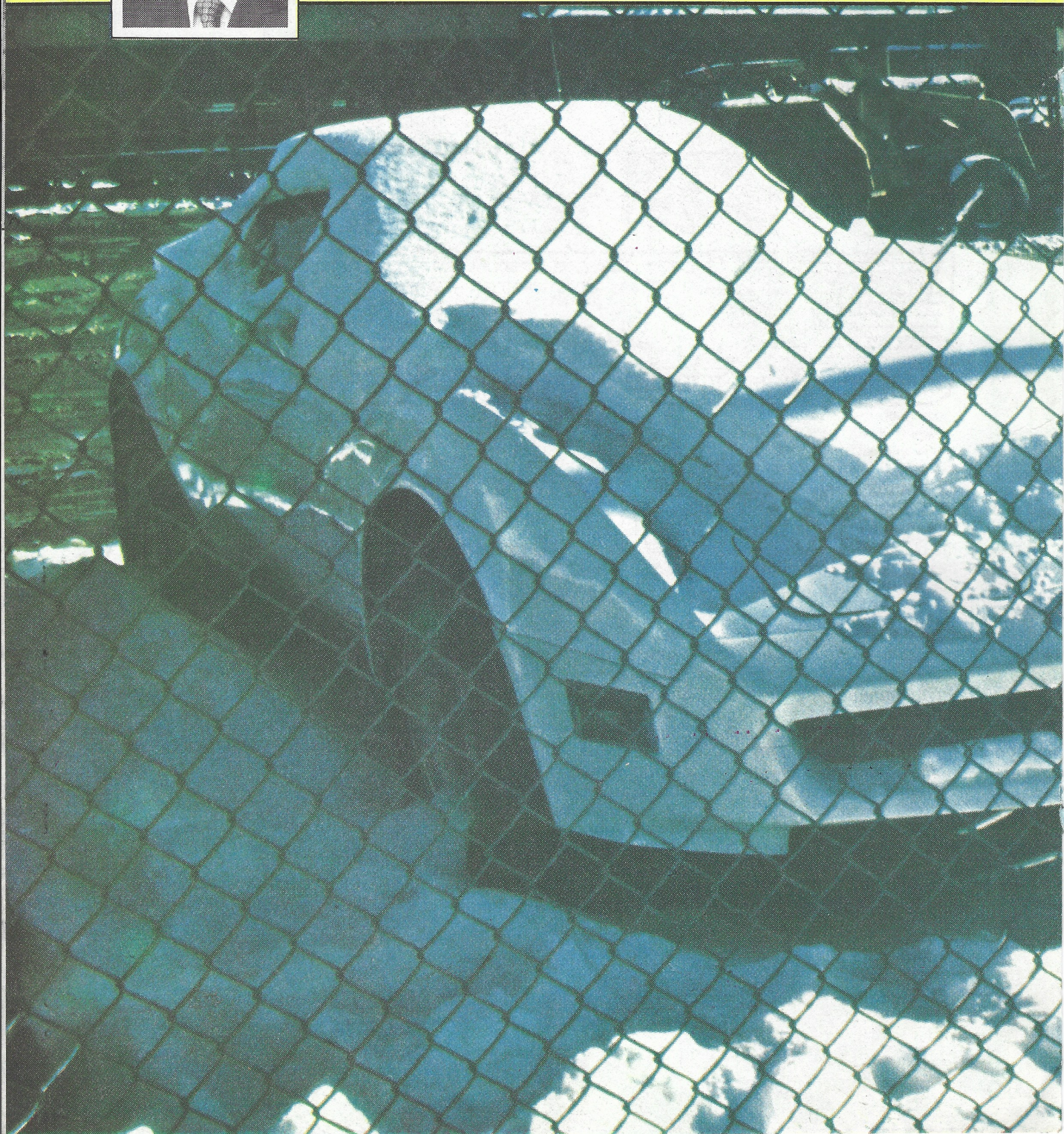


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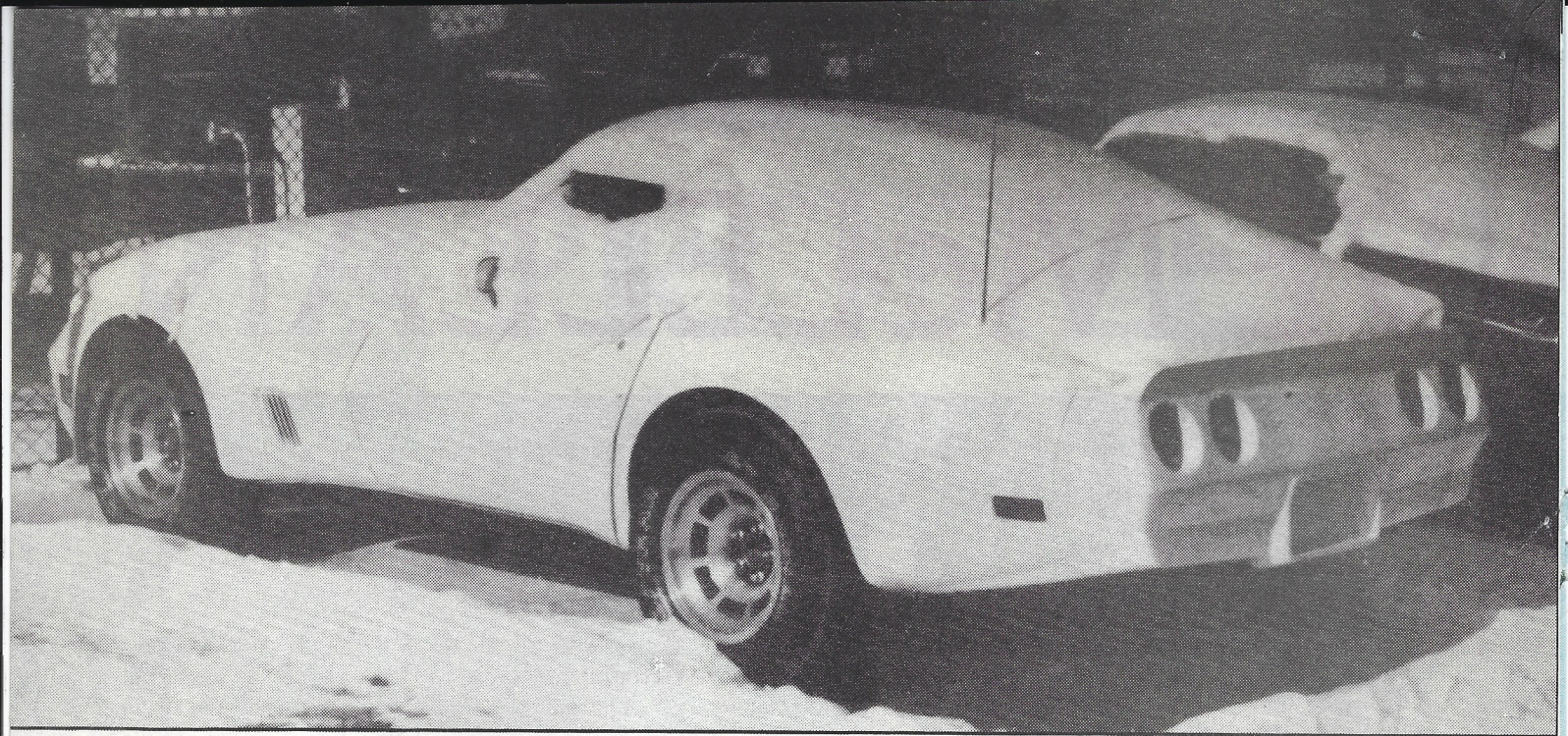
DAVE MCLELLAN

CORVETTE CHIEF ENGINEER

By Gary Witzenburg

He is not a large man in stature, but when Zora Arkus-Duntov retired in January, 1975, he left a mighty large set of shoes to fill as chief engineer of America's only two-seater sports car. True, the car had aged and greyed somewhat along with its near legendary mentor, but in 22 years it had achieved an impressive reputation as a unique, hair-chested American status symbol, had greatly enhanced the image of the company that built it, and had attracted legions of faithful followers who were prone to buying up the entire year's production months ahead of

The front end treatment for the '80 Corvette is most distinctive and adds a rakish look to the car. It also makes the Corvette look like it's hugging the ground much closer. If, in fact, this is the '80 Corvette, we heartily approve. Furthermore, if the 'Vette is some 260 to 270 pounds lighter in addition to its new looks, we predict it'll be one of the most sought after of all Corvettes. If this is the 1980 Corvette, Dave and his staff are to be congratulated for doing a great job in changing the existing 12-year-old design.



time, year after year, good times and bad.

When David R. McLellan, at the age of 39, was appointed as Duntov's replacement, he was charged with the responsibility of smoothing out some of the car's rough spots without risking the loss of any of that tremendous following. Zora had adopted the Corvette as an infant struggling for survival, and had built a legend around it in spite of periodic anti-performance tantrums and bean-counting short-sightedness on the part of upper GM management, then had watched his mid-engine dream car go down for the last time just as the politics of safety, emissions and damageability were hastening their emasculation of the original.

McLellan couldn't have inherited the Corvette at a worse time — or a better time if you consider the engineering challenge involved. The country was in the depths of its worst recession in modern memory. Regulatory mania was gaining momentum at a frightening pace, and the latest rallying cry in Washington was "Fuel Economy at Any Cost!" GM's across-the-board conversion to catalytic converters had just come into force, obligating the Corvette engineers to scrap their precious dual exhausts for a convoluted cross-over and single converter system with back-pressure higher than a bureaucrat's self-righteousness. The mighty, macho

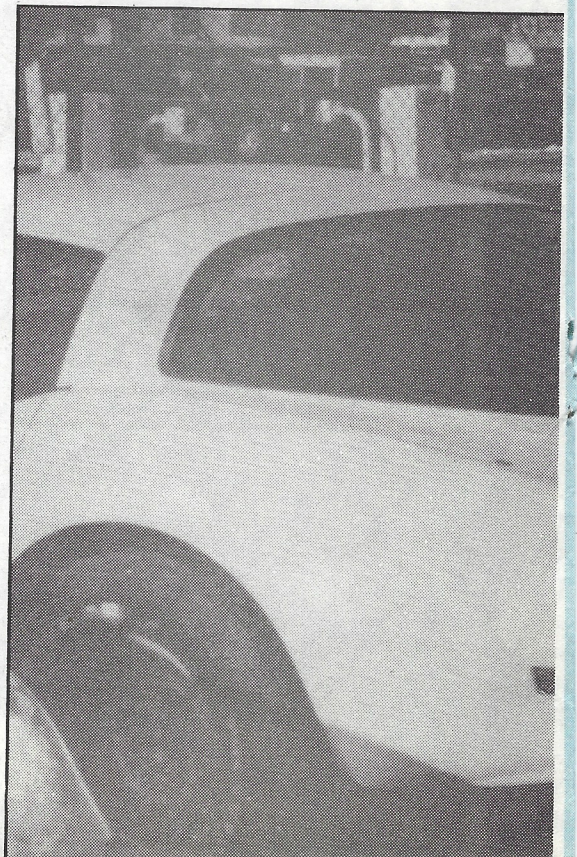
Corvette was at a low in power and performance prestige unequalled since its first fledgling six-cylinder days.

Fresh from a 16-year GM background in vehicle dynamics, product engineering and chassis engineering, McLellan tackled this new challenge with a vengeance. "When I came in '75," he relates, "I looked at the car and talked with the people involved with it to find out where the problems were. There were a lot of things about it that were right, but there were a lot of problems. It was a matter of identifying where these problems were and then doing something about them."

"The '78 Corvette represents an attempt to solve some of those problems, and also to look toward the future. There's the obvious styling benefit of the fastback design, but there's also a significant utility improvement. It also gave us the opportunity to do a larger fuel cell. We completely redid the instrumentation and the interior trim to clean up some of the problems there. And there were improvements from the performance aspect, although we won't complete all of that until '80. The seating package in the '79 car (a forward-folding, lightweight plastic shell design) was intended as part of the '78 fastback program but didn't make it in time because there were too many things to do all at once."

Once the '78 changes were re-

ABOVE: Spot the changes? The 1980 Corvette has a different vent arrangement on the front fenders. As you can see, it is a multi-louvered design in place of the single open-cavity used in the 1979 Corvette. **BELOW:** There you have it . . . a fine comparison between the '79 and the (we believe) '80 Corvette. The big differences are both front and rear with a smaller change on the side. The new rear end treatment shows an integrated spoiler and a return to the flat rear end look. The effect, as described by Dave McLellan in this feature, is to make the Corvette look shorter.



alized, and some more for '79 were underway, McLellan and his group started looking seriously at long-term plans for the car. "Where do we want to be five years out," they asked themselves, "when we're talking about a new car?" Most important was to get the weight down, although serious downsizing was ruled out as a viable possibility.

"As long as you keep a V-8 engine in the car," he explains, "which is part of our strategy, it isn't going to get a hell of a lot smaller. To pack a V-8 in there, you need so many cubic feet of stuff. Wheels and tires . . . so many cubic feet of stuff. Put two people and luggage in, even in cramped accommodations . . . so many cubic feet of stuff. So how do you come up with this car that's two feet shorter, eight inches lower and five inches narrower? The car will get smaller, but it will get smaller in small amounts. And it will be perceived as smaller. Today's car is perceived as large because of the flamboyant fender shapes, the pointed-nose design and the way the rear end terminates. It's a much different situation than the normal passenger car that starts at the radiator and ends at the luggage compartment."

There's a school of thought among lightweight sports car

buffs that the next Corvette will be an X1/9-like mid-ship affair using the upcoming front-drive Nova series powertrain and V-6 engine, perhaps turbocharged, behind the seats. But McLellan lays that speculation to rest. "Well, we're always working on new-car ideas; but my philosophy on the car is basically conservative. I don't see it as needing radical surgery from the standpoint of our relationship to our customers. It's a very strong bond, and it's our goal to maintain that bond. I don't intend to tear the car up for no good reason."

On the idea of going to a V-6, he continues: "That gets back to the issue of radical surgery. Do we have to take the step to a 3-liter V-6 engine to accomplish the fuel economy goals? The answer is no. The whole concept of the car is a robust, high-performance sports car. It's not a small-engine, peaky, tweaky little car. So the first thing we don't want to do is throw away the whole customer body we've got out there and go looking for another bunch of customers. And, as I perceive it, that's what we would be doing if we went off and did a car that was radically different."

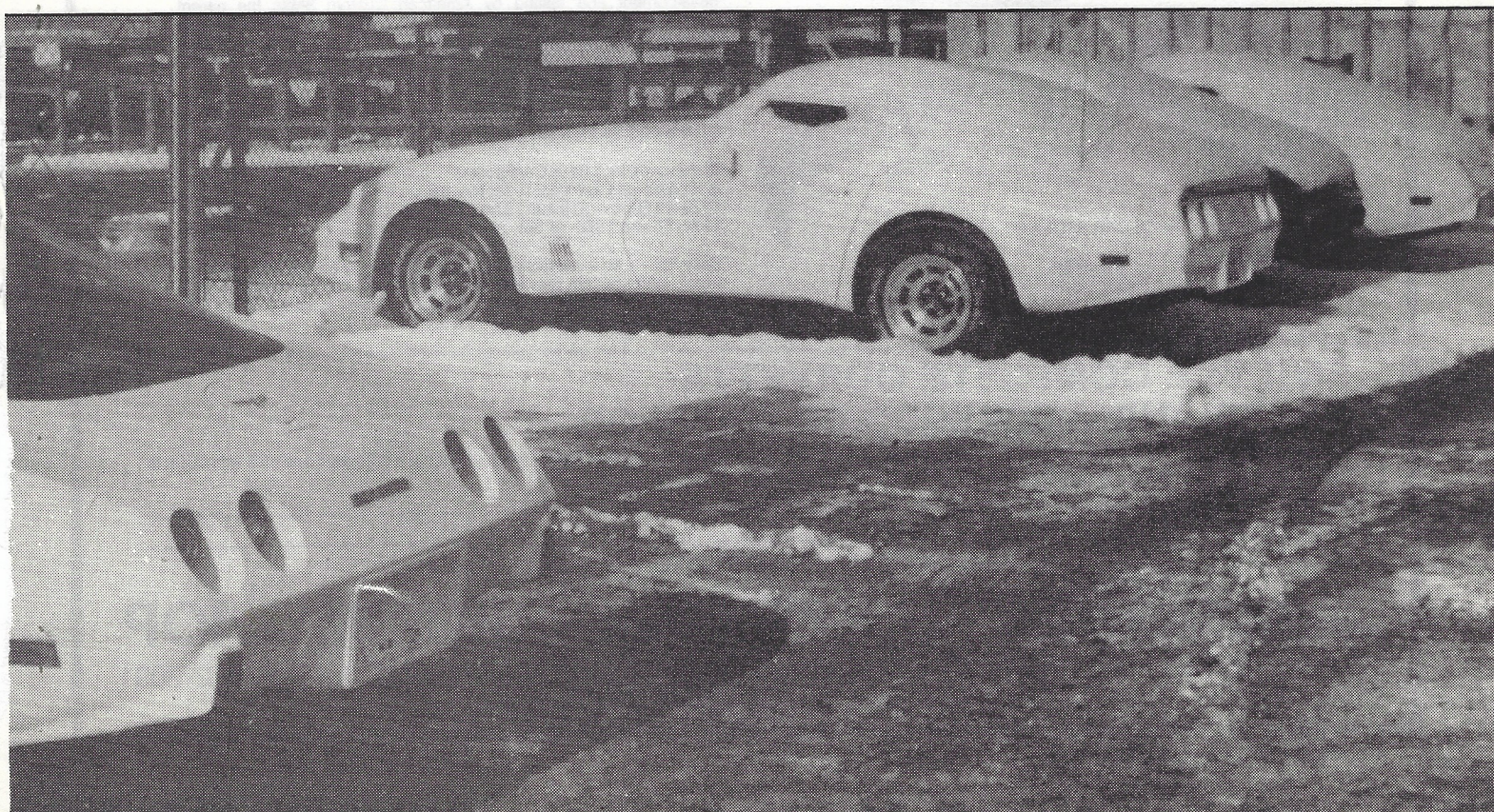
Would he rule out the mid-ship configuration? "I wouldn't rule it out, but that's radical surgery, too. I have no particular hang-up for a mid-ship car. It has a different set

of problems. Its major fault is packaging . . . creature comforts and utility space. Where are the successful mid-ship street cars? You've got to package two people and some luggage in there, and that takes up so many cubic feet of space. Look where Porsche is going."

Well, one might ask, if the future Corvette isn't going to get much smaller, will sport a V-8 powerplant for the foreseeable future and is likely to retain its conventional drivetrain, exactly where is it going? McLellan's eyes light up. His future ducks are aligned in neat and tidy rows, and there's no question in his fertile mind that they're marching in the right direction. For 1980, the Corvette will get a fairly substantial facelift, which he chooses not to describe except to say "You'll still recognize it as a Corvette." But there's a lot going on under the new skin that he doesn't mind describing in mind-boggling detail.

To begin with, the '80 car will be some 260-270 lbs. lighter, bringing its curb weight down to about 3,340 lbs. with all the options, back to about where it was "before it had to have bumpers, converters and the other mass-increasing kinds of items." A major part of this reduction (80 lbs.) will come

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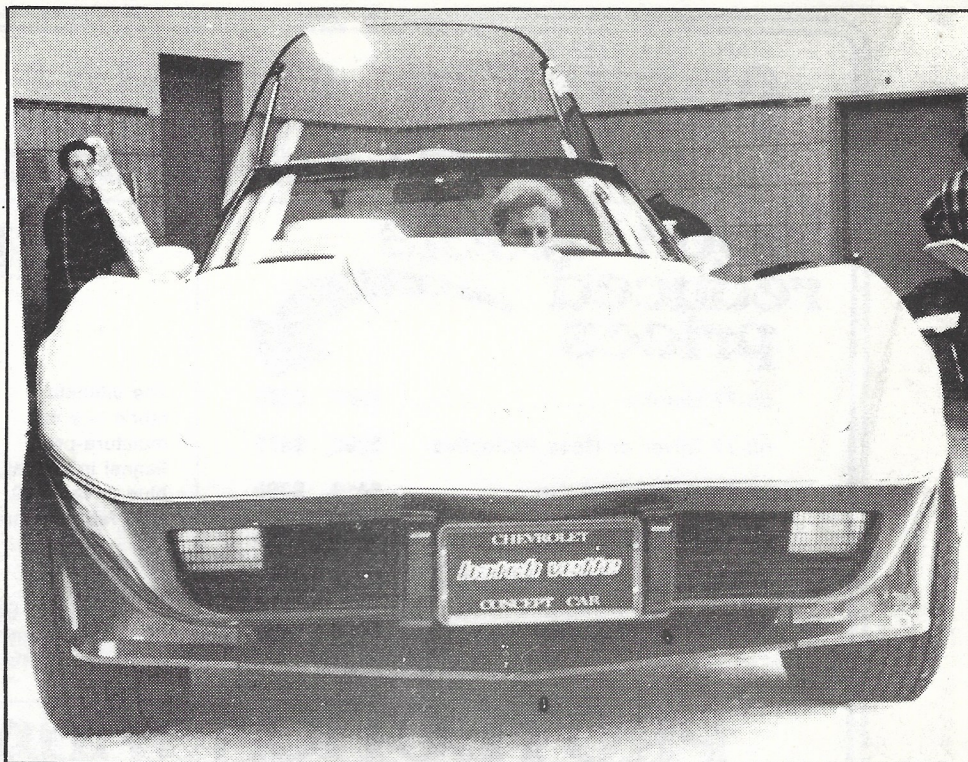


PROFILE

(Continued from page 37)

from a revolutionary new XMC fiberglass front bumper system, plus a new aluminum rear bumper. The rear axle will be redesigned with aluminum for both the axle case and the support crossmember — a 65-lb. reduction. The frame will be downgauged for another 35-40 pounds, while alloy wheels and other weight-saving items throughout the car will contribute the rest. "And remember, every 69 pounds of weight reduction," he gleefully points out, "is worth one-tenth of a second in quarter-mile speed."

There will be aerodynamic improvements with the re-touched body, as well as another (10 hp) performance boost from a redesigned exhaust system. A new transmission crossmember will permit dual 2½-inch downpipes to pass under it and into a common three-inch collector at the converter. A new in-mold coating process for the fiberglass body panels will



ABOVE & RIGHT: Does this Chevrolet "hatch Vette" concept car seen at the New York Colliseum Car Show give a hint of another change that might appear on the 1980 Corvette? Dave McLellan says no, we can't tell for sure because of the large amount of snow that covers the rear end of the Corvette we believe to be the 1980 model. If it is included in the '80 Corvette, it'd be a welcome addition. (Photos by Anthony Butera)

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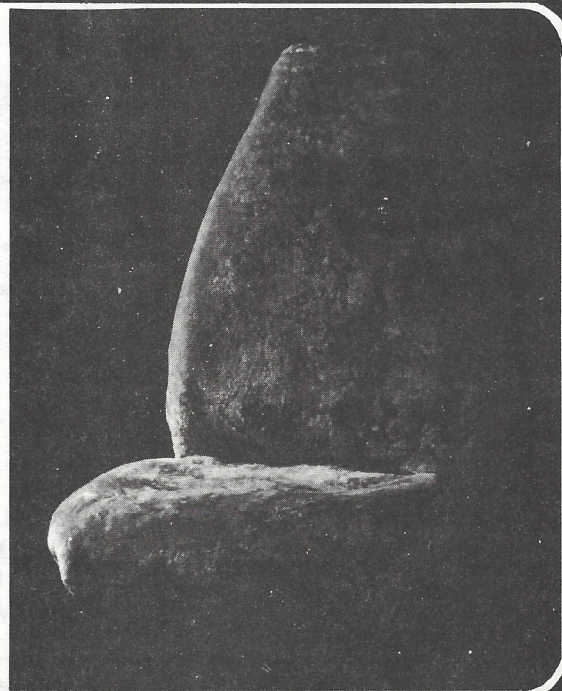
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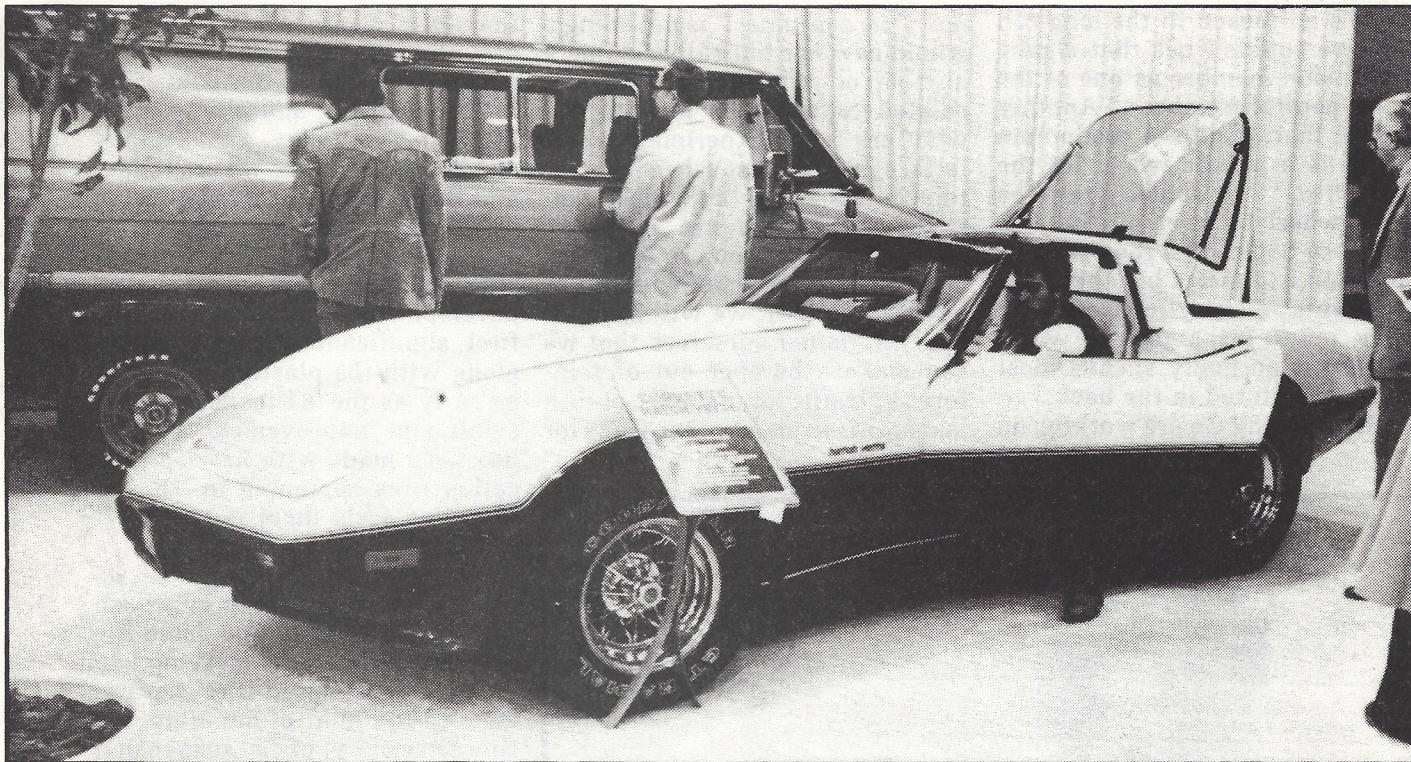
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apply color during the curing cycle and eliminate the troublesome in-plant painting system for a "Class A" finish, in McLellan's words.

"In '81, we're looking at a fiber-

glass/graphite rear leaf spring, which takes that spring from about 44 lbs. to about 10 lbs. with the same packaging geometry we have today. Once we have that into

production and we have confidence that it will meet all the production requirements, then we can start looking at utilizing it as a much more active suspension unit.

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There's no reason in the long run why we couldn't use that elastic suspension member as one of the major control members." Another project that might see production by '81 is a plastic wheel for the spare tire. "You actually test the spare wheel to meet all the performance bogies of a road wheel," McLellan explains, "but the spare represents a very conservative entry point for a plastic wheel because it normally spends most of its time stored in the back."

"So the thing we are working on

now," he continues, "is not doing a whole new car but rather doing a number of redesign projects calculated to teach us how to use what are today experimental material systems... so when it comes time to do a new car, those material capabilities are in place. With a new car, you crunch lines, move lines around; but when we're busy doing that, we will have already satisfied ourselves that we can make a bumper out of reinforced plastic, for instance, or do a leaf spring in plastic. Our plans for

the future car are to take it down to around 2,800 lbs. curb with a V-8 engine, automatic transmission, air conditioning and all the other stuff we offer today. That's minus 800 lbs. from where we are today, and that's one hell of a step!"

The Corvette chief engineer is also working on a major tire, suspension and handling analysis and development program, with the first significant impact to come along with the plastic leaf spring as early as the '81 model year. A significant improvement already has been made with new-specification tires beginning in '78, but McLellan feels there is room left for improvement.

"We're taking an analytical, as well as developmental, approach toward optimizing the handling performance. We're trying to identify high-speed tire parameters to the limit of handling, the characteristics of a suspension that will optimize those tire parameters, and what it will take in the design of our system to accomplish those characteristics." Based on extensive high-speed transient handling evaluations on the road-course-like GM Proving Ground development track (rather than steady-state skid pad work), McLellan is convinced that the transverse rear leaf spring can still do the job. "The best I can tell you at this point," he says, "is that the improvements we would want to make are evolutionary... we won't need to scrap the whole concept of the front or the rear suspension and start all over again."

However, he doesn't rule out other possibilities. "Exactly what that suspension is going to look like, I don't know yet. There's nothing wrong with the leaf spring except that it's heavy, and the new lightweight one will take care of that. The semi-trailing arm really is no joy because its roll camber coefficients are not very good, so we're not interested in that. The new system will be unique but most likely evolutionary from today's Corvette. We really aren't focused on a particular hardware system as much as on trying to identify what it is we want to accomplish and then looking at how we can get from here to there."

What does he think of the Porsche 928 "Weissach" rear axle design with its unique toe-change



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compensation? "It's a car with a lot of good ideas... we're going to take a look at that rear suspension using the same analytical techniques we're using on our own car." What about the equally-innovative BMW 733i dual-strut rod front suspension? "It puts the virtual center of the lower ball joint out where you couldn't put it otherwise." Does he like it? "I don't know yet," he candidly admits.

Holding up three spread fingers, he sums up: "We think of a three-part linkage between ourselves, our customers and the government, where it used to be just between ourselves and the customer. The trick is to not jeopardize our relationship with that customer while we're solving our problems with the government."

McLellan is more than just a

"As long as you keep a V-8 engine in the car, which is part of our strategy, it isn't going to get a hell of a lot smaller. To pack a V-8 in there, you need so many cubic feet of stuff. And tires... so many cubic feet of stuff. Put two people and luggage in, so many cubic feet of stuff. So how do you come up with this car that's two feet shorter, eight inches lower and five inches narrower? The car will get smaller, but it will get smaller in small amounts."

Other questions draw equally frank and enlightening answers. Will we see a hatchback Corvette any time soon? "We've taken the current fastback and made a hatchback out of it by hinging the glass, and it works fine. But because of the liftover, I'm not sure it's worth taking that next step right now, compared to doing other things. Would you rather spend your time doing that, or taking 250 lbs. out of the car?" Is it true there's a lift problem at high speed with the new fastback body? "That's a myth," is the quick reply, "We've run the car in the wind tunnel and it behaves acceptably... about like the old car."

What about a turbocharged Corvette? "We have packaging problems and haven't come up with a good solution yet. There just isn't enough room without raising the hoodline. But we'd do it tomorrow if we could." Fuel injection? "The EFI Cadillac 350 gets about 165 horsepower. We're at 195 now and with the '80 exhaust system will get to 200-205, so we haven't demonstrated to ourselves that that system would do us any good performance-wise."

And what is Dave McLellan's feeling about the mushrooming problem of regulatory pressure? "You can look at these things as excellent make-work projects for engineers, or you can look at them as intrusions. But however you want to look at them, they're there and they have to be dealt with."

chief engineer. The Corvette's special relationship with its public makes his job unique in the industry... no one asks the big-car chief engineer to speak at Caprice Club meetings. He approaches his job with a scholarly intensity and with a broadness of knowledge and experience seemingly beyond his youthful 42 years. That he is a car enthusiast as well as a technology buff is attested to by the collection of pictures on his office wall... a full-size experimental (mid-ship) Corvette design rendering a detailed cutaway drawing of the Porsche 935 race car, and photos of the current Corvette undergoing wind-tunnel testing. Interestingly, he used to enjoy owning and driving older Porsches.

The official biography says he was born in Munsing, Michigan, got his engineering degree from Detroit's Wayne State University in 1959 and joined GM the same year, served in various capacities at the Proving Ground and the GM Technical Center, received a master's degree in management at Massachusetts Institute of Technology (under a special GM program for selected top management candidates), and became only the second Corvette chief engineer in the car's 26-year history. What it doesn't say is where he's going from here; but like his famed predecessor, he seems bound to take the Corvette a long way with him as he goes.

UNDER THE HOOD

(Continued from page 17)

wood about four inches long and wrap a thin piece of cotton cloth around it. Apply a small amount of rubbing compound to the cloth and block the edges of the bezels, the ridge around the cluster housing and the raised letters around the switches, removing the aluminum paint and exposing the chrome. Clean the cluster with a mild detergent and re-install all the gauges. If proper care has been taken, it will look better than new.

NOT AN OPTION

Dear Gene,

I have a '71 Corvette Coupe with a base 350 engine (L-48) and 400 auto. transmission. What I would like to know is: was it possible to order this power team back in 1971 with a 4:56 rear end? Possibly on a special order basis? I have been told that the lowest rear end ratio that was normal for this power team was a 3:36, but this sounds wrong to me.

Could you clarify this for me, please?

Gary Dekker
Hamilton, MI

Your 1971 L-48 auto would have had a standard 3.08 with or without air, or an optional 3.36 "performance" ratio. My books show the 4.11 to be the steepest ratio available as an option and that was with an LT-1 engine and a 2.20:1 low gear (close ratio) transmission.

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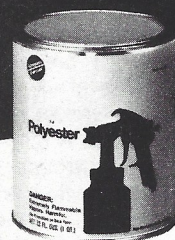
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