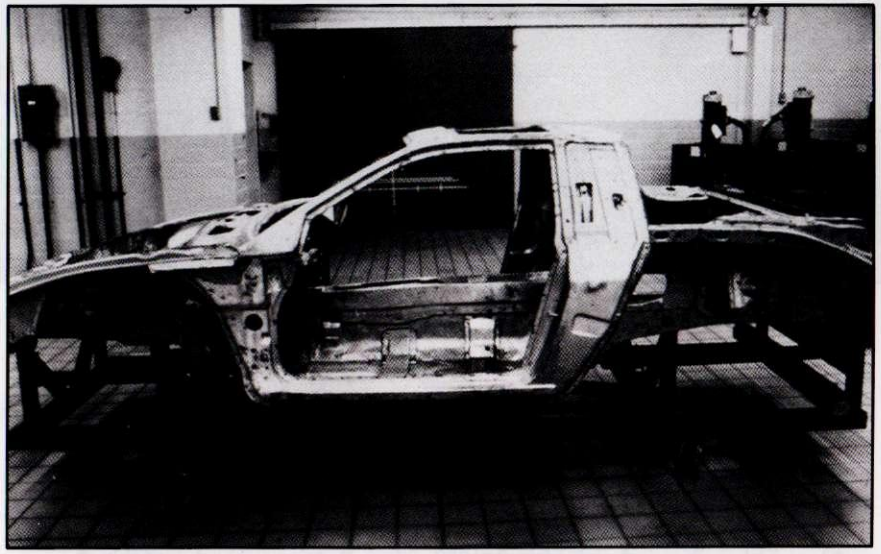
One extra feature of Satchell's Quad 4 Fiero was Saginaw's new variable-effort, electro-hydraulic power steering. This system used an electric motor to drive an integral power-steering pump. Not only did the steering ratio drop dramatically—from 19.2:1 to 16.0:1—but effort depended on vehicle speed. In other words, at low speeds, as in parking, the driver got maximum assist. Boost dropped progressively as vehicle speed increased so that, at about 50 mph, boost diminished to about 20%. Saginaw's power assist to the Fiero's rack-and-pinion steering was slated to become a $275 option for mid-year 1988 (April). While some magazine editors got to try it, Saginaw's electro-hydraulic power steering never made production; another victim of the Fiero's demise.

The end began quietly on Mar. 2, 1988, when Pontiac general manager J. Michael Losh announced that the last cars would be built on Aug. 16. The Fiero plant would officially shut down on Aug. 17. In preparation for that fateful day, the plant staff immediately set about organizing a number of events in August to ease the pain: first a barbeque, then an open house, and finally a farewell build-out. The barbeque took place one week before shutdown—a huge, festive party attended by nearly everyone in and around Pontiac who'd ever worked on a Fiero. Guests included engineers, transferred plant alumni, current staff, and all their families.

A contest was held among the workers to come up with a final slogan. As a result, large banners and lapel pins were made up with the winning words: *From our hearts to our hands, into history*. These, along with bunting and big Fiero emblems, were used to decorate the final week's plant activities.



Saginaw Div. developed a motor-driven, self-contained, hydro-electric power steering system for the Fiero, but this $275 option was never produced or offered.



Alcan, together with Entech, stamped two aluminum Fiero space frames. Lighter and stronger than steel, they used bonding instead of welds, hinted at future refinements.

As part of those final activities, all factory memorabilia was gathered and distributed to employees through a plant raffle. Items included emblems, posters, racing photos, hats, and dufflebags.

Pontiac management also let it be known that the last two Fieros built would go to two lucky employees who would win them in a drawing. So the highlight of the barbeque came when two slips of paper were extracted from a big barrel. The winners would take delivery of the final two cars inside the plant proper on the day production ceased.

Pontiac engineer Terry Satchell dropped a dohc 190-bhp Olds Quad 4 into one of the Alcan Fieros and recorded tremendous performance. The Quad 4 fit with only minor rerouting of hoses and wires.

Several days after the barbeque, the plant held one final open house. Factory tours had been routine, but this marked the public's last chance to see the Fiero teams in action. Families, well-wishers, and the press toured the facilities that day, taking pictures and occasionally chatting with the workers. The mood was happy and melancholy at the same time.

Then came Aug. 16, the final workday. The factory hummed along fairly normally that morning. During the build-out process, the steel spaceframes of those last two Fieros—the ones to be gien away—were "autographed" by employees. The assemblers etched their names into the metal. On that day, too, only plant personnel took part in end-of-the-line activities. The press and public were excluded. This was strictly a Fiero family affair.

In the final ceremonies, keys to the freshly minted twin red GT's were handed to Louis Manley and Mike Kelley, winners of the previous week's drawing. Amid applause and good wishes, Manley and Kelley climbed into their historic Fieros—VIN numbers 1G2PG1193JP226401 and 402 respectively—and drove them into a large, open area of the plant.

A few minutes later, a GM photographer snapped one last group portrait. Some of the Fiero employees in that final picture had also appeared in a similar group photo taken on the first day of Fiero production, five years earlier. And then it was over in one brief, emotional, bittersweet moment, softened by hugs and tears. Friends and co-workers suddenly realized that this really was the end. The camaraderie of working in teams, the pride of assembly, the good and bad times together would slowly recede into memory.

GM's decision to discontinue the Fiero came about for four distinct and separate reasons. The primary reason turned out to be economic. Sales had

GM Design Staff was working on 1989–90 Fiero clay models when the end of production was announced. These three possible treatments were shelved when word arrived.

fallen steadily since that first big season, model-year 1984, when they peaked at 136,840. By 1987 sales were down to 46,581. General Motors acknowledged that the Fiero plant had the capacity to build 200,000 cars a year, so running that plant at 20% capacity just didn't make economic sense.

For a year or so prior to closing, GM nurtured the hope that the GM80—the proposed 1988 replacement for the Camaro and Firebird—would be built with a spaceframe and plastic body panels similar to the Fiero's. The GM80 almost made production, but a last-minute decision killed that car, too.

Here was the Fiero, then, that enjoyed no sales help from any co-produced nameplate nor from any of Pontiac's sister divisions. Unlike the F-body Camaro/Firebird or the A-body Chevrolet Celebrity/Pontiac 6000/Olds Cutlass Ciera/Buick Century foursome, the P-body Fiero had no cousin to help spread production costs among several divisions. And Fiero sales through Pontiac dealers alone couldn't sustain the volume needed to make the Fiero profitable.

A second important reason for the Fiero's demise had to do with growing competition in the 2-seater market. The field had gotten crowded. The MR2, CRX, and RX7 were all good contenders vying for a customer base that was never very big to begin with. Ford's EXP also took some sales at the bottom end. So did sporty 4-seaters like the Camaro, Mustang, Firebird, Charger, Daytona, etc., some versions of which cost no more than the Fiero.

Reason number three had to do with escalating insurance rates, particularly those for sporty cars belonging to young drivers. Male Fiero owners under 25 were often asked to pay $5000 a year just for insurance. And those were drivers with *clean* records!

And reason number four had to do with the Fiero's longterm reputation which, due to the early "commuter" image, generally weak performance in those days, numb handling and, perhaps worst of all, engine-bay fires, put the Fiero behind some of its Japanese rivals. Never mind that GM recalled all 1984 Fieros to mitigate possible fires; never mind that the V-6, 5-speed, and 1988 handling improvements left this latest Fiero far superior to its earlier self . . . too many people remembered the way it was. The 1988 Fiero ended up illustrating the classic case of too little too late. General Motors had no choice but to wind down production and shut down the plant.

Car assembly had gotten off to a bad start in 1988 anyway. There were no Fieros built in January at all, due to a temporary holiday shutdown. By February, nearly 1250 employees—half the 1986 workforce—were on indefinite leave and were later offered jobs elsewhere. Only 2019 cars were assembled that month. This was followed by a high for the year of 2784 cars produced in March. For April, May, and June, production remained low but steady at 1940, 1941, and 1960 cars respectively. August was the final month of assembly, with only 1159 Fieros built.

No one wanted to see the Fiero go, least of all General Motors, and the corporation did discuss possible restarts with a number of outsiders. One was Entech, the company that had so much to do with the Fiero's initial development. Entech teamed with an Israeli firm called Elkon Group, which asked them (Entech) to redesign a British van for the handicapped. This van would use the Fiero's spaceframe concept. Production was to start in 1990, with a production target of 20,000 vans the first year, but this deal didn't materialize.

Another rescue possibility came from Magna International, the huge Canadian auto-parts supplier. Several kit-car manufacturers likewise considered restarting the Fiero plant to supply spaceframes and body panels. Among these were Zimmer Corp. of Pompano Beach, Fla., Corporate Concepts Ltd., of Capac, Mich., and Enterra Motor Cars Ltd. of Canada. Again, these plans came to naught.

James G. Musser, Jr., a former GM engineer and a prime mover of the original 1967 Camaro, expressed interest in restarting the Fiero plant. Musser was president of a seating-supplier company called Knusaga Corp. of Troy, Mich. A car-dealer group from Mississippi also expressed interest. And GM solicited various other concerns, including Porsche, Cars & Concepts, and ASC Inc., but these companies declined GM's overtures.

The 26,402 Fieros that were built for model-year 1988 will probably be the most sought-after by future collectors. All Fieros were good cars, but the 1988 models stood out as exceptional. Those fortunate owners who were lucky enough to buy a 1988 Fiero new and who've kept the car view it as an investment in the future. It's a shame that that future didn't include more Fieros, but those that remain will undoubtedly be cherished. □

On the Track

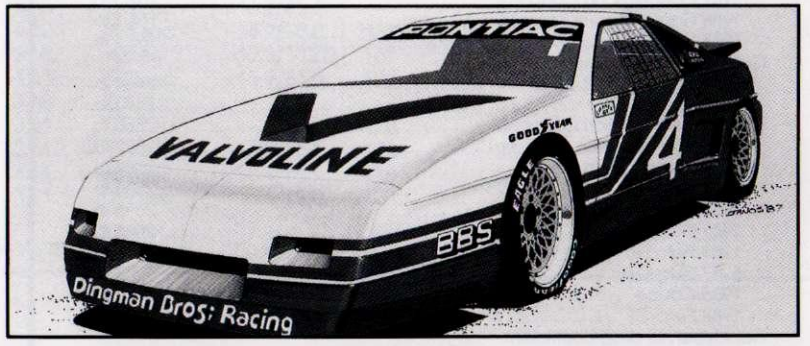
Fieros continued to distinguish themselves in competition, thanks largely to John Callies' Pontiac Motorsports and Super Duty efforts. In ealry 1987, the AT&T Fiero set half a dozen records on its way to victory in the prestigious IMSA Daytona Sunbank 24-Hour endurance race on Feb. 1. Driven by Don Bell, Jeff Kline, and Bob Earl, the AT&T Fiero set three official records in GTP-Lights class for prototype vehicles. These included a new qualifying speed mark of 116.807 mph, a fastest race lap of 109.082 mph, and an average speed record of 93.357 mph. The 330-bhp AT&T Fiero ran 2243 miles and won by an impressive 14.2-mile margin. The three unofficial records set at Daytona that day were: 1) first 4-cylinder winner in 25 years, 2) first GM car ever to win a prototype class, and 3) first U.S. car since 1966 to win in prototype class.

After Fiero's highly successful 1986 IMSA GTO season, the Dingman Brothers Valvoline Fiero #4 debuted for 1987 at the Miami Grand Prix on Mar. 1. This Spice-built car, with its 4.5-liter, 90° V-6 developing 500 bhp, again put Bob Earl in the pilot's seat, Walter Preston serving as crew chief. Earl easily won that event and also the Lime Rock race in September.

Meanwhile, Pontiac captured the 1987 IMSA Manufacturer's Cup in GTP-Lights class in September. This marked the first time anyone had managed to take the title away from Mazda. In the 16 events of this series, Fiero GTPs accounted for 11 of the fastest qualifying positions, set 10 fastest race laps, and won nine events. Four different Fiero GTP entries contributed: the AT&T/Collins & Aikman Fiero driven by Bell/Kline/Earl; the Jiffy Lube Fiero with Steve Durst and Michael Brockman; the STS/Minolta Fiero with Rothbarth/Morgan/Dobson; and the Whitehall Motorsports Fiero piloted by Tom Winters and Skeeter McKitterick.

The 1988 season saw McKitterick take the pole at that year's 24-hour Daytona, but the team managed only a 3-4 finish. The Fiero's motorsports activities were winding down along with production. Fieros came in third and fifth at the 1988 Miami GP and took fourth at West Palm Beach in April, and after that it was fade to black.

Victory Circle: 1987's IMSA Daytona 24-hour Endurance event was won by the ATXT/Pontiac Fiero GTP co-driven by Don Bell, Jeff Kline, and Bob Earl.



The new IMSA GTO Fiero as first shown for the 1987 Miami Grand Prix. 500 hp was noted for its 4.5 liter V-6; Valvoline was the sponsor.

In 14 events entered in 1986, the Fiero GTP shared three wins, was nine times fastest qualifier and set seven new track speed records. The Entech-sponsored car was powered by a 330 horsepower Super Duty four-cylinder.

Major Specifications

Specifications common to all Fieros, 1984–88:

Wheelbase	93.4 in.
Overall width	69.0 in.
Overall height	46.9 in.
Front tread	57.8 in.
Rear tread	58.7 in.
Cargo capacity	5.85 cu.ft.
Fuel capacity, 1984–86	10.2 gal.
Fuel capacity, 1987–88	11.9 gal.

Specification variances:

Overall length:	
1984–85 Coupe/Sport Coupe/SE	160.7 in.
1985 Fiero GT	165.8 in.
1986 Coupe/Sport Coupe	160.7 in.
1986–87 Fiero SE	165.1 in.
1986–87 Fiero GT	165.2 in.
1987 Coupe/Sport Coupe	162.5 in.
1988 Coupe/Sport Coupe	163.1 in.
1988 Fiero GT	165.1 in.
Curb weight:	
1984 Coupe/Sport Coupe	2464 lb.
1984 Fiero SE	2480 lb.
1985 Coupe/Sport Coupe/SE	2505 lb.
1985 Fiero GT	2572 lb.
1986 Coupe/Sport Coupe	2504 lb.
1986 Fiero SE	2531 lb.
1986 Fiero GT	2696 lb.
1987 Coupe/Sport Coupe	2546 lb.
1987 Fiero SE	2567 lb.
1987 Fiero GT	2708 lb.
1988 Coupe	2547 lb.
1988 Fiero GT	2735 lb.
Aerodynamic drag coefficient:	
1984–85 Coupe/Sport Coupe/SE	0.377 Cd.
1985 Fiero GT	0.350 Cd.
1986 Coupe/Sport Coupe	0.377 Cd.
1986–87 Fiero SE	0.350 Cd.
1986–88 Fiero GT	0.365 Cd.
1987–88 Coupe/Sport Coupe	0.357 Cd.
Steering gear ratio:	
1984 Coupe/Sport Coupe/SE	19.2:1.
1985–87 Coupe/Sport Coupe/SE	22.0:1.
1985–88 Fiero GT	19.2:1.
1988 Coupe	19.2:1.
Standard wheel size:	
1984 Coupe/Sport Coupe	13x5.5 in.
1984 Fiero SE	14x6.0 in.
1985 Coupe/Sport Coupe/SE	13x5.5 in.
1985 Fiero GT	14x6.0 in.
1986–87 Coupe/Sport Coupe	14x5.5 in.
1986–87 Fiero SE	14x6.0 in.
1986–88 Fiero GT/Formula	15x7.0 in.
1988 Coupe	14x6.0 in.
Standard tire size:	
1984–85 Coupe/Sport Coupe	P185/80R-13.
1984–85 Fiero SE/GT	P215/60R-14.
1986 Coupe/Sport Coupe	P185/75R-14.
1986–87 Fiero SE	P195/70R-14.
1987–88 Coupe/Sport Coupe	P185/75R-14.
1986–88 Fiero GT/Formula, front	P205/60R-15.
1986–88 Fiero FT/Formula, rear	P215/60R-15.

Engine Specifications

Year	Cyl.	Displ.	Bore & stroke	Bhp @ rpm	Torque @ rpm	Compr. ratio	Induc-tion	Engine mark
1984	4	2.5	4.0x3.0	92 @ 4000	134 @ 2800	9.0:1	TBI	I
1985–86	4	2.5	4.0x3.0	92 @ 4000	134 @ 2800	9.0:1	TBI	I
1985–86	V-6	2.8	3.5x3.0	140 @ 5200	170 @ 3600	8.5:1	MPFI	II
1987	4	2.5	4.0x3.0	96 @ 4800	135 @ 3200	9.0:1	TBI	III
1987	V-6	2.8	3.5x3.0	135 @ 4500	165 @ 3600	8.5:1	MPFI	IV
1988	4	2.5	4.0x3.0	98 @ 4800	135 @ 3200	9.0:1	TBI	III
1988	V-6	2.8	3.5x3.0	135 @ 4500	165 @ 3600	8.8:1	MPFI	IV

Engine/Transaxle Combinations

	Engine mark	Transaxle Std.	Transaxle Opt.	Axle ratios Manual	Axle ratios Autom.	Overall ratios Manual	Overall ratios Autom.
1984 Fiero Coupe	I (Std.)	A	—	3.32	—	2.42	—
1984 Sport Coupe	I (Std.)	B	G	4.10	3.18	3.32	3.18
1984 Fiero SE	I (Std.)	B	G	4.10	3.18	3.32	3.18
1985 Fiero Coupe	I (Std.)	D	—	3.35	—	2.48	—
1985 Sport Coupe/SE	I (Std.)	D	G	3.35	3.35	2.48	3.35
1985 Sport Coupe/SE	II (Opt.)	C	G	3.65	3.65	2.96	3.65
1985 Fiero GT	II (Std.)	C	G	3.65	3.65	2.96	3.65
1986 Fiero Coupe	I (Std.)	D	—	3.35	—	2.48	—
1986 Sport Coupe	I (Std.)	D	G	3.35	3.35	2.48	3.35
1986 Fiero SE	I (Std.)	D	G	3.35	3.35	2.48	3.35
1986 Fiero SE	II (Opt.)	C,F*	G	3.65	3.65	2.96	3.65
1986 Fiero GT	II (Std.)	C,F*	G	3.65	3.65	2.96	3.65
1987 Fiero Coupe	III (Std.)	E	—	3.35	—	2.48	—
1987 Sport Coupe	III (Std.)	E	G	3.35	2.84	2.48	2.84
1987 Fiero SE	III (Std.)	E	G	3.35	2.84	2.48	2.84
1987 Fiero SE	VI (Opt.)	F	G	3.61	3.33	2.60	3.33
1987 Fiero GT	VI (Std.)	F	G	3.61	3.33	2.60	3.33
1988 Coupe	VI (Std.)	H	G	3.35	2.84	2.60	2.84
1988 Fiero GT	VI (Std.)	I	G	3.61	3.33	2.60	3.33

**Getrag/Muncie 5-speed replaced 4-speed manual with V-6 in June 1986.*

Transaxle Specifications

	1st	2nd	3rd	4th	5th	Rev
4-speed manual						
1984 econ. 4	(A) 3.53	1.95	1.24	0.73	—	3.42
1984 std. 4	(B) 3.53	1.95	1.24	0.81	—	3.42
1985–86 V-6	(C) 3.31	1.95	1.24	0.81	—	3.42
5-speed manual						
1985–86 std. 4	(D) 3.73	2.04	1.45	1.03	0.74	3.50
1987 std. 4	(E) 3.73	2.15	1.45	1.03	0.74	3.50
1988 std. 4	(H) 3.73	2.04	1.45	1.03	0.74	3.58
1986–87 V-6	(F) 3.92	2.19	1.38	0.94	0.72	3.41
1988 V-6	(I) 3.50	2.05	1.38	0.94	0.72	3.41
3-speed automatic (THM-125)						
All 1984–88	(G) 2.84	1.60	1.00	—	—	2.07

Test Performance Data

Date	Source	Model	Displ/bhp/cyl	Trans	Axle	0–60 mph	1/4-Mile	top speed (mph)	lateral accln. (g)	brkng 60–0 (ft.)
9/83	PMD	'84 Cp	2.5/92/4	4-spd	3.32	12.5 sec	---	---	---	---
9/83	PMD	'84 SC	2.5/92/4	4-spd	4.10	11.5 sec	---	---	---	---
9/83	PMD	'84 SE	2.5/92/4	auto	3.18	12.7 sec	---	---	---	---
9/83	MT	'84 SE	2.5/92/4	4-spd	4.10	10.5 sec	17.7/75.2	120*	.80	147
9/83	RT	'84 SE	2.5/92/4	4-spd	4.10	11.6 sec	18.2/72.5	---	.81	150
9/83	CD	'84 SE	2.5/92/4	4-spd	4.10	10.9 sec	18.1/74.0	104	.81	---
12/83	CD	'84 SE	2.5/92/4	4-spd	4.10	11.3 sec	17.8/74.0	105	.79	---
2/84	MT	'84 SE	2.5/92/4	4-spd	4.10	10.9 sec	17.9/73.8	---	.78	140
3/84	RT	'84 SE	2.5/92/4	4-spd	4.10	10.9 sec	17.8/73.5	103	.84	167
5/84	MT	'84 SE	2.5/92/4	4-spd	4.10	10.6 sec	17.8/74.3	---	.77	143
11/84	MT	'85 GT	2.8/140/V-6	4-spd	3.65	8.3 sec	16.2/84.2	---	.82	151
11/84	RT	'85 GT	2.8/140/V-6	4-spd	3.65	8.4 sec	16.5/84.5	---	.82	158
11/84	CD	'85 GT	2.8/140/V-6	4-spd	3.65	8.2 sec	16.0/85.0	119*	.81	---
2/85	MT	'85 GT	2.8/140/V-6	4-spd	3.65	8.5 sec	16.2/83.8	---	.80	146
6/85	CD	'85 SD-4	2.7/180*/4	4-spd	4.10	6.3 sec	14.7/93.0	131	.82	---
6/85	CD	'85 GTU	2.7/275*/4	4-spd	3.66	4.0 sec	12.3/112.0	161	1.16	---
2/86	CD	'86 GT	2.8/140/V-6	4-spd	3.65	7.5 sec	15.9/85.0	123	.80	---
3/86	MT	'86 GT	2.8/140/V-6	4-spd	3.65	8.4 sec	---	---	.81	149
8/10/87	AW	'88 GT	2.8/135/V-6	5-spd	3.61	7.8 sec	---	128	---	---
10/87	RT	'88 Form	2.8/135/V-6	5-spd	3.61	8.0 sec	16.0/85.5	125	.83	160
3/88	MT	'88 GT	2.8/135/V-6	5-spd	3.61	8.7 sec	16.4/81.9	118	.84	141
4/88	CD	'88 Form	2.8/135/V-6	5-spd	3.61	7.9 sec	16.1/82.0	123	.83	---

**Estimated or calculated.*
Notes: *AW=AutoWeek; CD=Car and Driver; MT=Motor Trend; PMD=Pontiac Motor Div.; RT=Road & Track.*

Production Figures

	1984	1985	1986	1987	1988
Fiero Coupe	7,099	5,280	9,143	23,603	19,553
Fiero Sport Coupe	62,070	23,823	24,866	3,135	---
Fiero SE	67,671*	24,734	32,305	3,875	---
Fiero GT	---	22,534	17,660	15,968	6,848
Totals	136,840	76,371	83,974	46,581	26,401

**Includes 2000 Indy Pace Car replicas.*
Note: *The number of 1988 Formulas delivered was 5475.*

Base Prices

	1984	1985	1986	1987	1988
Fiero Coupe	$7999/ 8195*	$8495/ 8495	$8949/ 8299	$8299/ 8299	$8999/ 8999
Fiero Sport Coupe	8499/ 8695	8995/ 8995	9449/ 9499	9989/ 9989	---
Fiero SE	9599/ 9695	9995/ 9995	10,595/ 10,689	11,239/ 11,239	---
Fiero Formula	---	---	---	---	10,999/ 10,999
Fiero GT	---	11,795/ 11,795	---/ 12,999	13,489/ 13,489	13,999/ 13,999
Indy Pace Car	12,482	---	---	---	---

**Beginning/end of model years.*

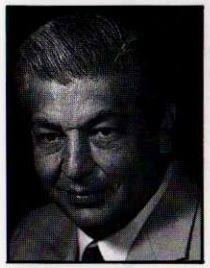
Fiero Exterior Paint Colors

Color	M Code	Fisher Code	PPG Code	Years used
White	40	WA-8554	8554	1984-86
Black	41	WA-8555	8555	1984-87
Red	71	WA-8553	8553	1984-85
Light Gray Met.	14	WA-8924	8924	1984-85
Bright Red	81	WA-8774	8774	1986-87
Silver Met.	16	WA-9004	9004	1986-87
Light Gold Met.	56	WA-8962	8962	1986-87
Med. Red Met.	77	WA-9077	9077	1987
Bright Blue	21	WA-8963	8963	1987
Med. Gray Met.*	18	WA-7719	7719	1984-87
Black (SE)*	- -	W30A-848	- - -	1986-87

**Lower body accent colors.*

Fiero Movers and Shakers

A gallery of some of the principals who made the Fiero happen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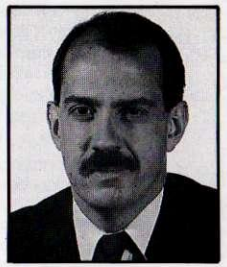
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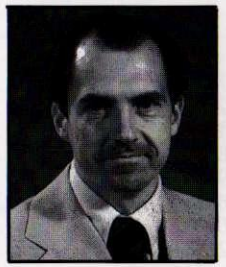
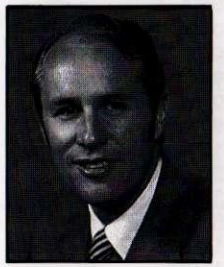

G.R. Angersbach


R.E. Benson


John Cafaro


John G. Callies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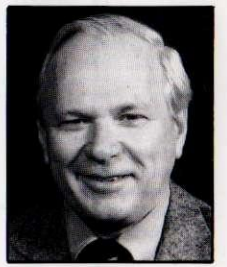
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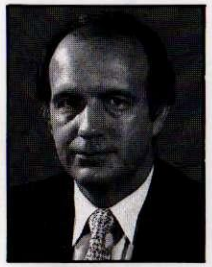
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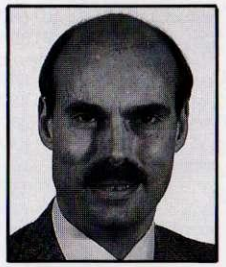
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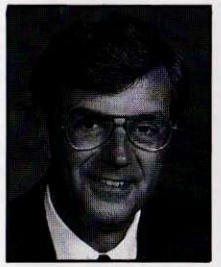
P.W. Furey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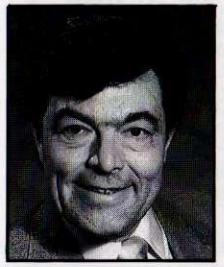
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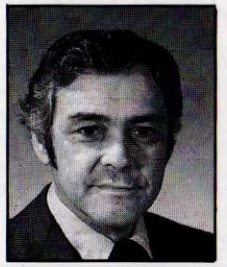
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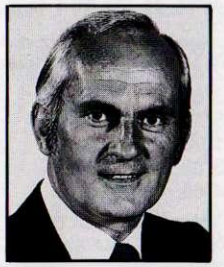
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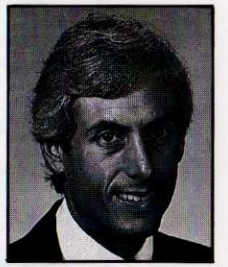
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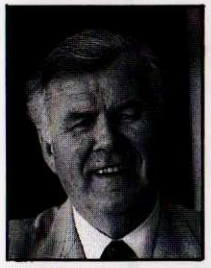
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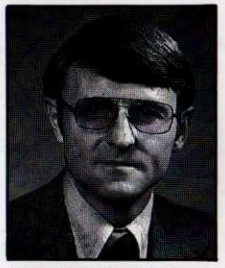
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J.G. Middlebrook


Geo. E. Moon


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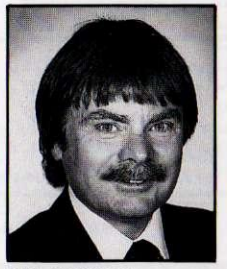
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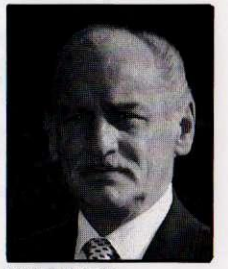
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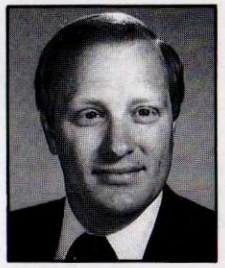
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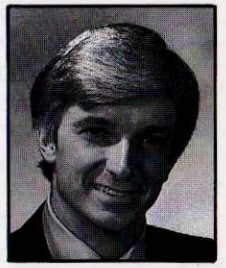
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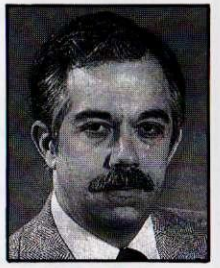
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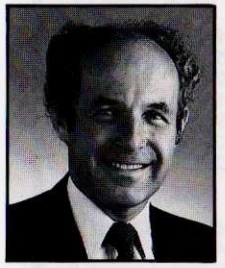
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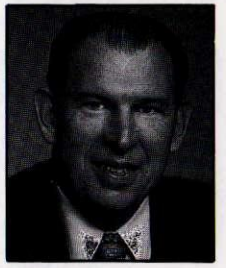
R.C. Stempel


Byron Warner


J. J. Wetzel

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