

MUSTANG TEST 302 • 351 • 429CJ



MOTOR TREND

COMBINED WITH **CAR LIFE**
The Complete Automotive Magazine

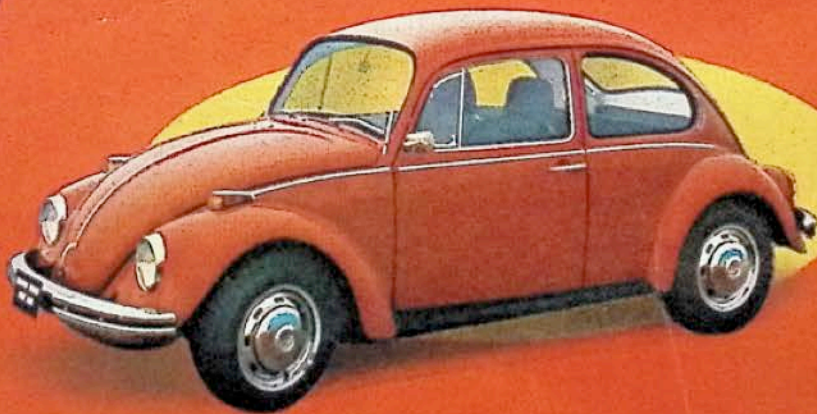
Catalytic Mufflers & Reactors

**Unser, Jones, Bignotti tell why
the Johnny Lightning 500 wins**

Hornet • Comet • Demon • Nova Test

CC UK 4/3 (21P) Sweden Skr. 4.75 Inkl. moms **50c** JANUARY 1971

Chevy and Ford Shoot At VW



COMPARISON TEST:

Vega • Pinto • Beetle

Dodge



1971 CHARGER SUPER BEE

The run of the mills is anything but run of the mill.

One great shape. Two great ways to go. First, Charger Super Bee (above), the budget way. Budget, yes—austerity, no. Super Bee's standard mill is the 383 Magnum V8 with free-breathing heads right off the 440 Magnum. It thrives on regular-grade gas and delivers all its energy through a slick, three-speed, all-synchro three-on-the-floor. Yes, Super Bee also has heavy-duty suspension and brakes; Rallye Instrument Cluster; plus

F70x14 wide-tread, whitewall, bias-belted tires; and a bench-type front seat. And what's wrong with that? Now let us proceed to the "all-stops-out" Charger R/T below. This one's a bit different. Its standard mill is the formidable Dodge 440 Magnum—the transmission, the three-speed TorqueFlite automatic. And you know all about them. Charger R/T gives you bucket seats up front; extra-heavy-duty suspension; heavy-duty brakes;

G70x14 wide-tread, raised white letter, bias-belted tires; special paint and stripes. So you see that if you have the urge, we have the Charger for you. Super Bee or R/T. Check your budget again. Then try them both at your nearby Dodge Dealer's. Either way, you can't lose.



1971 CHARGER R/T

Now — Run Your Car Without Spark Plugs—

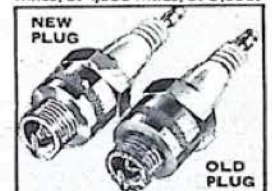
Get More Horsepower, More Miles Per Gallon USING ONLY REGULAR GAS!

Yes—this revolutionary new FIRE INJECTION SYSTEM—installed in 15 minutes, must deliver maximum power and economy WITHOUT CHANGING TO HIGH-PRICED PREMIUM GAS—must give you more H.P., more miles per gallon for the life of your car. See unprecedented GUARANTEE!

Your car runs because gasoline is fed into the cylinders where a spark causes it to fire. This action causes the gas to explode—this explosion pushes down the piston. Now here is the important thing to you. The larger this spark is, the more powerful the explosion. The more powerful the explosion, the more power you get from a given amount of gasoline. Poor explosion means wasted gas — loss of power, poor getaway, bad starting, a sluggish car. Good explosion means more miles per gallon, more horsepower, blazing pick-up, instant starting, an exciting car to drive!

WHAT CONTROLS YOUR ENGINE'S EFFICIENCY?

Your spark plugs control the efficiency of that explosion. And not only do they give a small, weak spark to begin with, but they get worse every mile you drive. And that you can see for yourself. Put a new set of spark plugs in your car and then look at them at 100 miles, at 1,000 miles, at 5,000.



Every time you look you will see more filth and carbon and you will see more of the electrode burning away. Why, some of the new high compression engines can burn up a set of plugs in a couple of thousand miles. Now you ask yourself how a weak, inefficient spark from a filthy, burned-out plug can possibly give you the kind of flashing, economical performance you want.

STOP USING SPARK PLUGS — NOW!

Now — read very carefully what we're going to suggest... that you stop using spark plugs in your car! That's right—get rid of them—forever. But—if you get rid of your plugs, what will make the engine run? Well, please remember that if you were told a couple of years ago that your car could run without a carburetor, you wouldn't have believed it—yet today you can have gas injection and get far more mileage, efficiency and power from less gas—and in a few years gas injection will have completely

replaced carburetors on most automobiles. In the same way, now is the time to replace your old, temporary, inefficient spark plugs with a modern, efficient permanent fire injection system, and you can do it yourself in 15 minutes if you've never handled a tool in your whole life!

MECHANICS & ENGINEERS READ THIS CAREFULLY

Now...this new fire injection system is so inexpensive that it can pay for itself in gas savings alone in one month of driving. Forget, for the moment, about the extra pep, power and performance you are going to get. Forget about the savings in spark plug servicing and replacement, the savings in wear and tear on your pistons and cylinders that come from unburned gas washing the protective oil coating off the cylinder walls. Just remember that this fire injection system will pay for itself in gas savings alone in a single month of driving. Here's how:

A spark plug jumps a spark of electricity across an air gap; this is most wasteful, and limits the size of the spark.

A fire injector fires on the surface of an electrical conductor. You get a heavy, powerful flame that will not blow out at pressures far greater than those created by the highest compression engine.

On ordinary spark plugs, the air gap is always getting bigger, wasting power and gas. Your plug is constantly accumulating filth and carbon because of inefficient ignition.

A fire injector has no air gap and no electrode to burn away. It never needs cleaning or setting, and actually becomes more efficient with use. It will actually outlast your car, delivering maximum efficiency without servicing or replacement. There is no waste gasoline, no loss of power.

NOW — USE REGULAR GAS!

With ordinary spark plugs you are using, or should be using premium gas, which costs from 4 to 8 cents more than regular gas.

With fire injectors, regular gas will give you more gas miles per

gallon, more horsepower, plus easier starting in all weather.

Ordinary spark plugs have to be replaced regularly. In some of the new high-compression cars, a set of plugs will burn up in two months.

A fire injector installation is guaranteed for the life of your car—without cleaning, servicing or replacing.

HERE IS POSITIVE, SCIENTIFIC PROOF!

Now—when you get your set of FIRE INJECTORS, here is all you do. If you have automatic transmission, make a note of how fast your car crawls forward when it is in the drive position with the motor idling. If you have a sports car, a racing car or a boat, make a note of the RPMs as indicated on the tachometer when idling.

If you have a regular transmission, put your car in low gear on a level road and notice its speed with the motor idling. Next, take any inexpensive auto spark plug wrench and remove your spark plugs. You'll never need them again. Just screw your fire injectors right into the spark plug openings. Then — no matter what kind of gas you have been using — fill the tank with regular gas. That's all you have to do to see the most amazing results you could ever imagine in all the years you have driven an automobile!

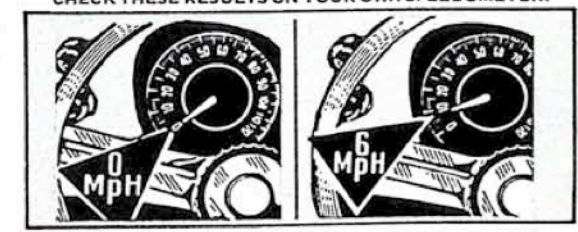
CHECK YOUR RESULTS CAREFULLY!

If you have automatic transmission—now put your car in drive and let your engine idle. If your car stood still with spark plugs, it will now move forward at from 4 to 6 miles per hour; that means that the amount of gas that just kept your engine turning over will now carry you up to 6 miles at no cost to you.

If you have a racing car, sports car or boat, your RPMs will increase up to 200 more at idling — up to 300 more at higher speeds.

If you have regular transmission, in low gear and with your motor idling YOUR CAR WILL MOVE FORWARD 4 TO 6 MILES PER HOUR FASTER. In other words, no matter what you drive, here is absolute proof that you can go further, faster and cheaper when you put proven FIRE INJECTORS in your car.

CHECK THESE RESULTS ON YOUR OWN SPEEDOMETER!



FREE GIFT
Deluxe 6-Pc. Set Power-Grip SCREW DRIVERS

Amazing Bonus Gift — Yours Absolutely FREE TO KEEP Just for Trying Fire Injectors NOW! Here is a gift that every car owner and home handyman can use! A complete set of SIX high quality screwdrivers that will be used in a hundred different ways. Every size screwdriver you'll ever need is in this set... and they're yours FREE TO KEEP WITH EVERY SET OF FIRE INJECTORS YOU ORDER! This valuable screwdriver set features: TEMPERED steel blades... all are MAGNETIZED to hold screws... and all have pure shockproof GRIPS for non-slip power-grip. This set is what every car owner and home handyman would like to own... and it's all yours free to keep for just trying Fire Injectors today. PLUS a copy of the world's largest and most complete catalog of automotive parts and accessories for all cars and trucks will be mailed to you FREE.

CHECK THESE DIFFERENCES



SPARK PLUG	FIRE INJECTOR
Fires across air gap	NO air gap required
Wire electrode burns away	NO wire electrode
Carbon ruins firing tip	NO tip deterioration
Needs cleaning and setting	NO cleaning or setting
Needs periodic replacing	NO replacing
Must have exact heat range	NO heat range
Spark blows out under pressure	NO blowing out even at highest compressions

EVERY FIRE INJECTOR CARRIES THIS NO-RISK, MONEY-BACK GUARANTEE

FIRE INJECTOR GUARANTEE

Use these remarkable FIRE INJECTORS in your car entirely at our risk... give them every test you can think of... POWER — ECONOMY — STARTING — SURE-FIRE SMOOTHNESS — PERFORMANCE, etc. Now, if you are not completely satisfied in every possible way at the end of 30 full days, simply return your FIRE INJECTORS for a FULL and IMMEDIATE REFUND.

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If you're a driver who wants his car to MOVE when he steps on the gas; if you want your car to START when you turn the key, not after grinding your battery down; if you want every nickel's worth of mileage from every gallon of gas instead of wasting it in the firing chamber; if you're tired of cleaning, setting and replacing spark plugs — you'll order a set of FIRE INJECTORS for your car today!

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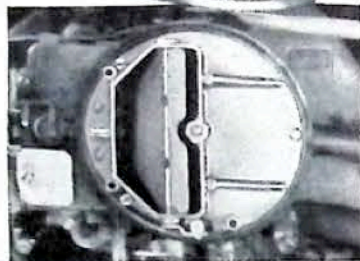
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4 MOTOR TREND / JANUARY 1971

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COVER: We shot a VW into the air, it fell to the ground in the middle of a target art director Terry Bratcher set for it. Fred Enke helped some, too.

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Shaves time.



This is the shave cream to use for that dreaded morning rush hour shave (when you shave faster than you should—without giving the lather enough time to really soak in).

Why? Because it heats up right under your nose. And takes less time to soften tough whiskers than ordinary cold shave cream. Making it entirely possible for you to get a close, comfortable shave in the morning. And still catch the 7:47.

The Hot One—when you shave too fast for comfort.

MARKING TIME

BY ERIC DAHLQUIST

"Innovation will not characterize the twelve months ahead — there will be few automotive breakthroughs, immediately because of smog and safety, and generally because the buyer may not want them."



Late in the autumn of 1967, on the last uncertain days of Indian summer before the snows skidded across the prairies, the nights were like black crystal. At the joint of Nebraska and Colorado, heading west on Route 36, you could almost perceive the foreboding gray face of the Rockies rising like a granite wall behind Denver. Yet, out here we were in the warm safe lock of the browned-grass plains, a light-pricked inky tent closed down on all sides. On an evening like this, a good radio can bring in Chicago or Kansas City or Salt Lake or even New Orleans, with a temperature inversion. But there was only one station for this night, for these people, for all nights, for all people. Beamed straight out from a University of Colorado night lecture, across the limitless flat-lands laced with meandering streams, were words which cut into the heart of America, laid bare its deepest problems, its darkest times ahead. The words said we were at the edge of a great revolution, a point at which civilization would make a giant turn in history, away from the industrial/atomic period into the time of electronics. A dislocation as great as the invention of language, writing and the printing press, man's first three revolutions.

But we would not do it easily or smoothly. We would rush up to the threshold almost unknowingly, look in and reel from what we saw because it was too complex to comprehend by this generation. It would come to be called future shock. And as we staggered back from the brink of this fourth revolution, there would be a mass grasping for once

familiar objects and ideas, things to save us from a hostile progress created by our own ingeniousness. Many events would make the time manifest. A national madness for antiques would run rampant and we would restore Tiffany lamps to places of honor, Mercer raceabouts to their former values, towns, cities, and, at last, the entire civilized, industrialized world. On that night, rushing through the vacant Colorado night, Marshall McLuhan was a hazy name, his message dimly perceived.

Now it is the first breath of a New Year, a time of a strange conservativeness and groping. The entire domestic auto industry is marching ahead to a new utilitarianism that somehow seems familiar: smaller cars, less complicated cars, more economical cars. The 1971 Mercury Comet 302 V8 is strangely reminiscent of the 1963 Comet S-22, replete with 3-speed insurance-beating transmission, and the Vega is in some ways like the original Corvair Monza, good a car as that was.

Independent German automotive designer, Walter Gotschke, spent four hours in Stuttgart one night, telling us that the Volkswagen Beetle's hold on the American psyche can be traced precisely to its ancient form. The rounded fenders and high stance reminding us warmly of things like '39 Fords and Chevys, cars of settled, more reasonable times. If this be true, Chevy and Ford would have more properly invested in a time-machine than a Vega or Pinto.

In racing one technological innovation after another — four-wheel drive, turbines, external wings, the "Vacuum Cleaner Chaparral" — has been voided by sanctioning bodies. Next, one learns that Indy car construction may revert from monocoque aluminum to steel tube for reasons of cost. Around circuits, there are dark rumblings from major constructors about artificial restrictions on the last remaining arena of unlimited racing, the Can-Am.

Listening quietly to Walter Cronkite's narrative on a recording of the NASA manned moon landing one night as the last bits of 1970 sputtered off the calendar somehow brought all these things into perspective. That McLuhan's words of four years ago were more right than we knew; that we must pay our dues now for what is ahead, by returning briefly to what was behind. Innovation will not characterize the twelve months ahead — there will be few automotive breakthroughs, immediately because of smog and safety, and generally because the buyer may not want them. How long it will be before we move forward once more is questionable. In a way, it's like the man who got a day younger each day he lived, until he was unborn. Perhaps the whole automobile problem will solve itself because we will abandon it for other transportation. Maybe next year.

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ROAD LOVE



it's your nickel

What The ———??

What had in 1969 GM has in 1971. In every race Chevy enters it hopped up Camaros always cheat.

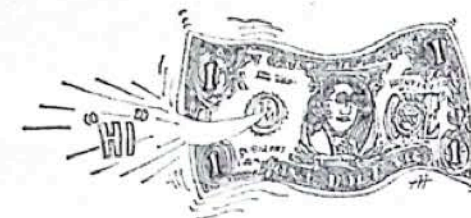
Studee Punter
Jamaica, N.Y.

Fall on Your Samurai Sword

The correct way to spell the traditional Japanese spirits is SAKE not SAKI.

Frederick Emmel
Springfield, N.J.

Well, for goodness sake. — Ed.



The Great Magazine Grab

Your use of Car Life's name in an attempt to lure the readers you could never attract before is unexcusable. The Car Life I knew, loved, and enjoyed no longer exists. Sometimes I hate like hell the fact that money talks.

Jim Anderson
Muskogee, Ok.

Heck, you talk like an Okie from Muskogee. — Ed.

Now that you've bought off your last worthy competitor, why don't you publish a magazine equal in quality and usefulness? Give us a magazine that leans more to the practicality of Car Life than to the esoteric idiocy of Car and Driver. You're all we have left now.

Chester Callahan
Corinth, Miss.

I am a subscriber to Motor Trend and Car Life (as well as Hot Rod and Sports Car Graphic) and would like to know if Motor Trend and Car Life are going to be combined into one magazine. If so, will my Motor Trend subscription be extended by the amount of time left on my Car Life subscription? Incidentally, my MT subscription expires in 1977, and my Car Life subscription expires in 1980, so a combination would make a new expiration date of 1987!

Louis Gelbert
Brooklyn, N.Y.

Big Brother is checking into this matter. — Ed.

Detroit's Natural Tendencies

Before Eric Dahlquist gets us all feeling sorry for the American automobile industry, a few facts should be recognized. The industry has shown a callous disregard for the pollution caused by automobiles until the government,

first in California and later nationwide, required some sort of smog control. Even the cars sold in the state do not meet these standards when delivered brand new.

Safety also had to be legislated. Still, rather than give Americans truly safe cars, the industry has created shoulder harnesses that are uncomfortable and difficult to use. In many cars, it is impossible to reach some controls with the harness in place. They have chosen to obey the letter of the law but have taken no initiative to obey the spirit of the law. GM and friends still sell over-sized cars that are difficult to control over anything but a straight line. Little effort has been made to improve handling on anything except limited production "performance" cars.

Detroit has chosen to put the bulk of their profits into styling rather than engineering. Each year sees "longer, lower, more beautiful" cars being pushed by the American car industry. Engineering advancements are usually limited to interior gadgets. The only notable exception has been this year with the small cars.

Alternatives to the internal combustion engine as we know it have existed for some years. The Wankel engine, while still an internal combustion engine, has met stringent pollution standards. But it was ignored in Detroit; too revolutionary. Japan made it practical. Several types of steam engines have been made by independent developers but they too are ignored in Detroit. The electric engine has been paraded by the auto industry to show its experimental program, but I wonder how much more has been spent on styling.

Detroit is so large and so lacking in imagination and pioneering spirit that the only way to get them to change is to legislate change. Perhaps if they showed a little initiative, "big bad" government would get off their backs. Remember, the government is the people.

Gary T. Green
Pasadena, Calif.

Missing

"Establishment Motor Pool" was a very good article for a comparison of 3 fine automobiles, but I would like to know why your comparison did not include the Chevrolet Caprice, which to me, should have been included in this article, because it does fall within the price range and specifications of the three test cars.

Evan S. Bice
Clarksburg, W. Va.

The test was conducted prior to '71 model introduction and a Chevrolet entry was not available. — Ed.

Letters submitted for use in "It's Your Nickel" are subject to editing to size and style.

AMC, AMX NO

At last I thought I had found a true American sports car. It wasn't some six grand freak with quality control and reliability that would have given fits to Dr. Porsche himself . . . yet American built with all of the advantages of an American car. Sure, it had a long way to go but it was coming!

I watched my dream car turn into a bloated Javelin with a couple of extra pieces of chrome, reducing it in effect to another Z/28, Boss 351, or AAR 'Cuda.

Mike Mason
Zanesville, Ohio

Fifth Column Movement

Your November article on the Ferrari P3 was great, but in the six pictures in which the steering wheel can be seen five times, it's on the right hand side and in the interior shot, it's on the left. Now what's the story, interchangeable steering column?

Dennis Fortin
New Bedford, Mass.

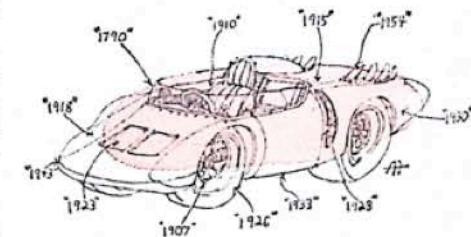
No, the same guy who flopped the Caprice picture in the October issue. — Ed.

Capacitive-Discharge

I plan on buying a CD unit and would like to know if I have to switch to hard core spark plug wires? Also, do I have to use dual points with a CD unit?

Lee Russell
Chattanooga, Tenn.

Most capacitive discharge systems are completely compatible with otherwise completely stock ignition systems. Carbon core wiring, as long as it is in good condition, is quite satisfactory. The same goes for the stock single-point distributor. — Ed.



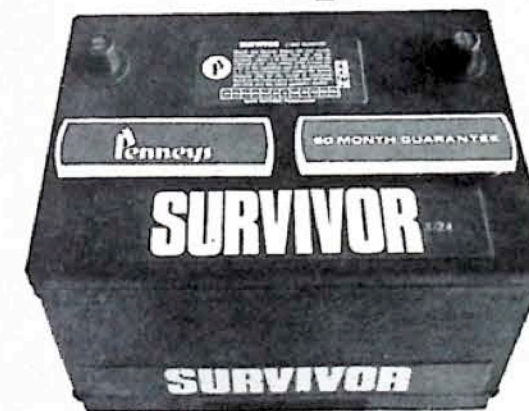
They Also Cerv

You say that Cerv II's monocoque frame and independent 4-wheel suspension is remarkable for a 1963 design. If true, then how much more remarkable was the Blood Brothers monocoque frame and independent 4-wheel suspension of 51 years earlier? In 1912 the Blood Brother's Cornelian had these features!

Then, further on in the article, you have this headline, "Cerv reaches 200 mph on 377 inches" as if this were a big deal. Cerv II is a 2,100-pound car. Back on April 25, 1928, Frank Lockhart

continued on page 10

Penneys Survivor battery. It survives snow, sleet, damp, heat, power windows, power seats, air conditioners, tape decks, radios and comparison!



And it's guaranteed for 5 years, too.

Guarantee

Should any Survivor Battery fail (not merely discharge) within 2-years from the date of purchase, return it to Penneys and it will be replaced at no extra charge. After 2-years but prior to the expiration date of the guarantee, J.C. Penney Company will replace the battery charging only for the period of ownership, based on the current price at the time of return, pro-rated over the stated guarantee months.

Compare the Survivor to any other car battery. This is a big, rugged powerhouse built to feed power-hungry cars. And it's built to survive. To start your car and keep on starting your car. Every time. Or we'll replace it at no extra charge any time during the first two years of the five year guarantee. That's a guarantee that survives comparison, too.

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*Price Effective Through January 31, 1971

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auto center

LETTERS

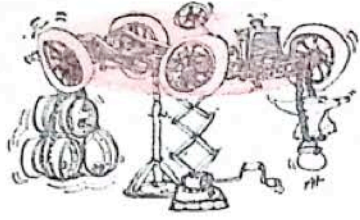
continued

drove his Stutz Black Hawk, a 2,800-pound car with a 181.6 cid, 220+ mph.

Finally, you indicate that the Cerv II people are real happy about their 377 cid putting out 490 hp @ 6400 rpm. Back in 1928, the little Miller 181.6 cid engine was putting out 570 hp @ 8100 rpm.

Cerv II may be a fine car but it is in no way as amazing as the car 51 years older, with a monocoque frame and 4-wheel independent suspension, nor the engine, less than half the size and 42 years older, putting out 80 more hp.

George Loyer
Roosevelt, N.J., 08555



Rigid Constructionist

While reading the article on the Cerv II (MT November), I noticed a comment on the torsional stiffness of the frame. I am quite interested in making some similar measurements on my small sports car, and would appreciate some technical advice. Also the comment "cylinder/bore measurements revealed a slight but detectable distortion" confused me.

Bob Austin
Menlo Park, Calif.

To make similar measurements on your car's frame, you would need to rigidly anchor one corner of the frame, along a wheel axis, and support the two adjacent corners on jack stands. This would leave the corner opposite the anchored point unsupported. A lever arm and weights attached at this corner (also along a wheel axis) would permit you to make your pounds-feet per degree deflection measurements. Since the engine was a major frame component in the Cerv II, frame bending could actually cause a change in bore shape, leading to the addition of brace.
— Ed.

Alive and well in Brazil

Would you please be kind enough as to send me some of your stiks? I have a collection of stiks and would appreciate very much if you sent me some of yours.

Juliano Schmidt da Silva
Parana, Brazil

Didn't I know your father? — Ed.

Body Story

I am interested in a career as an automobile body repairman. Please send any available information on this career and the required training.

John Felio
Adah, Penna.

There is currently a shortage of good body and paint men, perhaps due to

the scarcity of good formal training available. Strange, considering that salaries range from about \$500 a month for an apprentice/trainee up to as much as \$2,000 a month for a skilled metal man and painter. Most manufacturers have district schools and training centers with paint and body work courses, reportedly better than what most trade schools offer, although they are usually open only to people working at dealerships. Best bet would be to get in touch with one of these training centers in your area and ask for specific advice. — Ed.

Swiss Bell Ringer

What information can you give me on the Monteverdi 450 SS (Import Report, May 1970)? I would like to know when they will be imported, who the dealers will be, and if any actual performance tests have been run.

Gene Cook
Yoder, Indiana

To our knowledge, none of the mid-engine 450 hp Monteverdis have as yet been brought into the U.S. and no independent test figures are available. Your best bet for further information is the manufacturer: Automobile Monteverdi, Oberwilerstrasse 14-20, 4102 Binningen, Switzerland. — Ed.



Don't Tread on Me

If Ralph Nader comes fooling around with my Corvairs, I'll punch him right in the nose.

William Anthony
Rumson, N.Y.

Point and Counterpoint

VW improves the machinery not the looks, and the wear-resistant engine and parts they use have yet to be topped by any big bad American car. That is why you can drive a VW almost forever and an American car will fall apart in 4 or 5 years. If the VW is as bad as some people make it out to be, why does everybody try to copy it?

Scott Heise
Roselle Park, N.J.

Less than four months ago, after my VW died and my American-made beast, a MoPar monster, gave up the ghost, I was hard pressed for a means of CHEAP dependable transportation. When the decision was between the two leading Japanese imports and the Subaru, it was your own article which led me to try the Sub. (Mouse of the Rising Sun).

I'd like to commend the writer. He called the shot beautifully. My Star

Wagon will accelerate very well, shift quickly, turn surely, cruise at 75-80 mph, and do it all on regular gas, to the tune of 32 mpg around town, 37 or better on the freeway. Besides that, it's stylish and extremely comfortable. In my eyes, it's probably one of the best little cars made today.

Lou Zannini
Warwick Neck, R.I.

Challi-GT

I would like to know where I can obtain similar equipment for my 6-cylinder Dodge Challenger as was used for the Maverick in your May issue. I have asked the local Dodge dealer but he couldn't tell me anything about it.

Don Harriman
Bemus Point, N.Y.

You might start by requesting a hi-performance parts catalog from Chrysler Corporation, Performance Parts Service, P.O. Box 1919, Detroit, Mich., 48231. — Ed.

Please give the address of the Stutz Motor Car of America, Inc.

Joe Prieboy
East Chicago, Ill.

Stutz Motor Car of America, 52 Broadway, N.Y., 10004. — Ed.

Vagaries

In August you wrote Vega had recirculating ball steering. In September it was rack and opinion. Which is right?

We were right the first time: recirculating ball. — Ed.

I have been following articles in many different magazines on the Vega and have found differences of opinion concerning compression ratio. In one I found it be 3.50:1, while in another it is 10.00:1. And in Motor Trend it is 8.00:1. Who is right?

Bob Ungerbuehler
Cincinnati, Ohio

For once we were . . . it's 8:1. — Ed.



The Eagle Screams

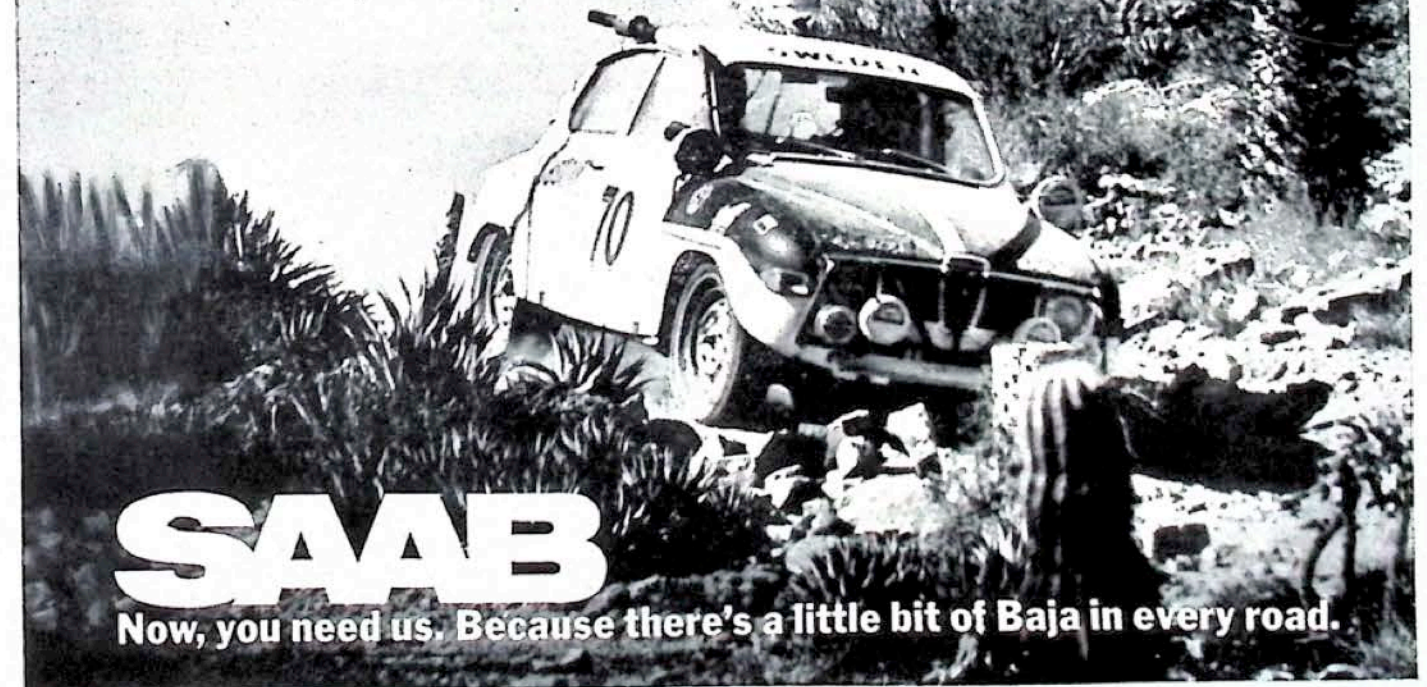
I would like to know if you people, with your contacts in the automobile field, would know where I could buy a hood ornament for a 1941 Packard 120. This ornament is an eagle.

W.C. Hitchcock
West Haven, Conn.

Guess you'll have to find the man that owns one. Try Packard Automobile Classics, Inc., P.O. Box 2808, Oakland, Calif. — Ed.

What made SAAB's third straight Baja 1000 win so impressive this year wasn't our record time*, but the competition we beat: Rambler, Chevrolet, Javelin, Ford, Oldsmobile, Corvair, BMW, Volvo, Citroen, Volkswagen, Cortina, Plymouth, Escort, Honda, Peugeot, Mustang, Porsche.

*SAAB beat 33 motorcycles and 219 other vehicles, including all 56 cars in its Passenger Class. While setting a record time of 19:14.56 (1:23 better than the old world record held by a motorcycle) and crossing the finish line 1½ hours ahead of its nearest competitor. Wouldn't you like to own a car that's so much better than the rest? Wouldn't you like to own a well-built Swede?



SAAB

Now, you need us. Because there's a little bit of Baja in every road.

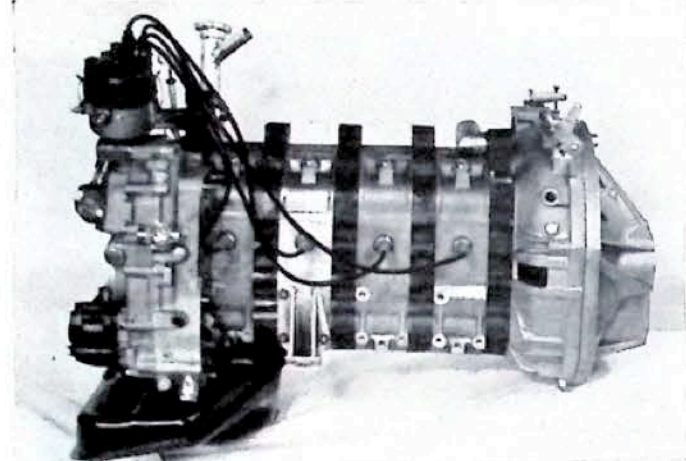
INSIDE DETROIT

General Motors commits itself to der Wankel.

Is there a leak in the Great Air Bag Threat?

Another Japanese auto-maker eyed by U.S. giant.

A WANKEL-POWERED GENERAL MOTORS CAR may be on the road in 1975. GM has agreed to pay up to \$50 million over the next five years for a non-exclusive worldwide license to manufacture the revolutionary German engine. GM did not say it would begin production but the implication is that GM is seriously considering it. GM could do so in 1975 without further royalty payments. Of the money GM is paying, about \$23 million will go to Curtiss-Wright, the American aircraft company which had the foresight in 1958 to acquire a U.S. license on the engine. The rest of the money will be divided between Audi NSU, a German firm 70 percent controlled by Volkswagen, and Wankel, the German firm founded by the inventor of the engine, Felix Wankel. The rotary piston engine is now being considered by U.S. makers because ways have been found to clean up its exhaust emissions. Competitors say GM's research and engineering labs already have 200 of these



engines. Dr. Fred Bowditch, in charge of GM's air pollution control efforts, said the "basic emissions from the Wankel show pretty high readings of hydrocarbons — a little worse than the internal combustion engine. But it is amenable to the same devices which can be used on our present engines. In some respects, the Wankel engine might be somewhat easier to work on." The Wankel is much smaller than the conventional small piston engine. This is why one Ford vice president says GM is interested—because it wants to use the Wankel in a small car. Ford and Chrysler also are interested in the Wankel. The engine already is being sold in this country on the Mazda, a Japanese car made by Toyo Kogyo, which has managed to meet the U.S. anti-smog standards by using an exhaust thermal reactor. NSU also sells the Ro80. But only a score of these have been sold in the U.S. in the past year. It also has a thermal reactor. The Ro80 is a \$6,000 car, the Mazda, \$2,500.

IT USED TO BE CALLED THE N.I.H. syndrome. The letters stand for Not Invented Here. And it meant that auto men weren't much interested in suggestions by outsiders on new devices for cars. While some critics may say Detroit hasn't changed, there are indications that it has. General Motors, in addition to its publicized new license on the Wankel, also has obtained in recent years licenses on two other revolutionary engines. One is the Stirling heat engine. While it was invented over 150 years ago by a Scottish minister of that name, the Stirling engine was modernized in 1937 by the N.V. Philips' Co. of Holland. This external combustion engine has been further

developed by GM under its license. GM even built the world's first Stirling-electric hybrid car but has no thought of going into production. GM also has a license on the French Sigma free piston engine and built one of those cars too, but again strictly for testing purposes. Ford builds about a dozen things under license from other firms and has about the same number of devices or techniques it licenses to other firms. Its largest operation under license is the Pilkington float glass process.

FEDERAL SAFETY OFFICIALS DENY THEY ARE retreating on air bags, but that is what it appears. They admit they have changed their views about requiring air bags on all cars beginning Jan. 1, 1973. The new date for installation of some sort of "passive restraint" device in the front seats of cars is July 1, 1973. Federal officials still say the air bag is the best passive restraint they know of. But they say they are not going to tell the industry it has to put in air bags. If they want to use automatic seatbelts, cantilevered seats, nets or anything else they can do so. But it appears the government is so sensitive to charges that it's backing down. It made the announcement routinely, without any formal press conference, with top officials conveniently out of town at the time.

A STRIPPED-DOWN VEGA MAY BE IN THE WORKS. Ford officials don't expect to keep their \$172 price advantage with the Pinto over the Vega for more than a year. They say the interior appointments in the Vega helped run up the cost of the car, and they expect Chevy to come out with a more austere version for the 1972 model year.

A MOBILE TESTING LAB HAS BEEN DEVELOPED for federal officials. It's part of a government study of motor vehicle inspection programs designed to see that cars are kept in a safe operating condition. The National Highway Safety Bureau unveiled a mobile motor vehicle inspection facility. The mobile unit, capable of being set up in 40 minutes, can perform a greater variety of tests than most of the current state or local vehicle inspection facilities, the bureau said. The mobile station, developed by RCA Service Co. under a \$150,000 government contract, is self contained in a 24-foot van equipped with a hydraulic lift to position the inspection equipment along a 140-foot lane. The unit also has a trailer mounted power generator. It's intended for use in sparsely populated areas where permanent inspection stations would not be economically feasible. Douglas Thoms, safety bureau director, said "regular inspection of cars and trucks is a vital factor in cutting down the staggering figure of 10,000 injuries a day in accidents on the streets and highways."

THE FEDERAL GOVERNMENT HAS RELAXED SOMEWHAT the strict new air pollution control test procedures it proposed for cars in 1972. The industry had complained it could not meet the new procedures and it appears that despite the changes the auto makers may still have some problems. The dispute involves an effort by the government to develop more realistic test standards. While the number of grams allowed to be emitted per mile was actually higher under the new standards, the change in test procedures made the standards tougher in reality. For example, emissions of hydrocarbons now are 2.2 grams. The government proposed 2.9 for 1972. The industry argued that it should have been 3.5. The government went most of the way and allowed a 3.4 reading. Carbon monoxide is now 23.0 grams per mile. The government had proposed 37.0; the industry said it should have been 43.0. The government settled on 39.0. The industry also objected to durability requirements for certifying the 1972 models because the testing would have

had to start last Oct. 1 and the standards were not finalized then. So the government dropped for the time being that new durability test. The industry also said the government testing system required use of leaded gasoline at a time when car makers are trying to change engines so they can run on unleaded low-octane fuel, a necessity for improved anti-smog systems of the mid-1970's which use catalytic converters that can be ruined by lead. The government is going to allow the unleaded gas to be used in the tests.

WHO'S BUYING THE PINTO? Ford data discloses the medium age of the buyer is 33, the median income is \$12,100 a year, 27 percent have a college education, 70 percent are men, 66 percent are married and 74 percent own more than one car. A total of 57 percent of Pinto buyers do not trade in another



car. Of the 43 percent of Pinto sales which have trade-ins, one in four is an import. Some 36 percent of the trade-ins are competitive domestic makes while 39 percent are Ford products.

LAMINATED GLASS IS BEING URGED FOR THE side windows of cars by Dr. Donald F. Huelke, professor of anatomy at the University of Michigan. Huelke says the present tempered glass windows pose a problem not seen before. The reason for this is that because of poor door locks, people were tossed out the doors in some accidents. But now the locks have been improved and people no longer exit this way. Instead they go out the tempered side windows. So, Huelke's solution would be to put the same laminated glass in the side windows which is now being used to success in the front windows. Huelke says the floorpan of cars can now be a problem. He cited cases where people's feet had been forced through the floorpan in a crash and "it was a hell of a job trying to get them out." Huelke says the side guard beams now in most new cars are helping to reduce casualties. But he did say "side impact accidents are still the most hazardous because there is not much room for energy absorbing design work." The federal government is proposing a side impact standard for new cars in two years.

GENERAL MOTORS MAY LINK UP WITH Isuzu Motors of Japan as a means of gaining a foothold in the Japanese market. GM has been discussing "areas of possible cooperation covering technical assistance and the exchange of know-how with respect to exhaust emission controls, safety measures, automatic transmissions and heavy duty engines." The goal, GM admits, is "potential entry into Japanese markets." Both Ford and Chrysler already have tie-ups with Japanese firms, with all three U.S. giants hoping to get into the market later in 1971.

ALLEGEDLY DEFECTIVE PICKUP TRUCK wheels have set the stage for a court test between General Motors and the federal government. GM was ordered by the National Highway Safety Bureau to tell owners of 1960-65 Chevrolet and GMC model pickup trucks that the wheels are defective. Some 200,000 trucks are involved. GM filed suit in federal court in an effort to block the government order. GM says the wheels are not defective. The government countered by filing a \$400,000 suit against GM for not following the bureau's directive. Auto critic Ralph Nader has been pressuring GM for two years to recall the vehicles. The wheels were manufactured by Kelsey-Hayes. The design was changed in the mid-1960's. While denying the wheels were defective, GM agreed a year ago to install new wheels of a different design on those trucks with camper bodies. It said some 19,000 owners responded and it has in-

stalled the wheels on 11,662 vehicles. GM says the wheels are subject to failure only if the vehicles are overloaded, such as by putting a camper body on the truck. The case originally came to light because of accidents involving some bakery trucks on which the wheels collapsed.

A NEW SOLID-STATE ELECTRIC UNIT WILL replace the present wiring harness in cars by the 1980's. This is the prediction of Fairchild Instrument's president, Dr. C. Lester Hogan. His firm has invented a device called the Automotive Central Processor which would amount to an on-board computer. It would be capable of being plugged into a computer at dealerships for diagnostic checks, similar to a program Volkswagen is working on for some of its cars in the years ahead.

THE FUTURE OF STUDDER TIRES IS IN DOUBT. This winter will be the last the tires can be used in Ontario. And it's thought that some states may also decide to ban them. They are concerned about whether the tires are chewing up miles of roadway each winter. Most of the northern states will probably follow Minnesota's lead, whatever that is. Canadian officials estimate their decision will save \$127 million over 10 years. Rubber industry officials are concerned about the trend away from these tires on the part of government officials. The rubber industry estimates that sales of winter tires this past year totaled 18.9 million, with 40 percent or 7.5 million being studded tires. In 1969, 18.1 million winter tires were sold, with 35 percent or 6.3 million being studded.

ADHESIVES MAY BE HOLDING CARS TOGETHER in the future. An executive of the B.F. Goodrich Co. says broader use of new "super adhesives" will enable automobiles of the future to be held together by this cement instead of being bolted and welded. H.L. Dixon, general manager of adhesive products for the firm, says aircraft manufacturers are already using adhesives to cut down weight and add strength to aircraft. He says the auto industry will adopt adhesive bonding as soon as adhesive systems are available that eliminate the elaborate surface preparation and jiggling now required.

THE USE OF PLASTIC IN CARS IS EXPECTED to set a record in 1971. Owens-Corning says fiberglass plastic materials are used in more than 200 different applications on the 1971 models compared with about 110 in 1970. Total consumption



will reach 213 million pounds, a 35 percent increase over the estimated 1970 volume of 157 million pounds.

THE FIRST PINTO RECALL HAS BEEN TIED to the pollution fight. Ford is recalling 26,000 of the cars because of a problem which began when they had the car's 1600 cc four-cylinder engine adjusted to meet the air pollution control standards. They then discovered it was "dieseling," a condition where the engine attempts to run after the ignition has been turned off. To correct the problem, a solenoid was installed in the accelerator system. In the process, the linkage was changed in such a way that it could stick under certain conditions, as engineers discovered later. The problem was noted in routine "cold room" tests of Pinto cars. A running change was made and a recall ordered on those already sold.

rap 'n 'pinion

“ I would doubt if there is as much pollution released into the air at a large drag meet in a given city as would be released in that same city every day with use of hair spray and underarm deodorant. ”

—ROY RICHTER, PRESIDENT,
SPECIALTY EQUIPMENT MANUFACTURERS ASSOCIATION



Roy Richter is a man who has somehow managed to be everywhere in the automotive performance field at one time or another. He was at Ascot driving in the sprint races before the war, when they still had the board track; at Torrey Pines in the late '40's he once dusted off Phil Hill in a Cad Allard. He was out on the dry lakes at Bonneville during the great days of the Model A roadsters. And when drag strips came into vogue in the mid-50's, Roy was there too, trying out new products. Now, in the '70's, the big words in the speed equipment field are "dune buggy" and Roy is trying to steal spare moments from his three businesses to design the ultimate duner.

President of Cragar Industries, the famed mag wheel firm, Roy also heads Bell-Topex, developers of safety-designed racing helmets, and is the owner of Bell Auto Parts in Compton, where he had his first job in the automotive field. Related to his businesses, and of deep personal interest to Roy, is his presidency of the Specialty Equipment Manufacturers Association (SEMA), formed to develop standards for the products you bolt on your car. Roy developed a special strength test for mag wheels that was later adopted by the government. He spends hundreds of hours trying to develop further tests which will insure that only the safest product designs get into the market. Because of his diverse background, Roy is an important member of Motor Trend's CARS (Conference of Automotive Research Specialists) panel judging the Car of the Year. With all of his activities, Roy still has time to raise a family of four; three boys and a girl. One son has already joined one of his businesses and he hopes the others will follow. But they'll have to go a ways to catch the ol' man. — Editor

The growth of the high performance industry has been spectacular and, to those of us who were around when this squirming, precocious infant was getting underway, it has been both extremely interesting and satisfying to observe.

Over the years the Specialty Equipment Manufacturers Association has had to change. Most of the early founders, including myself, came into this business through what I like to call the back door. We started as enthusiasts and, either through good luck or extra effort, found a way to enjoy our personal interests as a basis for starting what turns out to be an enjoyable business opportunity.

It takes strong dedication and many after-hour meetings to keep the activity moving in the proper direction, but, more important, it takes a professional, effi-

cient staff to handle the day to day activity and take care of the organizational details that go with the many activities of the SEMA group.

We are fortunate to have the staff we do at the SEMA office, headed by Eric Grant as Executive Director.

Eric's background is ideally suited for the duties he is faced with, particularly staying abreast of potential unintelligent legislation at both the state and federal levels. Through past activities in Sacramento and Washington, D.C., he is well acquainted with both the system and many of the people involved in the initiation and analysis of pending legislation that, if prepared without thorough subject knowledge, could have an ill effect on portions of our industry without benefiting the masses.

Fortunately, most public officials are ethical and work hard at proposing and approving legislation for the good of society. However, our current political structure is such that government officials are encouraged to make their names by associating with controversial legislation recognized as being in the general public's best interest. In some instances, the desire for recognition can cause legislation to be written without full knowledge of the subject involved. These are the areas that Eric Grant has been successful with, in telling the SEMA story as it really is.

Over a period of time, there has been legislation proposed in the name of safety and air pollution control, making it illegal to change any part of your automobile from the way it was received from the factory. I am not saying there is anything wrong with modern vehicles, but having the ability to improve the looks and the performance of your personal car is the basis for our entire industry, and, really, the development of the automobile. Exchanging cast iron exhaust manifolds for steel tubing headers, installing an efficient, accurate ignition system — either capacitor discharge or normal — or improving the engine's appearance with polished finned valve covers in no way increases pollutants pushed into the air as long as the P.C.V. and factory carburetor/ignition settings are untouched. Installing "mag" wheels that meet SEMA specs does not give you an unsafe automobile, yet legislation to prevent all these activities has been proposed and was on the way to becoming law until the powers that be were shown the errors in their assumptions.

There are obviously some wild street engines built, using equipment intended for track racing, that emit more pollutants

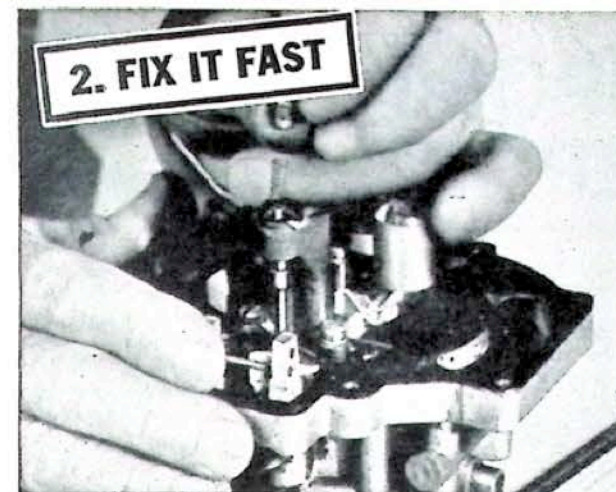
than the law allows. Once periodic vehicle inspection becomes law, these machines will be eliminated. It is not our intent that violations of this nature should be defended or recommended. I am sure SEMA, as a group of individuals, agrees that we are not after protection of improper acts; we have to breathe the same air as everyone else.

I would say, however, that vehicle inspection with the proper "sniffer" equipment would find many well-tuned high-performance engines, charged to be "illegal," putting out less pollutants than many "legal" engines driven by the non-auto enthusiast. The very nature of most enthusiasts in our high performance sport will preclude their letting the engines in the cars get into the sad, worn, out-of-tune condition that causes the majority of automobile-oriented pollution.

Criticism has been leveled at many racing events because of the smog that is obviously produced by the exotic fuel burning machinery gathered for the competition. There is no argument that could be legitimately given to say these machines were pure from a pollutant standpoint — no more than we can say that a jet airplane is pollution free. However, when a person attends these meets and becomes familiar with the hours of enthusiastic time spent by our young people in building and working on the cars, plus the enthusiasm displayed by the spectators watching the event, and the good time spent in reading about it, it is not difficult to justify the amount of pollution that is actually created. By virtue of its birth, each infant forever alters the earth's environment. I would rather my boys create their share of pollution in this manner than try to spend their energetic, searching years in other activity that many of our young people are exposed to, with damaging results.

I have no statistics to lean on, but I would doubt if there is as much pollution released into the air at a large drag meet in a given city as would be released in that same city every day with the use of hair spray and underarm deodorant. It is a matter of obviousness. Can you say there is more damage done to society than at one "swingin' pot party"?

In making the foregoing comments I have allowed myself to wander from the subject to SEMA. The only observation I can add is that as long as we can maintain the enthusiastic officers, and directors, and the competent staff, supported by the industry itself, SEMA will do its best to tell the honest ethical story in the right places to continue to benefit you, the enthusiast. — Roy Richter



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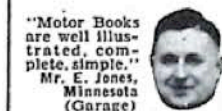
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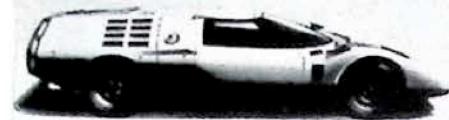
IMPORT REPORT

A mid-engine show car? Even Mazda has one.
Triumph re-does the Spitfire. Again.
VW volunteers to make safety bug prototype for U.S.

Mazda mid-engine GT

If you're a very hip auto-maker, engineering-wise, you have to have a mid-engine GT show car, right? That's why we have been drooling over the Mercedes Wankel gull-wing, the AMX/3, the Ford Mach II, and the mid-engine Corvette.

Latest to join the crowd is Toyo Kogyo, fourth largest auto-maker in Japan. Their RX500 show car was displayed at the Tokyo Motor Show.



With a chopped "Kamm" tail, identical in profile to the famed "breadvan" Ferrari, the RX500 also has front hood grates like the Mercedes Wankel and an under-grille scoop for the Wankel-type engine.

Among the special features of the car are the urethane foam front and rear ends and molded plastic body panels. The non-functional show car weighs 1,850 lbs. and has a wheelbase of only 58 inches, which makes it some three feet shorter than a Corvette.

Mazda presently makes its car bodies out of metal. But the Japanese are gaining fast in fiberglass and vacuum-formed plastics experience, which may lead to a plastic-bodied car from Japan soon.

Coming: A Safety Bug

U.S. safety rules might well keep imports at home within a few years, if foreign manufacturers don't respond to Washington requests. So far, only one has, and you guessed right if you said Volkswagen. Most European manufacturers were quite upset when the U.S. government asked them to develop a 2,000-pound "safety prototype."

"We have enough problems on our hands as it is, with air pollution and existing safety rules," the spokesman of a major company recently said. "The only reasonable way to build such a prototype would be for all of us to get together. Each manufacturer would contribute his experience in a different area of safety, and the prototype could be a common project. But to make one alone would be too expensive and too time-consuming..."

Volkswagen apparently did not feel that way. "Being Europe's leading manufacturer and exporter," VW boss Kurt Lotz replied, "we have to contribute as much as possible to the improvement of safety, in every respect. Our U.S. experience taught us that American safety rules are the only valid base for unified European regulations."

Volkswagen proceeded to put these

words into action by launching a research project for the construction of a new safety car in conjunction with the U.S. and German governments. The car will weigh approximately 2,000 pounds. It is to protect passengers from heavy injury in case of frontal collisions occurring at 50 mph.

New look at Triumph

Two of British Leyland's major export trumps have been given the facial surgery treatment. The Triumph Spitfire — now called the Mark 4 — of which two-thirds are sold outside of Great Britain, has a brand new interior, a restyled black grille, and rounded out bumpers moving all the way into the front fenders. Lights have been modified and the windscreen extended downwards by 2 in. in order to improve visibility. The rear panel was also redesigned along the lines of the new 3 liter Triumph Stag. Similar changes were brought to the GT 6, now known as the Mark 3 version, along with various



improvements in interior decoration and trim. English buyers will hardly notice the difference: 95% of all GT 6's were exported during the last twelve-months.

Customer for G.M.

When they set up a plant in Strasbourg, France, to produce 300,000 automatic transmissions per year, General Motors managers were convinced that they could easily sell their product to competing manufacturers. They soon found out that things would be much tougher than ex-

pected. Most prospects preferred building their own: Peugeot, Renault and Ford, among others, are presently setting up specialized plants to produce automatic transmissions of their own design. Further, Europe still does not seem ready for automatic driving. The loss of power is too important with small size engines, and the cost of the automatic option runs too high; it often represents up to 15 percent of the total price of a car. General Motors therefore had to keep its production at around 100,000 units a year, one-third of its potential.

Now, G.M. has found a client at long last. Strike-plagued Fiat decided to use G.M. automatic transmissions instead of trying to make its own. The three-speed automatic gearbox in Strasbourg is now available on four of its best-selling models: the 124 Special, 124 Special "S," 125 Sedan and 125 Special.

All these types were slightly restyled in the fall: new grille, bumpers and rear lights for the 124, which also got servo-brakes. A 124 Special "S" was launched as a kind of "super-special," with two ohc's fitted on the 1438 cc engine, which develops 88 hp instead of 77 on the "Special" version. Top speed is now 100 mph as against 94. A new dashboard (with real wood paneling) and more comfortable seats were developed for the 125. Observers were favorably impressed by these improvements, but all noted that it was the first time in ages that Fiat did

not use the Turin show to promote a brand new model. The reason: strikes and absenteeism cost Europe's number 2 manufacturer some 200,000 cars in 1970. "We just can't grow in Turin anymore," Fiat boss Giovanni Agnelli said. "Our new factories in the south will give us an additional potential of 300,000 cars per year. After that, we might well build our next plants in France, along with Citroen."

Whatever the company's problems, Fiat's research and development departments have not remained idle. Insiders report that Fiat will introduce two brand new cars in 1971: the 127 to replace the existing 850 and a new mini-car with the small 500 cc. engine to take over from Fiat's all-time best-seller, the 500. Three million units of this model have already been produced, and the 500 is still being built at the rate of 2,000 units a day.

Buick's Vega — from Opel

No one thought Opel would ever try to fit an intermediate car in between their Kadett and Rekord lines, but they have. The Kadett was slightly too small, the Rekord slightly too expensive. Opel therefore launched the Ascona line (to be known in the U.S. as Buick's Opel 1600) as a car providing "comfort for five and a trunk for five," while the price remains that of smaller four-seaters. The car comes in two-, four-, and three-door versions, the latter being promoted as the Ascona Voyage station wagon.

Actually, this new Opel line was to be launched earlier, with the Manta completing it as a coupe version. Considering the success Ford was experiencing with the Capri, Opel chose to introduce



the Manta first as an "original line," while unveiling the Ascona two months later at the Turin show. In reality, all those cars are exactly the same, with only styling differences as far as the Manta is concerned.

The Ascona uses the same ohc engines which power the weaker Manta versions: a 79 hp 1.6 liter and a higher, 92 horse 1.6 S. Top speed is claimed as 96 mph with a 0 to 60 mph time of 14.5 sec. The car is quite compact with an over-all length of 162 in. (164 in. for the station wagon). A traditional line rear-axle/coil spring suspension is quite conventional, but then Opel never intended to enter its cars in a technical sophistication contest. For '70-71 16,000 units of this model are to be sold in the U.S. through Buick dealers, who will use it as their own type of Vega, next to the "Opel 1900" Manta, the Kadett and the Opel GT.

New from Jaguar

The new and long expected Jaguar V-12 engine is about ready to hit the market but more interesting is the probability of a V8 also. Even Jaguar officials now admit that "plans to introduce the new unit in specially developed versions of existing models are to be announced

during the first half of 1971." Jaguar made it known that the 420 G (of which 25,000 units were built since introduction in 1961) is being phased out of production. The new Jaguar engine should be launched in a special version of the E-type within a few months.

A Fiat to look at

It could be a bestseller, if they ever decided to manufacture it. So far, though, the clay model Fiat introduced at the Turin show is only meant as a styling exercise. It was completed in 40 days at Fiat's styling center, as a "demonstration prototype." Should it ever be produced,



it would come as a mid-engine sports car. Its low wind-swept shapes easily made it into the most exciting effort at the Turin show.

Mazda electric?

Toyo Kogyo, makers of the Mazda car, bill themselves as "the world's most creative automaker." While we think some European firms we know could put up a good fight for this title, we are always pleased to see the latest prototype in Mazda's closet. In this case, it's a bubble car — reminiscent of the Isetta.

The prototype, called the EX005, combines a Mazda Wankel-type rotary engine with electric power, in the same manner as the hybrid cars that were entered in the Clean Air Car Race.

The rotary engine drives the generator at a constant speed to charge the battery while the car is running. The electric motor actually drives the car.

The acceleration, steering, and braking are all controlled by one "joystick," similar to the arrangement used in the last of GM's Firebird gas-turbine cars. There are wheels, though you can't see them. The wheels can travel at different speeds and in different directions, which allows the vehicle to turn on a yen note.

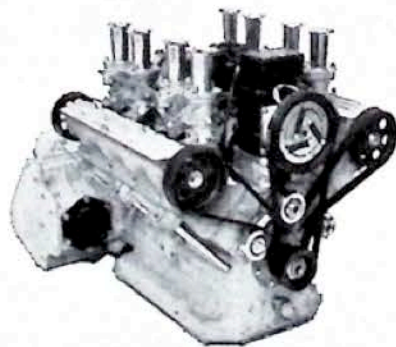
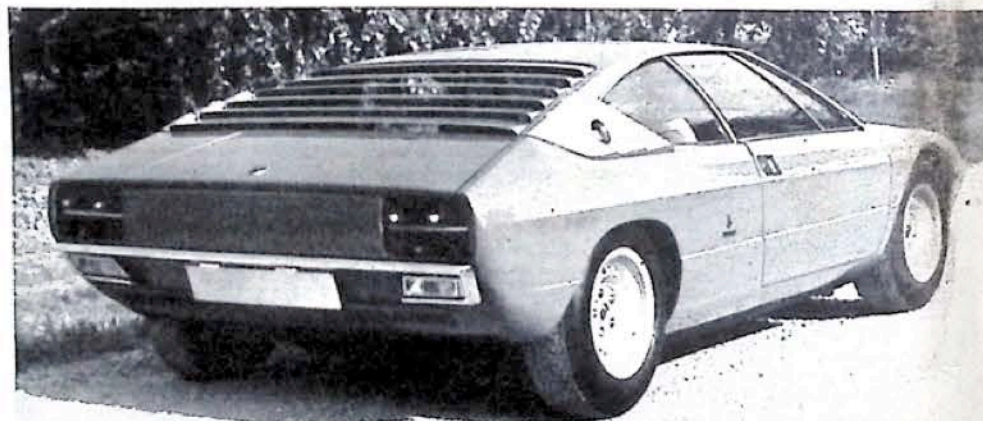
Weighing under 1,000 lbs., the EX005 seats four and has a fiberglass body.



Eight lead storage batteries are below the molded-in seats.

Will the car be produced? Toyo Kogyo claims it's a prototype and we're glad. We'd like to see some angular lines put in. Something about its present styling makes us want to assume the pre-natal position. To the womb, anyone?

NEVER SAY DIE, SAYS LAMBORGHINI



Trouble for "The Other" Commendatore?



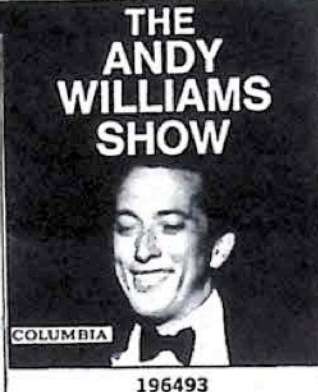





While Commendatore Enzo Ferrari — now a Fiat satellite — is coming back full blast on Formula 1 racing circuits (his cars won four of the season's five last Grand Prix), word has come from Sant'Agata Bolognese that "the other" Commendatore is in trouble. The "other" is Ferruccio Lamborghini, builder of what many consider the greatest sports cars on earth nowadays. Lamborghini made his money in agricultural tractors, heating equipment and air conditioning units, first building his cars as a hobby.

Insiders have it that the Commendatore might now be willing to sell out his auto division, and that Ford might be interested.

For the time being, Lamborghini is adding two new aisles to his buildings, nevertheless, in order to start construction of his latest baby, the P 250. Lamborghini became famous with a series of 12 cylinder jobs, the Miura, the Espada, and the Jarama. This one is slightly more economical, with a 2.5 liter V8 midship engine, producing in excess of 240 hp at 7800 rpm. Peak torque is 166 lb. ft. at 5750 rpm. The transmission is a five-speed. Like every other Lamborghini, the car was styled by Bertone as a luxurious four-seater, with a cruising speed in excess of 150 mph. Suspension uses MacPherson struts all round. The body is of integral construction with a platform chassis. Overall dimensions of the P 250 are: length 14 ft., width 5 ft. 11 in., and height 3 ft. 8 in. The wheel base is 8 ft. 11 in., and the tracks front and rear are 4 ft. 10 in. It easily rates a long with every other first class fighting bull ever put out by Lamborghini since he produced the first Miura in 1966.

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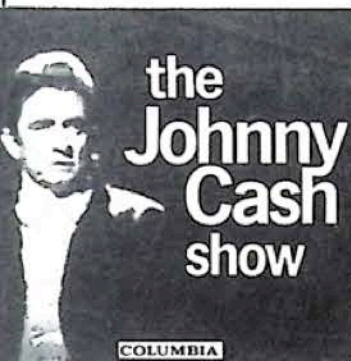
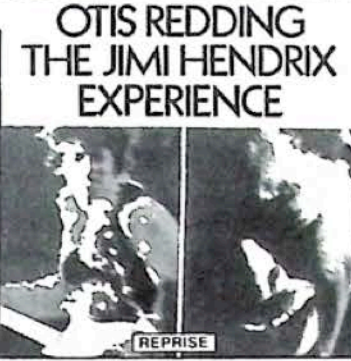
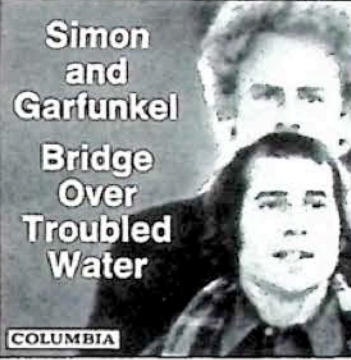
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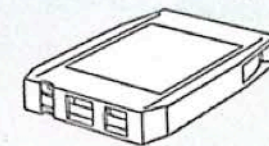
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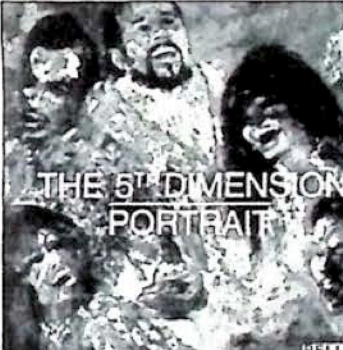
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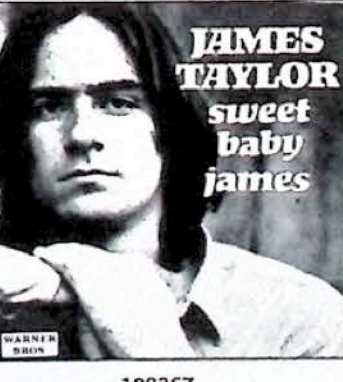
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Comparison: Volkswagen-Pinto-Vega

YOUR TARGET FOR TODAY: VOLKSWAGEN

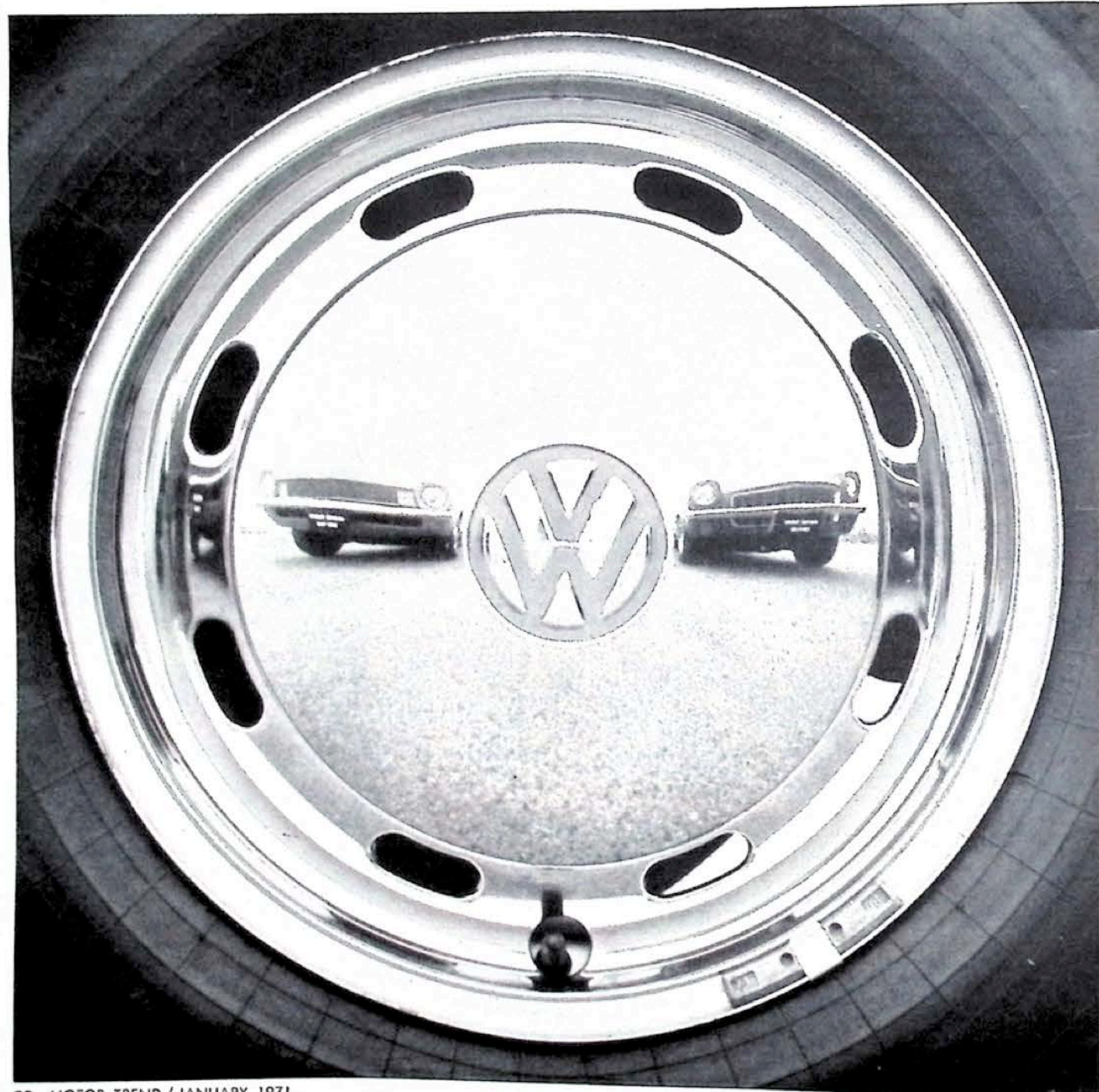
Two Car of The Year nominees take on the Car of the Decade.

By A.B. Shuman

That "Chevy and Ford Shoot At VW" cover blurb that got you to pluck this issue from the newsstand or sparked your interest when your subscription copy finally arrived or looked like it might be good for a laugh if you're reading this in a barber shop in June, was a little misleading. Actually, it should have read "Pinto Shoots at Both Vega and VW," for the two V-cars are miles apart, with the littlest Ford in the middle. To look at the cars, in terms of overall size, you'd probably argue that the two new U.S. subcompacts most

definitely fall into the turf currently dominated by VW (which "owns" 50 percent of the import car market), but the only thing Vega engineers were out gunning for as far as the Beetle is concerned was its fuel economy. True, the Vega 2300 (note the sly use of metric measures) is aimed at potential import car buyers, but not VW owners per se; price alone keeps it out of the Volks class. Further, by their own estimates, Vega marketeers project that only about 23 percent of Vega sales will be sedans, with the sportier-styled — and more ex-

pensive — coupes expected to account for 50 percent, the wagons for 24 percent, and the little panel trucks about 2 percent. The Pinto, on the other hand, is unmistakably, and unabashedly, aimed squarely at Beetle buyers, with a \$1,919 base price, only \$79 more than the Volkswagen's west coast price and \$172 less than the Vega's. And what about the Gremlin? That was a stop gap measure, albeit a clever one, which, despite its low cost (\$1,899 for the 2-passenger model, \$1,999 for the 4-passenger), inventive packaging and 6-



cylinder power, can't stand up to the total engineering of the Johnny-come-lately models.

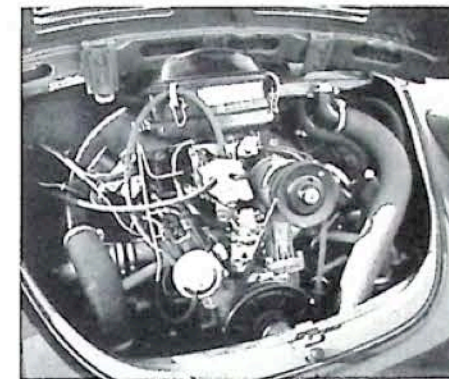
Because of its phenomenal sales success the Beetle has become the currently accepted standard when speaking of import/small cars. That is not to say it is the best or the best engineered; it is merely the most successful. A great deal of credit for this must be attributed to the sheer economics of owning a VW: initial cost is low, running and maintenance costs are low, and resale value is high. There of course have been other cars which were cheaper to buy and operate, but they lacked the quality in execution that typifies the finish of a VW. Even its detractors — and there are those who hate Volkswagens with a passion — grudgingly admit to that. "It's a ten-dollar car with a hundred-dollar paint job." It's not that simple, though.

Looking much the same as it did 35 years ago, when it was first put forth by the Third Reich's product planners as "the peoples' car," the Beetle has actually undergone hundreds of engineering and design changes and, while the earliest models brought into this country carried a 36-horsepower engine, an inconceivably low rating even by mid-'50's standards, the latest versions carry 60-horse mills that will chirp the tires on a fast shift to second gear. The shift linkage, too, has been improved, with the fulcrum moved higher, eliminating the old "klunk, klunk" action and even permitting full-throttle speed-shifts, for those so inclined. In terms of performance, this means sub-20-second quarter-mile acceleration times, a barrier heretofore as formidable as the granite face of Annapurna. The mid-range acceleration is still lacking, calling for good planning and a dash of derring-do (a generous supply of which is soon instilled in the neophyte VW owner) to make it on and off the freeway.

One of the truly significant changes this year is the incorporation of flow-through ventilation, detectable by the large half-moon-shaped vent just aft of each side window. VW explains that the half-moon has traditionally stood for ventilation in American folklore. Inside the car there are two chest level slots mounted atop the dash which direct ram air at the clavicles of the driver and front seat passenger. Flipping a small lever directs the flow against the base of the windshield, should you not desire a cold. To handle safety considerations, the sensuous dashboard control knobs are made of an eerie type of rubbery plastic that yields, fleshlike, to the touch. In contrast, the high-back bucket seats are quite firm, but the backs are adjustable. Engine noise continues to be an adverse characteristic, especially for rear seat passengers, and directional stability in gusty crosswinds will not win any award. The hand-operated vent windows are easy to work, but noisy, and, more important, because of the seating position and close-coupled accommodations, impair vision to the left. The car, itself, it goes without saying, is not suitable for claustrophobes, as it really is just a capsule, designed strictly to carry

its load of passengers from thither to yon, or wherever.

Beetlemanics will protest loudly that the car is more than that, that it is fun to drive. But the fun is of a sneaky, dirty type: the fun of cheating (the law, gravity, the cosmos). Then there's the question of handling. We had to settle that one for ourselves, under the controlled conditions of the road course at Orange County International Raceway, sweeping through the treacherous, off-camber, hairpin Turn Nine. As we shot down the long straightaway at 70 and I began downshifting, junior editor Wally Wyss (who recently bought an old VW body left over from a buggy-building project and has hopes of converting it into a small car suitable for commuting) was nervously clutching his clipboard and stop-watches and warning me that the rear wheels would tuck under and we'd flip. Out of deference to his



Beetle's air-cooled four has become standard of economy and reliability, is now rated at 60 hp. Aft location helps weight bias, provides more space for passengers.

wishes and pathetic whimpering, I stabbed the brakes, dropped it into second, just as we entered the turn, and we scooted around nicely at close to 40 mph, quite respectable for a VW. Body lean was only moderate, far less than expected, as the car took a set and held it all the way around, the rear end kicking out just slightly. We made a few more passes from both directions, kicking up the speed a little each time. At the limit, the front end began to slide to the outside of the turn, as happens with rear-engine cars, but lifting on the throttle and straightening the wheels stopped the sideways motion. "You know," said Wally brightly, "the Volkswagen can be pushed a lot harder than most people believe."

Stopping is also better than most people would believe. There's absolutely no wheelhop in a fully-locked-up panic stop from 60 mph, though the car does tend to veer to the right, requiring corrective steering. The distances required to bring a flying Beetle to a full halt, however, are well within the realm of respectability, fitting between the Pinto and the Vega.

Mention must also be made of Volkswagen's Medi-car program of automobile diagnosis and maintenance. It was

introduced in October of 1969 and has been improved and expanded since. When you buy a VW, you get not only a 24-month/24,000-mile warranty covering the entire car, unique in itself, but four free electronic diagnoses. The system is revolutionary in that it does away with the concept of preventative maintenance. There are certain items of mandatory maintenance, such as changing the oil, etc., but all the rest is left to the results of the electronic diagnoses, which are to be performed at 6,000-mile intervals. This way, each car is given only the servicing that it actually requires, resulting in lower costs for the typical driver.

Programs such as Medi-car, which augment an already relatively simple and trouble-free car, further build strong customer loyalty. For a new, untried car like the Pinto to move in and bring about defections seems to be an almost impossible task. But the base version, the one that comes closest to that all-important low price for the Beetle, has a lot going for it. First, and foremost, *it is really fun to drive*. More so than any other car I've driven. It's got rack and pinion steering, with terrific feel; a little 1,600cc Kent engine which, though actually slower than the Beetle in the quarter-mile, is more responsive at normal driving speeds (50-70 mph in 13.9 seconds, compared to 14.5) and delivers 24 mpg economy; a single-rail floor-shift four-speed trans that invites continuous up- and downshifting; and good handling. The Pinto, with coil spring front suspension and parallel leaf/staggered shock rear, exhibits what is referred to as final oversteer. Whipping it though that same hairpin at Orange County, it acted like a well-set-up dirt track car, the tail coming out quite nicely passing the apex of the turn, so that it was pointed practically straight ahead coming out of it. The only problem was that the car was completely wound-out in second gear at that point, robbing you of the flat-out blast of acceleration down the straight that's supposed to follow.

It may seem incongruous to speak in terms of "race car" handling when discussing a car supposedly designed for plain, old, uninteresting commuting, but that's what the Pinto exudes. There are some bad points, too, as might be expected. On hard deceleration there is extremely severe rear wheelhop. In our panic brake tests, the Pinto produced amazingly short stopping distances, coming to rest after one 60-mph pedal stomper in just 116.9 feet. But all is not rose; there is a strong pull to the left, requiring conscious counter-steering by the driver. Front disc brakes are an available option (at about \$32) that can further improve stopping distances, though the trouble is centered in the rear, in both the suspension and brakes which lock all too easily. In contrast to all this, recently released government figures on stopping distances for fully-loaded cars showed the 2-liter Pinto with disc brakes to be the best stopping car made in the U.S.

Overall, the car is quite well-designed. The "cute" shape — born out of the long hood/short deck school, of which the >>>



Left: Pinto's rack and pinion steering, handling, and 4-speed make it supreme fun to drive; Pinto owners even wave to each other. Rear brakes tend to lock in panic stop, however, resulting in sharp pull to the left. Above: Fit and finish of interior is on a very high level, but seats lack comfort for long trips. Car shown has the optional 3-speed automatic, requiring 2-liter engine; both standard equipment. Though not powered, ventilation is good.



Right: Is this the cause of all the furor? VW, with annual U.S. sales of about a half-million, accounting for 50% of the import trade, is weak in many areas, but delivers economical, reliable transportation and a high quality of finish, which is apparently what a lot of people want. Above: Interior is not flashy, but functional. Seats, shown with optional leatherette upholstery, are firm, but backs are adjustable. All controls are in easy reach of driver and all instrumentation is integrated into speedo face. The shift linkage has been greatly improved.



YOUR TARGET FOR TODAY

Gremlin must be considered the ultimate conclusion — covers what has to be the best interior space utilization in the industry. Currently there is just one body style available, the two-door sedan, but a three-door, with flip-up "tailgate," will be offered in late February. Price for the new model is expected to be about \$100 more than the standard version, but the fold-down rear seat, a \$36 option, will be included in the package. Normal luggage space is a minimal 5.6 cubic feet, but the fold-down seat increases this to a more usable 38 cubic feet.

Though nine inches lower than a Beetle, the Pinto is easier to enter and exit, thanks to extra-long (53-inch) doors, which swing open wider. The doors themselves are quite thin, making good use of the 8.4-inch greater width over the VW, despite the high degree of tumble home, as front seat hip room is three inches greater and shoulder room is up 6.6 inches. This chart will better illustrate the salient points. (To pacify avid Gremlin enthusiasts we will include figures for that marque as well.)

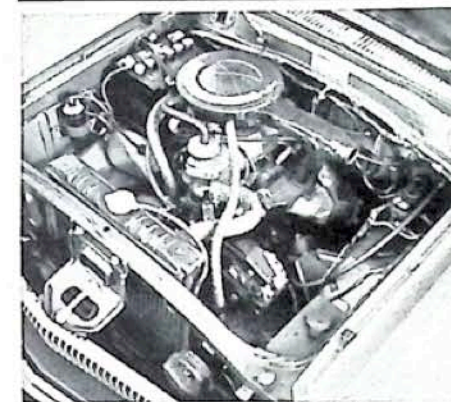
	Beetle	Pinto	Vega	Gremlin
Overall width:	6.10	69.4	65.4	70.6
Overall height:	59.1	50.1	51.9	51.8
Headroom, front:	39.1	37.5	38.3	37.8
Headroom, rear:	35.7	36.3	37.4	36.4
Legroom, front:	37.5	41.0	42.4	41.0
Legroom, rear:	34.5	31.7	33.2	29.0
Shoulder room, front:	45.9	52.5	51.6	54.9
Shoulder room, rear:	48.3	51.6	49.5	53.0
Hip room, front:	48.8	51.8	49.1	54.9
Hip room, rear:	51.2	44.3	42.5	53.0
Trunk capacity:	4.9	5.6	9.0	6.0

What the figures don't convey is just how big the rear seat area looks. There's a little visual trickery involved, because the seats are fairly shallow, and they afford a very low seating position, but compared to a Torino, or even a Galaxie, it looks like a big cavern back there. The quality of fit and finish of the interior and standard upholstery is also surprising... surprisingly good. The seat backs are thin, both in section and padding, so are not really suitable for long trips. Padding in the rear seatback is virtually non-existent, but the seating position causes the passenger to lean forward slightly, so he doesn't really miss it. Pinto engineers took a lead from VW in showing a lot of body metal on the inside of the doors, but the quality of the paint doesn't approach that of the exterior... or the Beetle, so the result looks a little cheap, especially with the exposed, unfinished welds where the top of the door frame meets the door sill.

Other details include a glove compartment, something the more expensive Vega lacks; three-point Uni-Lock seat belt and shoulder harness arrangement, about the most convenient system avail-

able in American cars; low-mounted, central seat back lock release levers, easily actuated by the driver to aid passengers getting into the rear seat; and standard bi-level ventilation system, with adjustable upper vents.

In normal driving the gearbox must be utilized to extract the full performance potential from the car. Shifting action is generally smooth and easy, but the gate between first-and-second and second-and-third sometimes gets in the way. The engine is fairly quiet, but the car itself is noisy at high speeds, with a noticeable resonance occurring at 50 mph. As speed increases to above 65 mph, noise also increases, and ride qualities on anything but smooth roads rapidly diminish. The car is exceptionally stable in crosswinds, better than most full-size cars. There is some chop-piness at moderate speeds over paved strips, and hard braking from cruising speeds produced vertical vibrations in the steering coming down through 40



Tiny, but tough, 1.6-liter 75 hp Kent engine is standard fare in Pinto. Cast iron 4 has seen service in variety of English Fords. New 100 hp OHC 2-liter is \$50 option.

mph. With over 3,170 square inches of glass, including the ventless side windows, visibility is generally good. Our car was equipped with the standard fixed rear side windows, but there is a flip-out option available which we recommend strictly because of the salutary effect it will have on the non-powered ventilation system.

The engine, rated at 75 horsepower, starts right up in cold weather, and is virtually like the Volkswagen in that it can be driven away without any warm-up. It does have a tendency to run-on (diesel) occasionally after the ignition has been shut-off, but this can be circumvented by setting the brake and shutting the engine off with the transmission in gear, simultaneously easing out the clutch.

The engine in the Vega is the strongest of the three: 140 cubic inches and 90 horsepower. Its carburetion seems to be set exceptionally lean, especially in the midrange, though its drag strip performances (18.33 seconds at 72.6 mph) will blow the doors off both the Pinto and the VW. Cold starting is difficult and the engine will not idle until warmed for several minutes. There was talk of

a change to the carburetion to richen it slightly in the cruising range, but this will probably have little effect on the cold start characteristics. Such is the price we pay for low HC emissions.

The engine in our test car was coupled to the optional Opel-supplied four-speed transmission (\$52.95), as base cars, for reasons of low sticker price, are fitted with a three-speed, also of Opel manufacture. There were quite a few other options on the car which we normally wouldn't want for a comparison test such as this, but with the strike still to be settled we had to take whatever we could get. So, we had the custom exterior, the custom interior (including adjustable front passenger seat, as the base Vega, just as the base Pinto, comes with a fixed passenger seat), bumper guards, clock, tinted glass, etc., all of which raised the total from \$2,091 to \$2,632.05, including \$99 for transportation. As Chevy p.r. men are quick to point out, the cost of a base Vega and a comparably-equipped Pinto are a lot closer than the \$172 disparity in starting prices. Things like the A78-13 tires that are standard on the Vega and cost an extra \$40 on the Pinto, or the front disc brakes. I guess it's all just a question of marketing philosophy. The thing is that there's really no excuse for not offering the four-speed as the standard transmission, as it really makes the car work.

When driving the Vega, even the unglamorous sedan, you get the feeling that you're really in a Camaro or a Nova. The fat steering wheel feels like a full-size car's (even oozes the same oily secretion when left in the sun), not like the skinny rims in the VW and Pinto. The radio antenna is imbedded in the windshield, just like the Camaro and its kin. There's an inside hood release, and powered flow-through ventilation, and foam-filled high-back bucket seats, side guard door beams, side terminal battery, just like the big cars. So, it's very difficult to keep it straight in your mind that you're testing a sub-compact, and you find yourself criticizing the lateral support in the seats, because they're not equal to the high cornering speeds attainable in the car. (The Vega approach to handling is at opposite poles to the Pinto's; the steering is slower and closer to neutral in cornering, with the car capable of sticking to the turn under higher "g" forces. The Pinto tends to hop sideways when cornering on rough surfaces, but equally front and rear, so you're always aimed in the same direction you started. Traction in the wet for both is another story, however, as the tires break loose easily. Caution is advised until you get the feel of the car.)

Although the Vega seats are more comfortable and the vinyl ventilated (with the custom interior), the Pinto interior has a higher finish quality. Such things as rough flashings remaining on the plastic inner window moldings and the way the various pieces fit together detract from the overall image. The aforementioned lack of a real glove compartment is also grating, though there are map pockets in each door panel and an open cubby hole in the dash (deleted when air conditioning is installed). >>>



Left: Carrying a higher base price than VW or Pinto, Vega has more standard equipment, but cursory shoppers may overlook this. Ford is reportedly relying on Maverick to blunt Vega sales. Above: Interior accommodations are more comfortable and quiet than "competition," but lack of a locking glove box is bad oversight. Optional 4-speed should be standard.

YOUR TARGET FOR TODAY

Where do you keep things like your registration? Since the basic body style will remain unchanged for four years, maybe the big breakthrough for 1972 will be an honest to goodness glove compartment.

The Vega, itself, is a very quiet car. The only major noise source is the engine and transmission, and, depending on your bent, that smooth humming may be music to your ears. Thanks to the use of external harmonic dampers, sonic reverberations do not become a factor until speeds of over 80 mph, and if you're driving that fast you deserve to get a little noise. Stock gearing in the sedan, with either the standard three-speed or the optional automatics, is 2:53.1. With the four-speed, it's 2:92.1, further adding to the car's acceleration capability, but still yielding a top speed of close to 100 mph. The four-speed is a pleasure to use; even the stock knob is just the right shape for the proper grip in going up or down through the gears. Unlike the Pinto-Cologne gearbox, which can sometimes get hung-up on a really fast shift, the Vega-Opel box has a reverse lockout that prevents such things. The four-speed, in reality, is a variation on a regular three-speed box, having another forward speed where reverse usually is and a sliding reverse idler gear which engages external teeth on the first-second synchronizer sleeve to provide reverse gear. It works nicely.

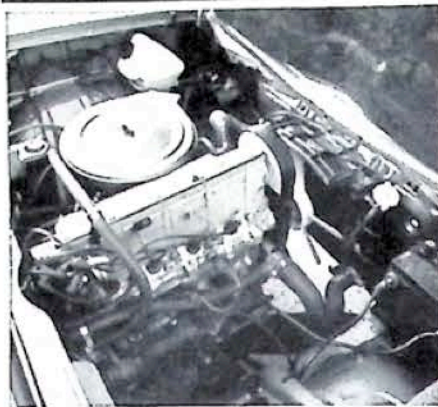
There's a lot of rubber in the car (though not as much as in the Toyota, which was the "bogey" as far as quietness, as that was considered too much), giving the doors a firm feel and sound (followed by a hissing as the air escapes from the seals) as you bring them closed. One place where the rubber seems to be overdone is in the rear suspension, as the Vega, like the VW and Pinto, exhibits quite a bit of wheelhop on high-rpm, high-power starts, such as we used during our acceleration tests.

This did not effect the braking tests, as there was no wheelhop encountered there. The tendency to pull to the right, which we found in the prototype cars we tested for the August issue, has been almost totally eliminated, with a slight trace, easily controlled by counter-steering, remaining. Even without making any corrections, there is no problem in keeping within your own driving lane. With its front disc brakes, the sedan has a very high initial deceleration force, but the optional wider A70-13 tires are needed to derive full potential.

Steering is light, but the ratio is slower than it should be. In order to get the fast 16:1 ratio it is necessary to order power steering and that is far from a satisfactory solution. The standard 22.4:1 ratio was chosen so that little grandmothers wouldn't have any trouble maneuvering fat-tired versions into tight parking spaces. There was some talk of an RPO 18.5:1 manual steering gear being offered for enthusiasts, but this plan has apparently been sidetracked. In addition to the slow ratio, the Vega front suspension is mounted in high-compliance rubber bushings, a factor

designed to compensate for the normal tendency of drivers to turn the wheels too sharply when first entering a curve, according to Vega engineers. The only time the effect of this can really be detected is under high crosswind conditions, when, again along with the standard steering ratio, it seems to complicate the job of maintaining directional stability. Pinto is far ahead here.

Although the coupe has more immediate appeal on a visceral level, the sedan soon grows on you. The greater interior headroom, especially in the rear, and the large amount of glass (3,635 square inches, compared to 3,550 in the coupe and less than 3,200 in the Pinto) provides excellent all-around visibility.



New and radical, die cast aluminum Vega engine has iron head but no cylinder liners. Standard 90 hp model pulls good torque from 2300cc displacement.

There are a few things we don't like: the giant gaps in the body panels, especially around the hood; the mechanism for holding the hood open is located on the passenger's side of the car, when it would seem to make more sense on the driver's side. In addition, it appears fragile enough that an unwitting gas station attendant could snap it by trying to close the hood without releasing it. The belts and harnesses represent a hopeless tangle of webbing and buckles, and the outboard halves of the seat belts invariably lodge themselves in the space between the seat and the door. The seat back lock release levers are flimsy and inconveniently located. The door lock buttons should be placed further ahead on the doors to make them easier to operate from either seat. These are by no means gripes of a major nature, but we hope that they will seriously be looked at by the Vega engineering team.

How do the Pinto and Vega stack up against the standard of the Beetle? In most respects very well. VW still has the lead in quality of finish, low cost, and top-notch servicing. In addition, it's got more power and performance, improved shifting, handling, and braking, flow-through ventilation, and more importantly, a bigger version, the Super Beetle, with MacPherson strut front suspension and more luggage space, for less than \$150 more than the standard Beetle.

The Pinto has the greatest chance of

breaking into this market, competing successfully not only with the Volkswagen, but the Toyota, Datsun, and all the other Japanese cars heading our way, which loom as a more important threat to domestic sales. Out of the box, just as it comes, with four-speed and 1,600cc engine, it is a ball to drive, ideally suited for the job of a commuter-car. For use on long trips, it lacks the luggage space, seating comfort, and quietness required. The standard brakes tend to lock up in a hard braking situation, usually causing a rapid change in direction. That is one thing that has to be fixed. (This same characteristic was encountered in varying degrees in three different Pinto's which I've driven.) The space utilization and overall fit and finish of the interior, dash, and upholstery is quite good by any standards, but it would be a nice idea to at least put recommended shift points on the speedometer in lieu of a tachometer. The three-door model will give the Pinto a good hedge against sales losses to the Vega line-up, although styling more than utility is expected to sell the hatchback coupe. At only \$50 additional the 2-liter/100 horsepower engine option is expected to be popular, probably going into the majority of Pintos sold, and mandatory when the automatic trans or air conditioning is ordered. In my own view, having driven both 1.6 and 2-liter Pintos, I'd have to say that the smaller engine is really quite adequate and, because you have to use the gearbox to optimize performance, more fun... and really all you need in urban areas. However, in hilly country, the 2-liter is obviously the way to go.

The Vega, while enjoyable to drive, is a more serious car. It's faster, more comfortable, quieter, and better riding than either the Pinto or VW, while still delivering respectable fuel economy. It carries a higher base price, but includes a lot more standard equipment than the others, some of which is part of the basic structure and isn't even available optionally on the lower-priced cars. It ranks third as far as quality of finish, but is still on a high level. The minor details are where the greatest shortcomings exist. One wonders, though, what market it is really aimed at, as it is sure to hurt both Nova and Camaro sales to some degree. The import buyers Chevy is hoping to attract may be a little too finicky, or spoiled by the interior finish of the foreign cars, to settle for the "American look" of the Vega interior, centrally-mounted handbrake and internationally-marked control knobs notwithstanding. The Vega plant at Lordstown, Ohio, has the quality control apparatus and wherewithal to perfect all the construction details. The only question is, "Will they?"

So, VW still has the edge, economically speaking, but the Pinto and Vega offer alternatives that are stronger in many areas, especially those held dear by those to whom a car is more than just point A to point B transportation. But, for the non-enthusiasts, those desiring to have the simplest, least expensive transportation, the VW will continue to be the answer. MT



VW BEETLE
Base price (West Coast POE) .. \$1,840.00
AM radio .. 64.95
Leatherette upholstery .. 35.00
Invoice .. \$1,939.95



PINTO TWO-DOOR SEDAN
Base price .. \$1,919.00
Transportation .. 115.00
A78-13 tires .. 40.00
AM radio .. 61.00
Protection group .. 60.00
Invoice .. \$2,195.00



VEGA SEDAN
Base Price .. \$2,091.00
Transportation .. 99.00
Custom exterior .. 79.40
Custom interior .. 125.95
Bumper guards .. 23.30
Electric clock .. 14.55
Tinted glass .. 37.05
AM radio .. 61.15
Four-speed transmission .. 52.95
Invoice .. \$2,584.35

SPECIFICATIONS	MOTOR TREND SPECIFICATION DATA		
	VOLKSWAGEN BEETLE	PINTO	VEGA SEDAN
Engine:	OHV Horizontally opposed 4	OHV, Inline 4	SOHC, Inline 4
Bore & Stroke - ins.	3.36 x 2.72	3.19 x 3.06	3.50 x 3.625
Displacement - cu. in.	96.7 (1,584 cc)	97.6 (1,600cc)	140 (2,300cc)
HP @ RPM	60 @ 4,400	75 @ 5,000	90 @ 4,800
Torque: lbs.-ft. @ rpm	81.7 @ 3,000	96 @ 3,000	136 @ 2,400
Compression Ratio/Fuel	7.5:1/Regular	8.4:1/Regular	8.0:1/Regular
Carburetion	single 1-bbl	single 1-bbl	single 1-bbl
Transmission	4-spd, synchro	4-spd, synchro	4-spd, synchro
Final Drive Ratio	4.125:1	3.55:1	2.92:1
Steering Type	Worm and roller	Rack and pinion	Recirculating ball
Steering Ratio	19.0:1	22.1:1	22.8:1
Turning Diameter (Curb-to-curb-ft.)	36.0 ft.	31.7 ft.	33.0-ft.
Wheel Turns (lock-to-lock)	3.0	4.2	4.4
Tire Size	5.60-15	A78-13	A78-13
Brakes	Drum	Drum	Disc/Drum
Front Suspension	Independent, Torsion bar	Independent, coil	Independent, coil
Rear Suspension	Independent, Torsion bar	Parallel leaf	Link-and-coil
Body/Frame Construction	Semi-Unitized	Unitized	Unitized
Wheelbase - ins.	94.5	94.0	97.0
Overall Length - ins.	158.6	163.0	169.7
Width - ins.	61.0	69.4	65.4
Height - ins.	59.1	50.1	51.9
Front Track - ins.	51.6	55.0	55.1
Rear Track - ins.	53.3	55.0	54.1
Curb Weight - lbs.	1872	2030	2202
Fuel Capacity - gals.	10.6	11.0	11.0
Oil capacity - pints	5.3	7	8
PERFORMANCE	VOLKSWAGEN BEETLE	PINTO	VEGA
Acceleration 0-30 mph	4.5 secs.	4.5 secs.	4.3 secs.
0-45 mph	8.7 secs.	9.0 secs.	7.7 secs.
0-60 mph	16.0 secs.	16.2 secs.	13.5 secs.
0-75	36.3 secs.	32.9 secs.	22.3 secs.
Standing Start 1/4-mile Mph	65.0 mph	66.0 mph	72.6 mph
Elapsed time	19.8 secs.	19.9 secs.	18.3 secs.
Passing speeds 40-60 mph	9.1 secs.	9.3 secs.	7.0 secs.
50-70 mph	14.5 secs.	13.9 secs.	10.0 secs.
Speeds in gears			
1st ... mph @ rpm	24 @ 5,000	27 @ 5,000	34 @ 5,000
2nd ... mph @ rpm	45 @ 5,000	50 @ 5,000	55 @ 5,000
3rd ... mph @ rpm	72 @ 5,000	73 @ 5,000	84 @ 5,000
4th ... mph @ rpm	75 @ 3,700	78 @ 3,900	82 @ 3,500
Mph per 1000 rpm (in top gear)	20.2 mph	20 mph	23.4 mph
Stopping distances			
From 30 mph	28.6 ft.	26.4 ft.	28.7 ft.
From 60 mph	128.2 ft.	120.2 ft.	131.1 ft.
Stability	Fair, no wheelhop, pulled right	Poor, severe wheelhop, pulled left	Good, no wheelhop, slight pull to right
Gas mileage range	25.3 mpg	24.1 mpg	23.6 mpg
Speedometer error			
Electric speedometer	30 45 50 60 70	30 45 50 60 70	30 45 50 60 70 80
Car speedometer	32 48 54 63 72	31 46.5 50.5 60.5 70.5	30 45 50 60 69 80

The Capricious Citroën



The Citroën tradition for the untraditional moves ahead — on 60 cubic inches/By John Lamm

It was lunch period at the Montlhéry press day and, as at the American car previews, that's the secret time to drive all the best cars to your heart's content. We'd already spent a day tossing all the French cars, the Chryslers, Peugeots, Matras, Renaults and Citroëns, around this ancient road course and most everyone had taken his leave to try the cheese and wine of a nearby restaurant, but I stayed because I still hadn't tried the Renault Gordini or that new Citroën GS.

I had first seen the GS at the Citroën showroom on the Champs Elysee, where it resided between a new ancient-looking IDI9 and prestigious new Maserati-powered SM. I was sincerely shocked when Edouard Seidler, our European editor, lifted the rear deck panel to expose a huge, 15.25 cubic foot square-shaped trunk, with no protrusions (the spare is under the body). I couldn't even find enough luggage to fill that gaping cavern. The finish was very good for a car in its price class (about equivalent to intermediates in our price structure) and it seemed like a very "nice" car. Then (at Montlhéry) I got a chance to drive it.

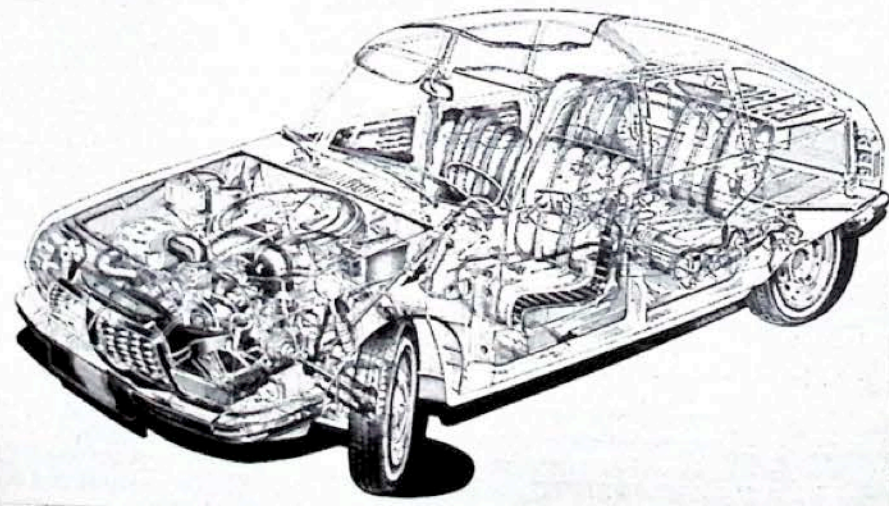
Of course Citroën couldn't just put together a dashboard; they had to innovate right from the start. There is the Citroën single-stroke steering wheel and a rather normal acting shift lever. The emergency brake is a hefty pull-on, twist-to-release affair right in the middle of the dashboard, and the speedometer a yellow-tinted, TV-shaped screen in the middle of the dash. The numbers roll around to indicate your speed, much like those compasses everyone used to put in his car. The tach looks as if it were designed after the engine's

acceleration curve and brightly arches up from left to right, redlining at 6,000 rpm. Turn signals, windshield wiper/washer, and light controls are on stalks sprouting from the dash within easy reach of the driver's hands while still on the wheel. There's a small clock, a fuel gauge, an ammeter, and battery of warning lights. The whole thing is done, like all French cars, in plastic. The seats, again like all French cars, were made to be sat in — very comfortable and in the Citroën style.

But then came the chance to drive it. I knew the car had an alloy four-cylinder opposed engine that had a camshaft in each bank and was air-cooled. As seems to be the practice in France, it was front-wheel-drive. While there was no way to measure acceleration, the entrance to the track was on to a long straight, so I had a chance to wring the car out and accelerated relatively evenly with a Peugeot 304 that followed me out. In a surprisingly short distance, I was cruising at 120 kilometers per hour

(74.5 mph) and bearing down on a haybale chicane set up near the end of the straight in an attempt to keep us mad journalists alive. With the 4-wheel disc brakes (the fronts are inboard), stopping was quick and steady — no pulling or slop. After the chicane, you go through a long dip and then down to a left hander. The interesting point being that like so many of the French cars I drove, the GS was not as blatantly front-wheel-drive as one would expect. You can't do any power-on broadsliding, but at anything less than hard, very serious driving, you are surprisingly unaware where the power is put to the ground. Of course, it helps to have Citroën's famous hydropneumatic suspension, but the vicious understeer of earlier fwd cars almost had to be purposely induced to be a problem. It's the fine handling of cars like this that make one understand why so many French are concerned that new speed limits and expanded freeways will destroy the fine suspensions that are usually found on their cars.

The real surprise came when I finished my laps, pitted, and found out that the GS's engine was only a 1-liter unit (61 cubic inches), with 61 SAE hp. I was convinced that it had to have been larger, because of the ease with which it reached and maintained 120 kph. That shows what high gasoline prices and a tax on engine displacement will force an automobile manufacturer to do with that one liter, and, in fact, with an entire car. We Americans will probably do even better, because when the car is finally imported to the U.S. sometime next year, it will most likely have a still larger engine. /MT



It takes guts to cut car prices* when others are raising theirs. Jeep guts.

***Now some of our list prices are even less than last year!**

We want to sell more Jeep vehicles in 1971. A lot more. And we're ready to take some strong measures to accomplish this.

Like cut prices. We've taken some of our most popular models and slashed prices down from last year. And we've taken other models and held back increases to a bare minimum.

As a result, the Jeep Universal equipped with our powerful V-6 engine option has a total list price which is \$93 less than last year. That's right, \$93 less.

The prices of the Jeep Gladiator pick-up trucks

have been chopped \$100 to \$110.* And that's not peanuts — especially when the list prices of other competitive pick-up trucks have been raised as much as \$200 to \$300.* And this price reduction goes for every single Gladiator model.

The Jeepster Commando price increase has been held to a bare minimum.* Now it's ready to take on Blazer, Bronco and Scout. Head on. And the same goes for the Jeep Wagoneer.

THE TOUGHEST 4-LETTER WORD ON WHEELS.

Jeep
Products from American Motors

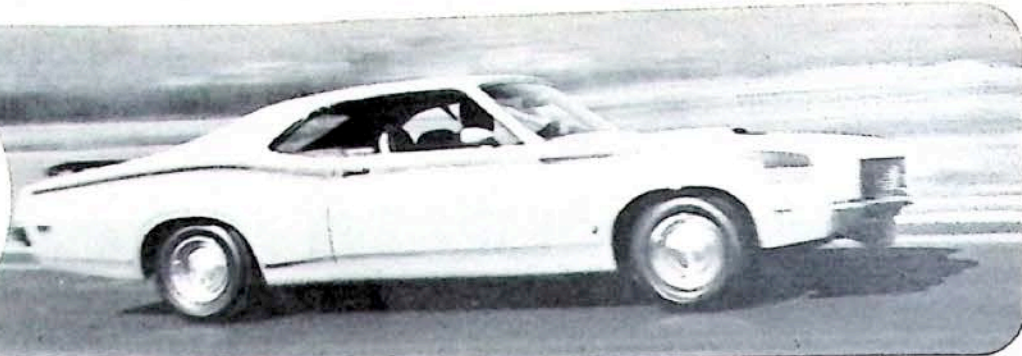


It's priced* to insure its place as the vehicle that outsells all other 4-wheel drive family wagons combined.

And they're all still the same durable 4-wheel drive vehicles that are imitated around the world. With the same rugged Jeep construction. And the same well-earned "go anywhere, do anything" reputation.

What it comes down to is this. We're doing our best to hold the line on new car prices.* And that takes guts. Especially with inflation rearing its ugly head. But that's what it takes to get the job done. Guts. Jeep guts.

*Manufacturer's suggested retail price
MOTOR TREND / JANUARY 1971 29



HOW TO BUY YOUR NEW MONTEGO

They used to call 'em Mercs back in the '50s. And there was only one body size. Now there are three, Mercury, Montego, and Comet. The Montego superseded the Comet when compacts become unfashionable in the late '60s, but now they're back in vogue so you have both. Which, for the first time in memory, is something GM middle-range marques don't have. Yet, we digress.

A Montego may be a foot smaller than the big "Ms" but it offers everything its larger brothers do and more, — including performance and luxury models, and even wagons.

The "budget" model is just called Montego, but it doesn't skimp on a thing. It's available in both a two-door hardtop and a four-door sedan and easily transports six people. The standard Montego six is a 145-hp 250 cu. in. mill that burns regular fuel, though we prefer V8s in anything this large.

Mercury climbs the luxury ladder with the MX model, offering more sound insulation and more bright trim. The MX series even has its own luxury model, the Brougham, available in a two-door or four-door hardtop, and a sedan or a Villager wagon. The Brougham's main attraction is rich brocade-cloth and simulated wood.

While Mercury enjoys a strong trade in cars for the family man, they haven't abandoned the bachelor market. That's why they offer the Cyclone series. The basic Cyclone starts out with the 285-hp 351 4-barrel V8, F70 x 14 wide ovals, a 3.25:1 rear axle ratio, and a "Cross

Country Ride Package," consisting of heavy-duty shocks fore and aft and a .85-in. diameter front stabilizer bar.

If the stock Cyclone is a little too performancey for you, then the Cyclone GT might be the answer. This Cyclone is a little dressier, with hidden headlights and different trim than the basic Cyclone, but it has a lower-powered two-barrel V8 and an automatic transmission standard with a 2.75:1 rear axle ratio. The Cross Country Ride Package is a yours-if-you-want-it item.

One of the freebies with the GT and Spoiler packages is the Instrumentation Group — a tach, an ammeter, oil pressure and water temp gauges. If you like to know what's going on under the hood, we strongly recommend this package, optional on other Cyclones.

Where can you go from the Cyclone GT? To the Cyclone Spoiler. Like the basic Cyclone, it totes the 4-barrel 351 and a Hurst-assisted four-speed but it also packs Mercury's Traction-Lok differential with its 3.25:1 rear gear. Naturally, it has the Cross Country Ride Package and, with a name like Spoiler, it runs both the front "chin whisker" air dam and the rear "surfboard."

While the 285-hp 351 4-barrel "Cleveland" V8 is a hefty puller, Mercury's real "bargain" performance engine for '71 is the 330-hp "Boss" 351 four-barrel V8. This power-plant might be regarded as the product of a union between the late, lamented Boss 302 and the still thriving 429 C.J., mainly because of its "Little Boss" features, like deep breathing induced by giant valves —

canted to favor maximum flow — and the strong bottom end, with its widened main-bearing caps and broader bearing support. The intake manifold is aluminum and the carb a new Autolite 4-throat which flows 750 cfm. Appropriately, Mercury requires that you order a 4-speed with this high-winder.

The 429 C.J. Montego's ultimate engine offering is a further development of the high performance engine they first introduced in '69. Rated at 370 hp, it boasts large valves, a high-rise large port intake manifold, a high-lift cam and header-styled exhaust manifolds, plus a 750 cfm Rochester four-barrel. Order the "CJ" and Ford sets up the suspension for heavy-duty, adds an 80-ampere battery, a 55-amp alternator and dual exhausts.

Mercury for '71 is de-emphasizing their performance a bit, which means you've got to dig around a bit to find the good parts. You can still order the Traction-Lok limited slip differential on all the Montegos, though to get last year's "No-Slip" Detroit Locker differential you have to order last year's and have it dealer-installed.

Offering a model for every taste, from the budget-minded to luxury lovers to performance buffs, Mercury has the intermediate class well-covered, if not surrounded. To make choosing what's right for you a little easier, we've grouped what we recommend for each type of buyer at the right. If you'd rather "free lance" your Merc, we've got an engine chart and a parts list. Go to it. /MT



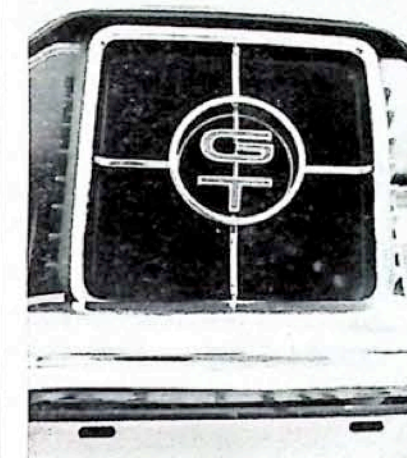
1971 MONTEGO POWER TEAMS

ENGINES	TRANSMISSION AVAILABLE	TORQUE	CARBURETION	COMPRESSION RATIO	FUEL REQUIRED	REAR AXLE RATIO
145-hp 250 6-Cylinder Hydraulic valve lifters	Manual 3-speed or automatic	232 @ 1600	Single-barrel	9.0	Regular	2.79 or 3.00
210-hp 302 V8 Hydraulic valve lifters	Manual 3-speed or automatic	296 @ 2600	Two-barrel	9.0	Regular	2.79 or 3.00
240-hp 351 V8 Hydraulic valve lifters	Automatic only	350 @ 2600	Two-barrel	9.0	Regular	2.75, 3.00 or 3.25
285-hp 351 V8 Hydraulic valve lifters	Manual 4-speed or automatic	370 @ 3400	Four-barrel	10.7	Premium	2.75, 3.00, 3.25, 3.50
330-hp 351 HO V8 Hydraulic valve lifters	Manual 4-speed only	370 @ 4000	Four-barrel	11.7	Premium	3.25 or 3.50
370-hp 429 CJ V8 Hydraulic valve lifters	Manual 4-speed or automatic	450 @ 3400	Four-barrel	11.3	Premium	3.25 or 3.50

FROM MERCURY'S HARD PARTS BOX

Cross-Country Ride Package
Heavy-duty springs
1-in. heavy duty shocks
.85-in. front stabilizer bar

Competition Handling Package
(available with 429 CJ only)
Extra-heavy duty springs
1-3/16 in. shocks
.95-in front stabilizer bar



ECONOMY

We would recommend the plain Montego, add the optional 210-hp 302 V8 with the automatic trans and spec the 2.79 rear axle ratio. Add power steering.

LUXURY

With a name like Brougham, you're bound to get comfort. We'd order the Brougham with the 285-hp 351 V8, add the 3.25 rear end ratio and all the options we could find, including air, a tilt steering wheel, and full power.

STREET PERFORMANCE

The 330-hp 351, whether it's called the "Boss" or "HO," would be our choice for an excellent street/strip combo. We would add a 4-speed, Traction-Lok and the Cross Country Ride package and the rear stabilizer bar from the Police Package. Be sure to spec the Instrumentation Group.

TRACK PERFORMANCE

Here's where foot-pounds of torque lead us naturally to the 370-hp 429 CJ which we would order with Ram Air Induction, the Instrumentation Group, Traction-Lok, and G70 x 14 treads.

MONTEGO RACING PARTS

The following are available from Mercury dealers as service parts. Many of them are listed under their '70 part numbers but will fit '71 models.

Name	Quantity	Part No.
Spoilers		
Front Spoiler	1	DOGY65001A74A
Rear Spoiler	1	D1GY6544210A
351 Mods		
Autolite 600 CFM Carb	1	C8AZ-9510-AD
Aluminum hi-rise manifold	1	C90Z-9424-E
Spacer	1	C2AZ-9A589-E
Air Cleaner	1	C5ZZ-9600-W
Steel core wiring kit	1	C40Z-12259-C
Radio Static suppression kit (for street use of steel wire)	1	C4AZ-18827-A
Rear Stabilizer Bar (Police Package)		
Bar	1	D00Z5A772-A
Insulators	4	D00Z5493C
Spacers	2	D00Z5A486-A
Brackets	4	D00Z5486-B
Brackets	2	D00Z5E494-A
Non-Slip Drag-Racing Rear Axles		
Detroit Locker	1	C3AZ4880-B
3.91 gear	1	C80Z4209-A
4.11 gear	1	B7AZ4209-K
4.30 gear	1	C80Z4209-D

Mustang — America's best selling sporty compact car — is even more sports and luxury oriented for 1971. The most changed Mustang since the original, it is built to a design reminiscent of the most expensive personal sports cars. The long-hood, short-deck styling is continued, but with more flair and more look of performance than it ever had before.

This is how Ford describes the 1971 Mustang. If it were true, they would have the hottest selling car since, well, since 1964, when the first Mustang was introduced. Unfortunately it is only half true. Yes, the car does have the luxury and performance flair and it does look good. It is changed—in some places even for the good—but sporty, compact and personal? Somehow these terms don't ring true with the Mustang. After all, a car which sells in the hundreds of thousands can hardly be called "personal." That's about as personal as junk mail advertising sent to "occupant." And, can a car with a 109-inch wheelbase, 189.5-inch length, 50.5-inch height and a 39.8-foot turning diameter be "sporty and compact"? With measurements like those, it would be better off singing lead soprano in a Wagnerian opera.

But then all personal, compact, sporty cars have gone the same route, so you can't really criticize the Mustang too much. Besides, there are some developments which deserve note. Among them is the availability of the Boss 351 Mustang with the "Cleveland" 351-4v HO (for High Output) engine. It is strictly a performance car and as such, does its job quite well.

The engine is a derivative of the former 302-4v HO powerplant and has been designed for growth in displacement size. The cylinder block decks are one inch taller than

those in the 302 and, to match the increased stroke of the 351, the cylinders have been lengthened by .46-inch. To insure low oil consumption and good ring seating for crankcase emission control, the piston rings are kept square with the 4.00-inch bore by grinding the ring surface to a vertical configuration rather than to the normal convex design. Since the engine is a high performance option, the cylinder heads have larger oval ports to increase the flow of the air/fuel mixture, thereby providing greater power output. The pistons used in the HO version of the 351 are extruded aluminum—for the increased strength needed in a high performance engine. A further development taken from the 302 is a canted valve train arrangement which allows a smoother port design and optimum flow characteristics, while the sil-chrome and stainless steel valves, driven by a mechanical cam, are spaced far apart in the chamber and alternated to provide more efficient cooling.

Fuel is supplied to the engine through a four-venturi spread-bore carburetor which gives excellent throttle response. The carburetor has a maximum breathing capacity of 750 cfm, small, 1.56-inch, primary bores to insure a good fuel/air mixture when the throttle is first engaged and 1.96-inch secondaries which take over when extra power is needed for passing and quick acceleration.

All of this creates an engine which produces 330 hp at 5,400 rpm and 370 lbs-ft. of torque at 4,000 rpm. Naturally, with this setup you can't expect good economy and our test Boss 351 registered fuel consumption figures averaging 9.2 mpg. However, equipped with a 4-speed transmission and Hurst shift linkage, the standard 3.91:1 rear axle ratio and a non-stock header system, straight line performance excelled with a quarter-mile time of 13.8 seconds and 104.0 mph.

And performance is the Boss 351's strong point. Unfortunately, the Hurst shifter is good only for drag racing application since it is darn near impossible to down shift with any speed. Nevertheless, the car does handle well in the corners. Ford has seen to this by developing a competition-type suspension. It is composed of an independent frontal arrangement of coil springs and hydraulic shock absorbers and a live axle in the rear with leaf springs and staggered shocks to reduce wheelhop. Front and rear stabilizer bars have been added to keep body roll to a minimum, and lateral stability has been improved by increasing the wheel track to 61.5 inches up front and 61 in back. This gives the car basic understeer characteristics, but it can be induced into a controllable oversteering attitude at will.

One negative note on handling is an undue amount of wheelhop, despite the staggered shocks, encountered when exiting a corner and applying the throttle. This smooths itself out once the car is pointed straight and does not really affect the established line through a corner. It is, however, a somewhat unsettling sensation to experience.

Braking is accomplished through a power front disc/rear drum arrangement with the discs having a rotor diameter of 11.29 inches and the drums measuring 10 inches. With the standard F60 x 15 tires, the brakes took firm hold upon application and brought the car to a swift halt, 116.5 feet from 60 mph. But, the automobile also had a tendency to swing right at angles up to 45 degrees in panic stops.

Since the Boss 351 is a performance machine, there is no point in belaboring the sad lack of trunk space and room for rear seat passengers. People who purchase a car such as this do not really care about those things. However, driver comfort is extremely important in an automobile like

the Boss 351 and Ford could definitely stand to make some improvements here. Front seat room just is not adequate since FoMoCo, like all domestic auto makers, is still stuck in the average-driver-is-5 feet 10 inches-tall rut and refuses to allow enough seat travel for those of us who might be taller. This could be partially solved by at least offering tilting seats to allow more arm room, but as it is you must sit in an almost upright position with elbows tucked in close to the body for what is becoming a Detroit gothic: hands draped over the steering wheel like a dog begging at the supper table. The position is made even more uncomfortable by over elevated foot pedals which decrease the amount of leg support afforded by the seat cushions. And, if you have long lower extremities, you often discover that the turn signal can be activated by the knee cap while operating the clutch. Also, improper spacing of the brake and throttle controls make heel-and-toe driving next to impossible, another detraction from the car's cornering capabilities.

Considering the nature of the Boss 351, interior noise level was low. With the non-stock headers, engine noise did fill the riding compartment but it sounded so good that you could not really complain. However, engine and road vibrations were transmitted through the steering column to the driver and after a while this did become rather discomforting.

This brings us to the next step in our three-car test, the Mach I with a 429-4v CJ engine. Although also a high performance machine, the Mach I does incorporate some luxury items such as air conditioning (with 3.25:1 rear end only) and an automatic transmission. It is a decent mixture for those who want good performance and some comfort,

Range War

PHOTOGRAPHY: FRED ENKE



With a flat SportsRoof, Mustang's Mach I has the flair of Europe's great road cars, but the style and price of an American automobile.

There's trouble back at the ranch: nesters and sheepherders have moved in, and the lush pony car country that Mustang first discovered in '64 and ruled until this year now resembles a sprawling subdivision. But there are new foals in the Ford corral, with Maserati-inspired styling and a remuda of engines — the 302, 351 HO, and 429 CP. / By Chuck Kock



Mustang's hardtop, while not having the drama of the SportsRoof, retains the long-hood, short-deck style which made pony cars popular.

Range War

but it still remains a little unwieldy for city traffic.

The heart of the Mustang Mach I is the 429 CJ engine with the ram-air option and NASA-type hood, also used on the Boss 351. The engine is an offshoot of the 429-4v motor which powers the Thunderbird and produces 370 hp at 5,400 rpm. It has a cast iron block and cylinder heads, while the crankshaft is nodular cast iron alloy. Pistons are tin plated cast aluminum alloy with steel struts. The connecting rods are forged steel with pressed-in wrist pins and the bore/stroke is 4.362 x 3.59 inches.

Unlike the Super Cobra Jet version, the test Mach I had standard hydraulic lifters with the camshaft made of special alloy cast iron. As in the Boss 351, the sil-chrome and steel valves are canted and head diameters measure 2.248 inches for the intakes and 1.728 for the exhaust. Fuel is fed to the engine through a 4-barrel carburetor which has a maximum breathing capacity of 700 cfm with 1.38-inch primaries and 2.25-inch secondaries. Designed to run on premium gasoline, the 429 CJ has an 11.3:1 compression ratio and delivers 450 lbs.-ft. of torque at 3,400 rpm. While straight line performance, 14.61 in the quarter at 96.8 mph, was off from the Boss 351's marks, fuel economy improved to 10.6 mpg.

Handling characteristics are much the same as with the Boss 351, as they should be, since the Mach I is outfitted with the identical suspension system. Marked differences were the absence of wheelhop under full throttle acceleration, perhaps due to differing road surfaces over which

the cars were driven, a slower steering response from the power unit with a 17.5:1 ratio in the recirculating ball system, and a slight increase in body roll. Downshifting for corners was also easier in the Mach I due to an extremely smooth-acting automatic transmission which slipped into gear when the driver moved the lever, not after the normal hesitation period. Movement of the lever, however, was somewhat restricted by an overly high mounted center console glove box, which served equally as an armrest and obstacle.

Also shared with the Boss 351 is the front power disc/rear drum braking system and here wheelhop reared its ugly skid mark, although the car still halted in a good 135.7 feet from 60 mph. In addition to the wheelhop, a full right lock on the steering wheel was needed to keep the swing out angle to a respectable 25 degrees.

Interior comfort was a little more in evidence with the Mach I, although it too featured the same cramped driving position. Its dashboard design is a duplicate of the Boss 351's with two huge dials placed in front of the driver—a tachometer (without a redline, an obvious oversight) and speedometer. Above the console are gauges for battery charge, oil pressure and engine temperature. The air conditioner worked quietly and efficiently and with the windows rolled up there was little evidence of engine or road noise, leaving the passengers free to enjoy the excellent AM/FM stereo radio. Generally, the Mach I is a pleasant, although maybe not relaxing car to drive.

For the "let's go to the market" car there is the Mustang hardtop powered by a 302-2v V8 engine. It is a sensible machine with enough power to get the kids to school and sufficient economy to have something left over for food at

continued on page 36



MOTOR TREND SPECIFICATION DATA

SPECIFICATIONS	MUSTANG BOSS 351	MUSTANG MACH I	MUSTANG HARDTOP
Engine:	90° V-8 OHV	90° V-8 OHV	90° V-8 OHV
Bore & Stroke — ins.	4.00 x 3.50 in.	4.36 x 3.69 in.	4.00 x 3.00 in.
Displacement — cu. in.	351	429	302
HP @ RPM	330 @ 5400	370 @ 5400	220 @ 4600
Torque: lbs.-ft. @ rpm	370 @ 4000	450 @ 3400	300 @ 2600
Compression Ratio	11.0:1	11.3:1	9.0:1
Carburetion	1 4-bbl.	1 4-bbl.	1 2-bbl.
Transmission	4-speed	automatic	automatic
Final Drive Ratio	3.91:1	3.25:1	2.79:1
Steering Type	recirculating ball	recirculating ball	recirculating ball
Steering Ratio	16:1	17.5:1	17.5:1
Turning Diameter (Curb-to-curb-ft.)	39.8 ft.	39.8 ft.	39.8 ft.
Wheel Turns (lock-to-lock)	3.40	3.4	3.4
Tire size	F60 x 15	F60 x 15	F70 x 14
Brakes	disc/drum	disc/drum	disc/drum
Front Suspension	Independent, coil springs, shocks, stabilizer bar	Independent, coil springs, shocks, stabilizer bar	Independent, coil springs, hydraulic shocks
Rear Suspension	Live axle, leaf springs, stabilizer bar, shocks	Live axle, semi-elliptic leaf springs, stocks	Live axle, semi-elliptic leaf springs, shocks
Body/Frame Construction	Unitized	Unitized	Unitized
Wheelbase — ins.	109.0	109.0	109.0
Overall Length — ins.	189.5	189.5	189.5
Width — ins.	74.1	74.1	74.1
Height — ins.	50.1	50.1	50.7
Front Track — ins.	61.5	61.5	61.5
Rear Track — ins.	61.0	61.0	61.0
Curb Weight — lbs.	3452	3805	3349
Fuel Capacity — gals.	20.0	20.0	20.0
Oil Capacity — qts.	4.0	6.0	4.0

MOTOR TREND PERFORMANCE DATA

PERFORMANCE	MUSTANG BOSS 351	MUSTANG MACH I	MUSTANG HARDTOP
Acceleration			
0-30 mph	2.6 secs.	3.02 secs.	3.50 secs.
0-45 mph	4.00	4.68	6.25
0-60 mph	5.80	6.50	9.90
0-75 mph	8.60	9.25	14.78
Standing Start			
¼-mile Mph	104.00 mph	96.80 mph	78.25 mph
Elapsed time	13.80 secs.	14.61 secs.	17.50 secs.
Passing speeds			
40-60 mph	2.7 secs.	3.3 secs.	5.27 secs.
50-70 mph	3.1 secs.	3.5 secs.	6.45 secs.
Speeds in gear*			
1st ... mph @ rpm	37 mph @ 6000 rpm	47 mph @ 5400 rpm	48 mph @ 4600
2nd ... mph @ rpm	54 mph @ 6000 rpm	78.5 mph @ 5400 rpm	79.5 mph @ 4600
3rd ... mph @ rpm	74 mph @ 6000 rpm	113.5 mph @ 5400 rpm	86 mph @ 3500 rpm
4th ... mph @ rpm	100 mph @ 6000 rpm		
Mph per 1000 rpm (in top gear)	14.4 mph	21.0 mph	24.6 mph
Stopping distances			
From 30 mph	26.3 ft.	28.2 ft.	32.2 ft.
From 60 mph	116.5 ft.	139.7 ft.	135.2 ft.
Gas mileage range	8.9-9.6 mpg	10.1-11.3 mpg	15.2-17.1 mpg
Speedometer error			
Electric speedometer	30 45 50 60 70 80	30 45 50 60 70 80	30 45 50 60 70 80
Car speedometer	30 45 49 58.5 69 70	33 49 54 65 75 85	30 45 50 60 70 80

MUSTANG MACH I

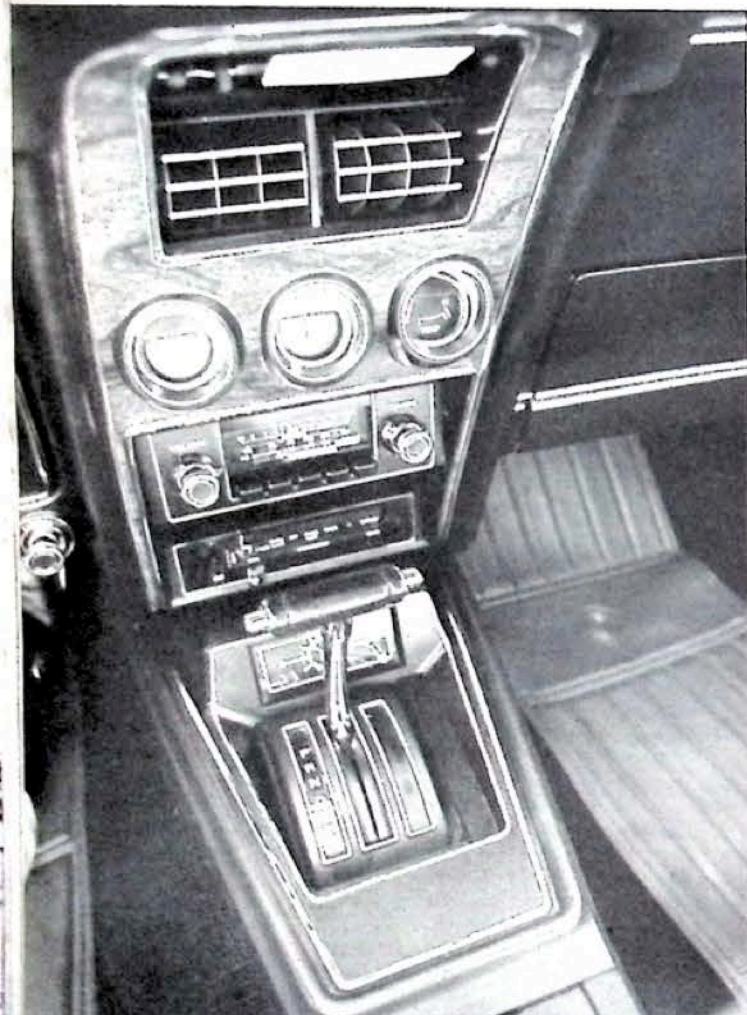
Mfg. suggested retail price	\$3,474.00
High back bucket seats	Std.
Spoiler bumper	Std.
Honeycomb grille	Std.
Dual exhausts	Std.
Sport lamps	Std.
Dual racing mirrors	Std.
Cigarette lighter	Std.
3.25:1 rear axle ratio	Std.
429-4v CJR engine	436.00
Mach I sports interior	130.00
Cruise-O-Matic	238.00
BSW/raised white letters	13.00
Convenience group	51.00
Power steering	110.00
Tilt steering wheel	45.00
Sport deck rear seat	97.00
Power front disc brakes	70.00
Air conditioning	407.00
AM/FM stereo radio	214.00
Center console	60.00
Intermittent windshield wipers	26.00
Deluxe seat belts/warning light	17.00
Instrumentation group	54.00
Invoice	\$5,490.00

MUSTANG HARDTOP

Mfg. suggested retail price	\$2,983.00
302-2v engine	Std.
Concealed windshield wipers	Std.
Recessed door handles	Std.
Armrests	Std.
Loop-piled carpets	Std.
Cigarette lighter	Std.
All-vinyl interior	Std.
High back bucket seats	Std.
Locking steering column	Std.
2.79:1 rear axle ratio	Std.
Cruise-O-Matic	217.00
Air conditioning	407.00
Center console	60.00
AM/FM stereo radio	214.00
Convenience group	51.00
Tinted glass	40.00
Power front disc brakes	70.00
Power steering	110.00
Deluxe steering wheel	39.00
WSW tires	39.00
Invoice	\$4,230.00

MUSTANG BOSS 351

Mfg. suggested retail price	\$4,101.00
351-4v HO engine	Std.
4-spd. transmission w/Hurst shifter	Std.
Power front disc brakes	Std.
NASA hood	Std.
Competition suspension	Std.
3.91:1 rear axle ratio	Std.
Heavy duty radiator	Std.
Instrumentation group	Std.
Dual racing mirrors	Std.
Front spoiler	Std.
AM/FM stereo radio	214.00
Center console	76.00
Power steering	110.00
Sport deck rear seat	97.00
Tilt steering wheel	45.00
Rear window electric defroster	48.00
Convenience group	51.00
Intermittent windshield wipers	26.00
Deluxe seat belts/warning light	17.00
Tinted glass	41.00
Boss 351 sports interior	88.00
Invoice	\$4,914.00



Above: The center console of the Mach I and Boss 351 models contains a full range of gauges, a detail which the hardtop lacks. Only the electric clock, partially covered by shift lever, is hard to read without removing gaze from the road.



Above: The only interior failing involved a lack of proper driver's leg and arm room. This could be easily solved by using a telescopic steering column. Below: Although Mustangs are known for a lack of rear seat passenger space, you can haul a lot of cargo by folding down seat back and trunk separator.



Range War

the end of the month. True, it does not have the dramatic styling flair of the Boss 351 or Mach I with their Sports-Roofs, spoilers, hood scoops and racing paint jobs, but the hardtop does have the same long-hood, short-deck look which popularized the Mustang in the first place, plus the added advantage of good visibility.

To have a sensible car, you must first have a sensible engine, and the 302-2v powerplant is just that. It is straight-forward with no tricked-up parts. A cast iron block and cylinder heads enclose aluminum alloy pistons and a nodular cast iron alloy crankshaft. The camshaft is located in the block above the crank and drives a hydraulic valve train. The valves are steel with aluminized heads and measure 1.788 inches in diameter for the intakes and 1.457 inches on the exhaust side. The carburetor is a two-venturi setup with a throttle bore of 1.564 inches. Overall, the engine has 220 hp at 4,600 rpm and 300 lbs.-ft. of torque at 2,600 rpm. Bore/stroke measurements are 4.00 x 3.00 inches and with a compression ratio of 9.0:1, the engine will deliver up to 17 mpg fuel economy on regular gas. Performance, of course, was not neck-snapping but it was quite surprising, 17.5 seconds in the quarter-mile at 78.25 mph.

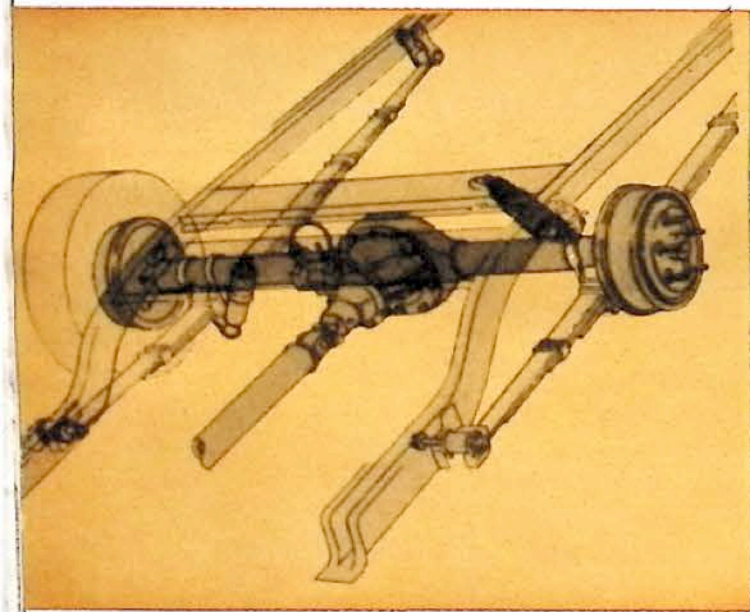
When we took the car on the handling course, we had visions of excess body roll and understeer. They were in evidence but in amazingly small quantities, considering the stock suspension system. This comprises an independent front through A arm, drag strut, coil springs and hydraulic shocks mounted over the upper A arms, and a live axle in the rear with semi-elliptical leaf springs and hydraulic shocks. Understeer was the predominant characteristic of

cornering and it took violent steering wheel movements and much speed before the car would assume an oversteer attitude. Unfortunately, when it did oversteer, there was no transition from the former understeer attitude; one moment the car would be plowing, then suddenly, the limit would be reached and go into oversteer. Despite the lack of stabilizer bars, body roll was not uncomfortable and while it did take a certain amount of body English to get around a corner, there was no sensation of falling off the curve.

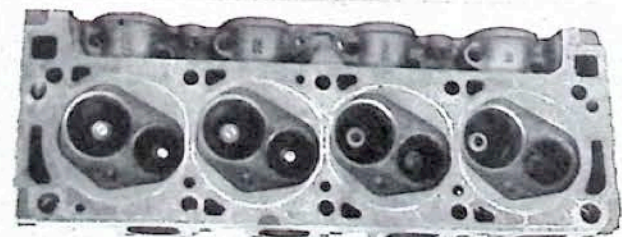
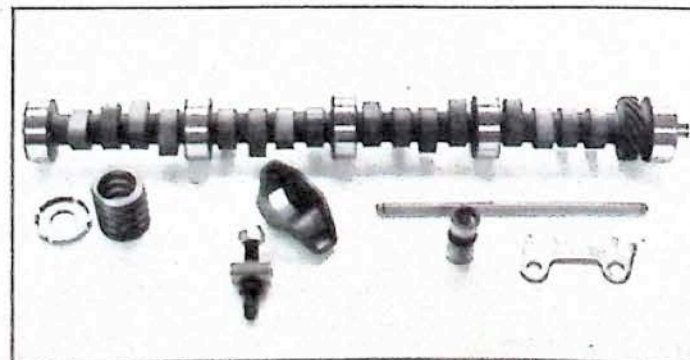
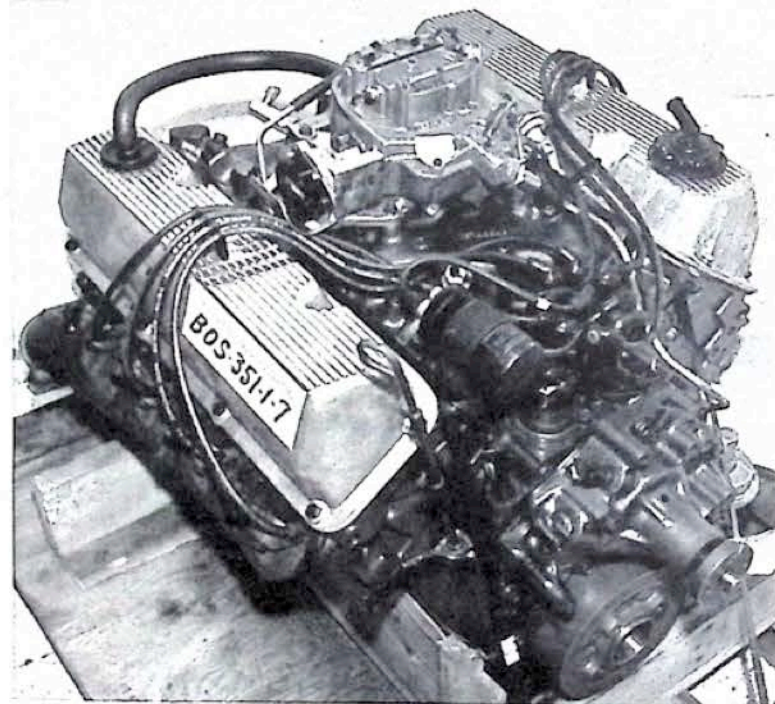
The brake test followed much the same pattern set by the Boss 351 and Mach I: wheel hop and full right steering wheel lock needed to keep the car fairly straight and within its traffic lane. Distance was good, 135.2 feet from 60 mph.

Creature-comfort-wise, the hardtop excelled in everything except the driver's position, something which Ford should strive to correct in future Mustangs; it would be as simple as offering a telescopic steering column, lowering the foot pedals and allowing for more seat travel. The seats were leatherette and exuded in air of luxury. The air conditioner worked perfectly and efficiently. With the small V8 engine, sound was no problem and even with the windows rolled down, wind noise has been kept to a tolerable level. The dashboard is not as flashy as that in the Boss 351 or Mach I but it serves its purpose well. One could only wish that gauges would replace the standard idiot lights. Again, the transmission lever is somewhat obstructed by the high center console and the console-mounted clock position does require removing your gaze from the road to read the dial. With its relatively soft suspension, the car rides well.

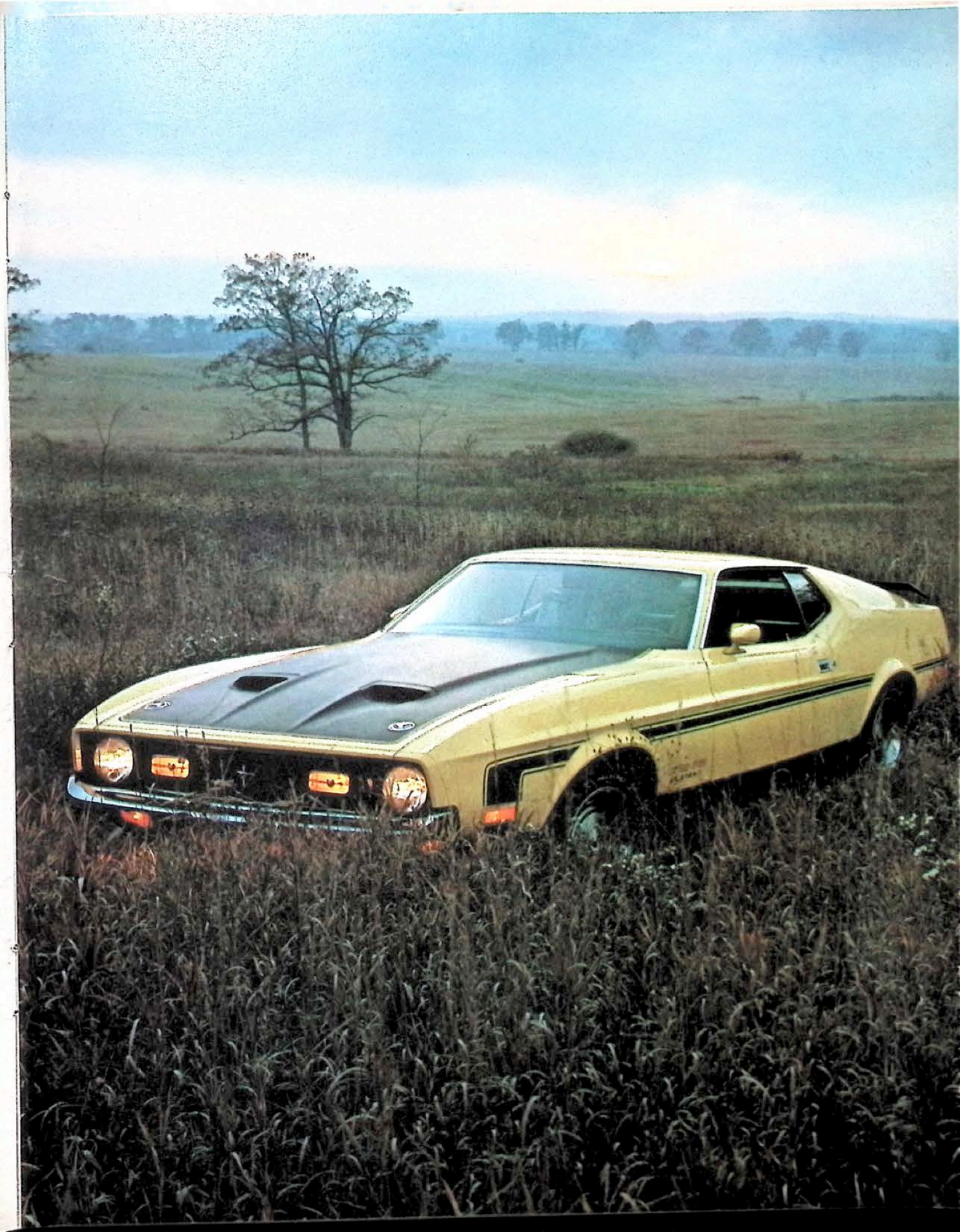
When considering the price and relativity of these three cars you have to admit that, as much fun as the performance Mustangs are to drive, the plain hardtop with its 302-2v engine is the best buy. It exemplifies what Ford started out to do in 1964 with the first Mustang: build an inexpensive car that is still stylish and pleasing to drive. /MT



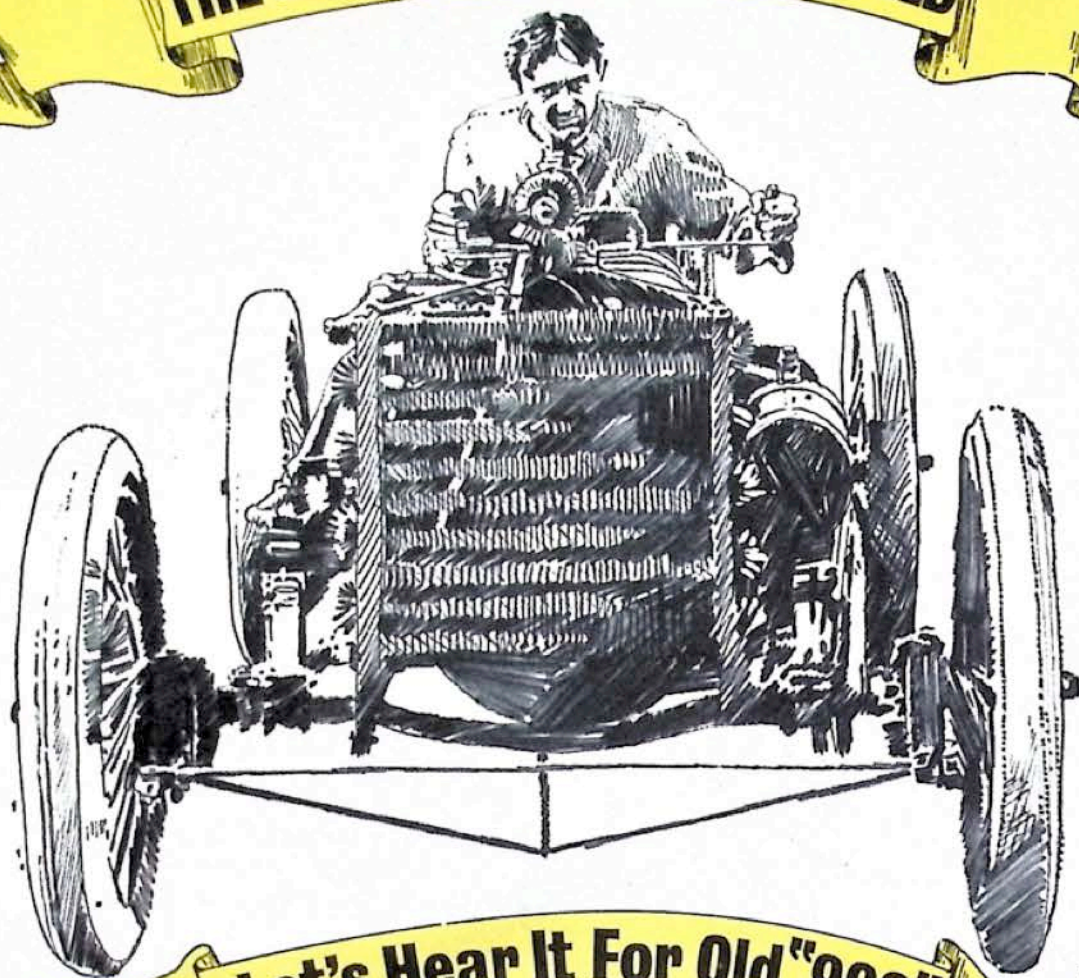
Above: Rear suspension in the Boss 351 (opposite page) uses staggered shocks to reduce wheelhop. Below: The 351's cast iron camshaft runs a canted valve train arrangement permitting smoother port design and flow characteristics.



Top: The 351 c.i. block is a derivative of the smaller 302 engine and is designed for a growth in displacement. Above: To create a greater power output the cylinder heads have larger, more efficient oval ports to increase the air/fuel mixture flow. The compression ratio is 11:1.



**OR, MORE PRECISELY,
THE LEGEND OF BARNEY OLDFIELD**



Let's Hear It For Old "999"

By Louis William Steinwedel
ILLUSTRATION BY RICHARD SPARKS

The hard-packed white sand of Daytona had already seen some great cars and daring men before this morning. In February, 1904 "Willie K." Vanderbilt drove his great Ninety Mercedes to a new world's record of 92.3 mph, and in 1907 Fred Marriott came to the beach with a Stanley steam car called the "Rocket" which flew down the sand at 197 mph — until it took off like a rocket and then crashed and exploded like one. Marriott survived and came back with another steamer which now held the official Daytona record of 127.66 mph. But on this morning there was the feeling that something epic was about to happen; tension and expectation floated on the gentle Florida breeze like the sea gulls circling overhead. Last minute preparations were finished, the officials and their timing equipment were in place, and the most famous driver in America kissed his wife good-bye, jammed an unlit Havana special in his mouth, and climbed into a weird, white machine straight out of Jules Verne.

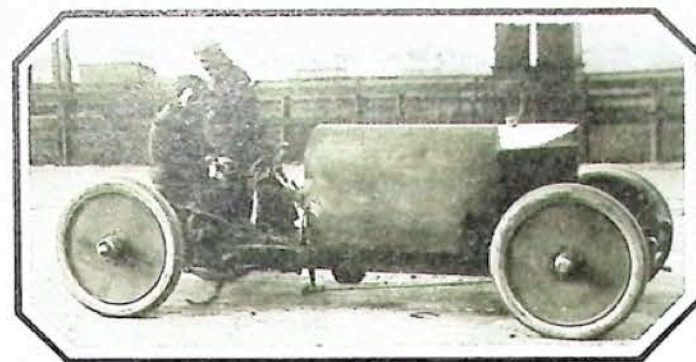
The low-throated, slow-turning throb of the monster four cylinder engine

would sound strange to ears tuned to the high pitched 10,000 rpm scream of today's Grand Prix cars, but no one could doubt the power pumped out by cylinders twice the diameter of champagne bottles. The flag was down and the "Blitzen Benz," pristine in German racing white with the imperial black eagle on its side, trundled down Daytona with Barney Oldfield at the wheel. They picked up speed slowly; no need for jack-rabbit starts here, no need to tease the clutch or put extra wear on the tires.

The big Benz and Barney Oldfield were a pair of naturals. Oldfield was the darling of a nation already in love with the automobile; the speed king of the wild and wonderful era of American dirt track racing before World War I. His name would bring thousands to see a race, and all across the country Firestone put up signs with his picture and the endorsement of "The World's Greatest Driver." Racing had brought Barney to the top of the heap, and he loved it. Once he said to a reporter, "If I go I want to be in the Blitzen Benz, or a faster car if they ever build

one, with my foot holding the throttle wide open. I want the grandstand to be crowded and the band playing the latest rag. I want them all to say as they file out the gate, 'Well, old Barney, he was going some!'"

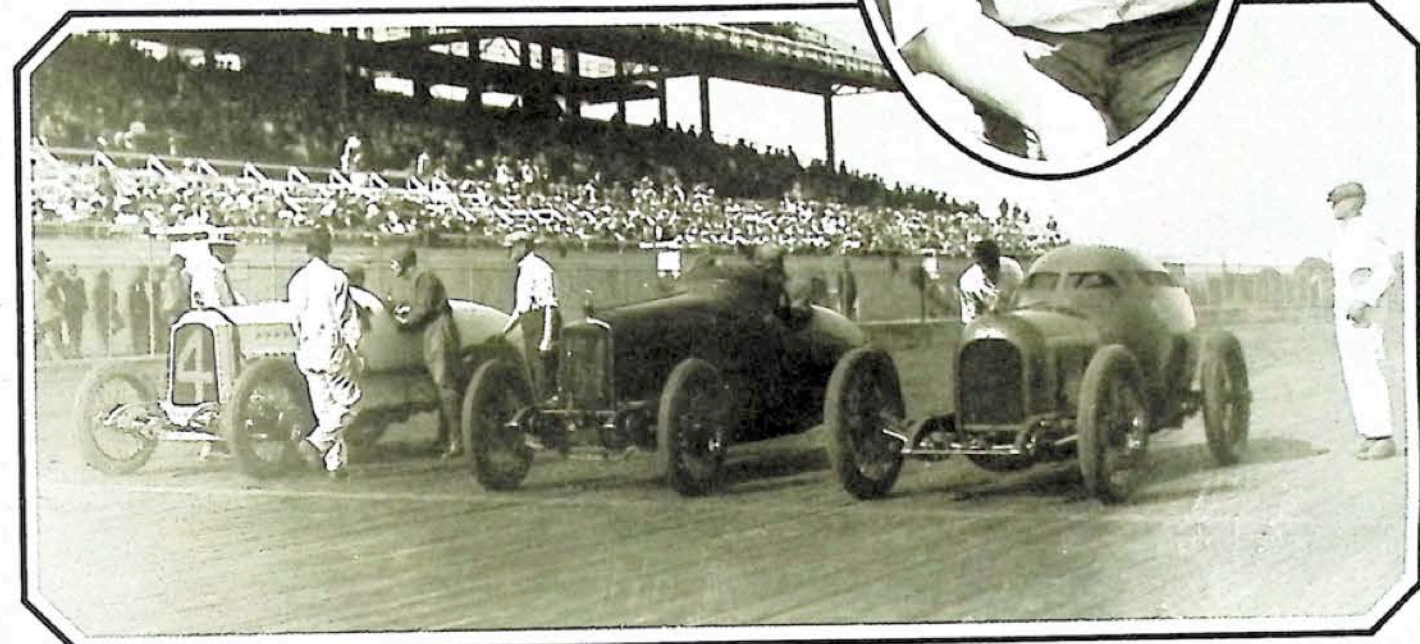
The Benz was moving faster now and kicking up a fine spray of white sand in its wake. She was a unique machine, the very essence of an era which was mastering the motorcar and immensely proud of its success. She was a descendant of the Benz Grand Prix car of 1908 which had taken second place to a Mercedes at the French Grand Prix that year and which Barney bought and drove to victories and records on American tracks. Benz's chief engineer, Hans Nibel, bored out the Grand Prix engine to an amazing 21.5 litres (1312 cubic inches) with a bore and stroke of 185 x 200 mm. The torque was enormous, and each of the four cylinders put out about fifty horsepower at a mere 1600 rpm. Nibel discarded the original Grand Prix chassis and used a special 112-inch wheelbase affair with a forked front axle. The special body was considered very aero-



Functional and sophisticated as an animal, Peerless Green Dragon was B.O.'s favorite



White shirt, goggles, cigar; pure Oldfield



Classic matchrace at Sheephead Bay on the boards: DePalma (Packard V12), Chevrolet (Frontenac), and Oldfield (Miller Submarine). Chevrolet triumphed.

dynamic for 1909, and there was a trademark "beak" over the radiator, which was intended to aid in cooling the giant engine. In October of 1909 with Grand Prix driver Victor Hemery up, the "Blitzen Benz" set a new world's record of 127.4 mph around England's famous Brooklands track. Barney read the accounts of the Benz at speed, realized what such a car could do on the straight sand of Daytona, and made up his mind to own it. Benz Auto Import brought the car to America and for \$6,000 plus his 1908 Grand Prix Benz, Barney Oldfield took title to the world's fastest car.

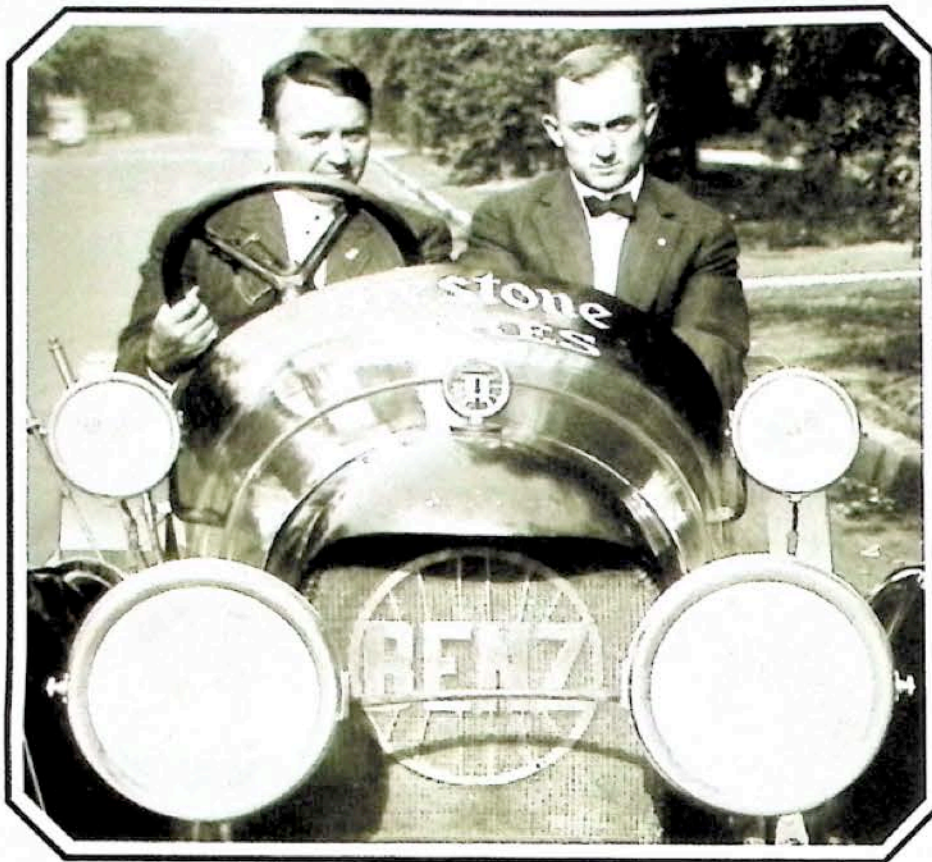
Barney and the Benz were well down the beach now. Eighty-miles-an-hour, ninety-miles-an-hour. The big engine was coming to life, and Barney bit down on his lucky cigar and floored it for all she was worth. The chain drive to the rear wheels whined under the strain, a white blur shot over the sand, and the awful noise was something seldom heard until the coming of the jet age. Faster and faster, until the wheels lifted off the ground and the car sailed over the sand in great leaps and bounds.

Oldfield's able biographer, William F. Nolan, recorded Barney's own description of the wonderful terror of being the fastest man on earth: "... for fully a third of the distance the wheels were off the ground while I fought for control. The front wheels were shooting up and down in a weird dance, and I knew that if a tire burst I would be beyond mortal help. I shot through space until all before me became enshrouded in a dark haze and I approached the verge of unconsciousness. Then I shut her down, knowing that I had traveled faster than any other human on the face of the earth."

Oldfield went past the timers at 131.7 mph which, if you discount Marriott's unofficial "flight," was the fastest that man had ever traveled. Newspapers spilled out gaudy headlines, and telegrams poured into Florida. At least one of them came over the trans-Atlantic cable and was signed by Kaiser Wilhelm. It read: "I congratulate a daring Yankee on so remarkable a performance in a German car." Barney was as jubilant as anybody and celebrated in his usual style; by re-telling

the story — each time more elaborately — between drinks in a grand tour of local saloons.

Under objective analysis, Barney Oldfield perhaps did not have the perfectionist touch of such later drivers as Nuvolari or Caracciola (nor such equipment, either), and he never captured the coveted AAA crown that was the goal of every American driver. Yet he did capture the popular imagination as no other race driver has ever done before or since. For millions of people his name was synonymous with fast and flamboyant driving. For years it was standard operating procedure for a traffic cop to hop off his cycle, walk over to a speeder, and ask "Who do you think you are, Barney Oldfield?" (Once, when a particularly determined officer ran down his quarry and used the line, he blinked and saw that it was Barney Oldfield.) Oldfield had a variegated career. He was a bicycle rider, a racing driver, tire salesman, millionaire, a pauper, a showman, saloon keeper (and sometimes his own best customer), business tycoon, friend of celebrities, and a country club proprietor. He had >>>



Winning triumvirate: Oldfield, Ty Cobb & Benz.



Oldfield in a Delage on the road at Elgin, Ill.

Let's Hear It For Old "999"

a solid gold and diamond encrusted medal won in Arizona in 1914 which also proclaimed him as "The Master Driver of the World." He believed it, and so did most of two generations of Americans.

From the beginning Barney Oldfield was fascinated with speed, and spent his younger years pumping his heart out in bicycle races. His first experience in letting internal combustion do the work for him came when a friend bought an English motorcycle "built for two." Oldfield liked the 40 mph speed but balked when his friend and partner, Tom Cooper, joined a guy named Henry Ford to build and run two racing cars, with Barney as driver. The promise of 60 mph gradually overcame his skepticism and he agreed to drive. The cars were big and powerful — 1080 cubic inches and 80 horsepower — but were still primitive and unreliable. There were no gearboxes, only one forward speed was provided, and

steering was by crude iron tiller bar with a hand grip at each end. The whole thing seemed a seat of the pants operation. Once, when the finicky engine appeared starved for gas, Barney remedied it by blowing through a hose to the gas tank to force the fuel into the engine.

Finally, when some of the bugs were ironed out, one of the cars, nicknamed "999," was entered in a race at Grosse Pointe, Michigan in October of 1902. Oldfield and "999" were both unknown quantities and the favorite of the day was dapper Alexander Winton in his famous "Bullet." But before the dust had settled that day Barney Oldfield had driven to the brink of disaster to come within a hair of covering a mile in a minute, had tasted his first victory as a racing driver, and had chosen his life's work.

Oldfield went through an earn-as-you-learn session with "999," and found that he could earn astonishingly well by thrilling the spectators gathered around the dirt tracks in middle America. Despite his fascination with speed,

Barney was always candid about cash consideration: he readily admitted it was mainly money that made it worth "risking my neck." It was money which brought him to his old rival Alexander Winton, who was willing to pay Barney a handsome annual retainer plus anything he could win to drive a Winton. It was a good deal for both. It got Barney into the big money and it got the cause of Winton's string of "second places" onto his side of the fence. Besides, Winton had a daring new eight cylinder car called the "Bullet II." It was with this car that the legend of Barney Oldfield really started to roll. It grew in exhibition races and at county fairs, and it got a big boost when Barney in the homely, wedge-shaped "Bullet II" bested Willie K. Vanderbilt aboard his record holding Mercedes at Daytona early in 1904. And the legend grew at flamboyant parties and more frequent barroom brawls which only seemed to make Barney "one of the boys" to his public.

Barney's next mount, the fearsome Peerless "Green Dragon" (actually three separate cars of the same name), carried him to what some consider to be the peak of his career. The Peerless Manufacturing Company of Cleveland and Barney Oldfield had similar origins; both had begun with bicycles and switched to motorcars. In 1900 Peerless began building two models of small rear-engined "motorettes" under French license from de Dion. Two years later Louis P. Mooers dropped the foreign patents and introduced advanced new cars of his own design with shaft drive, channel iron frame, and a novel side swing steering wheel for easy entrance. The top of the line was a big sixty horsepower overhead valve four cylinder car. From this standard production eleven liter car a special racer called the "Green Dragon" was built and Mooers himself drove it in the famous 1903 James Gordon Bennett race at Ballyshannon, Ireland, although he never got it past the second lap. Accordingly, Mooers saw the value of an ace driver for the Dragon.

Despite a spectacular accident at the St. Louis World's Fair, Mooers would not regret hiring Barney. In October of 1904, at Los Angeles, the "Green Dragon" ran nine miles in eight minutes to set a new record, and scored brilliant triumphs wherever it and Oldfield appeared around the country. Then, the Peerless was entered for the "World Championship" to be run at Empire City track in New York against crack European drivers and sophisticated continental machinery which out-gunned the Dragon in raw power. But what Barney lacked in power he made up for with a willingness to drive to the very edge of doom to get the best that the Dragon had to offer. It was this combination of natural skill and total fearlessness (plus perhaps the \$5,000 that he had bet on himself) which defeated Europe's best cars and drivers and set a new record that autumn day in New York. Up to this time American showings in International racing had been miserably poor

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BIG DADDY WINS WITH FRAM FILTERS



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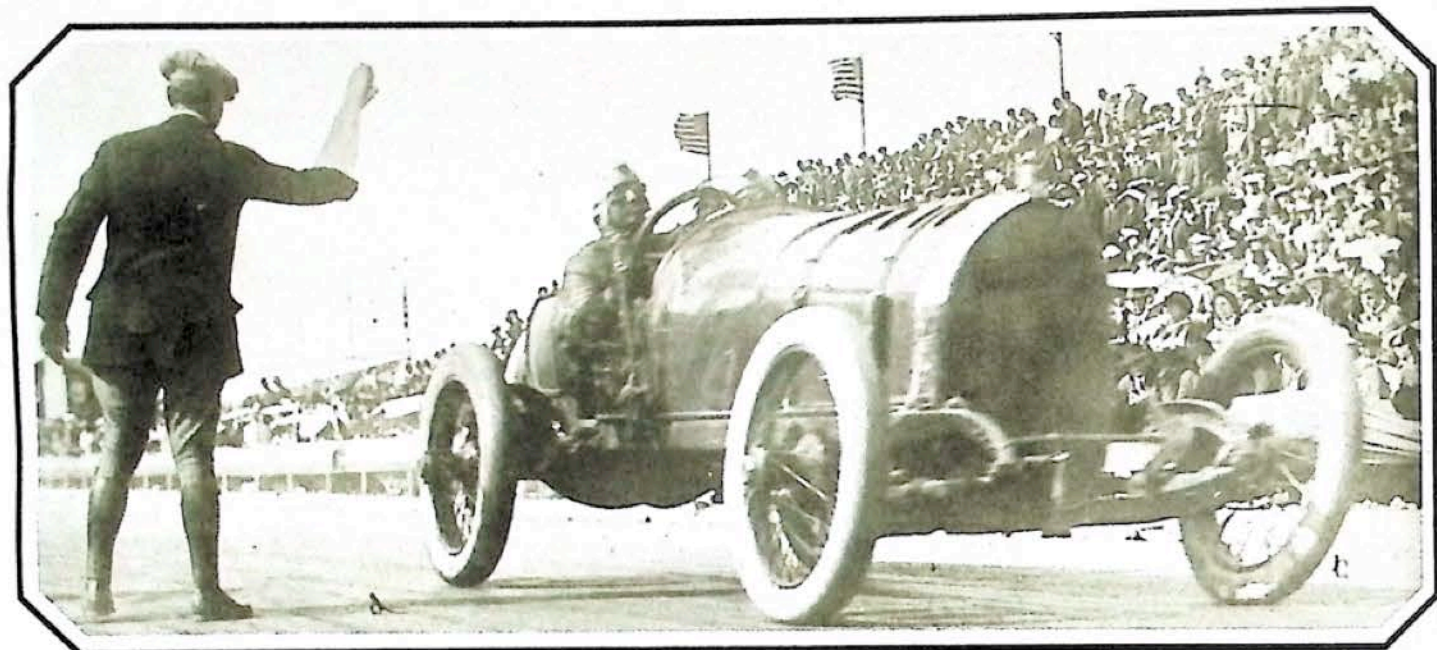
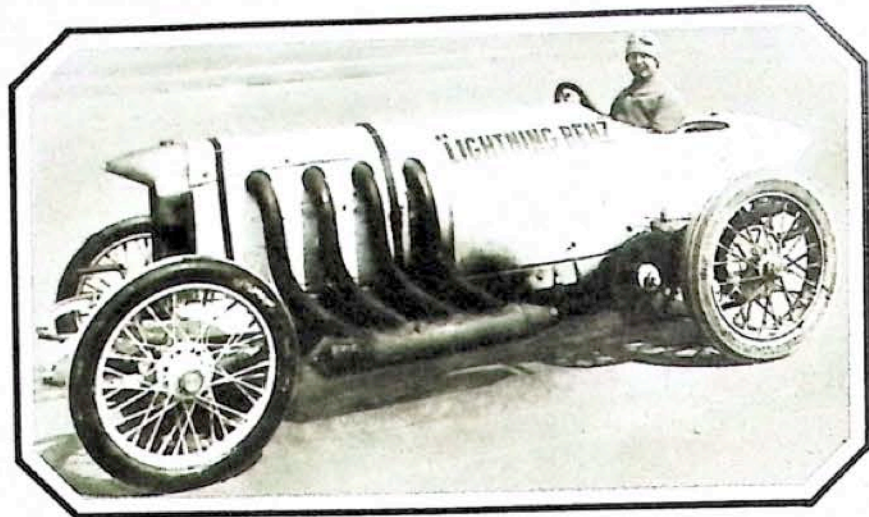
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Let's Hear It For Old "999"

In the Blitzen Benz Oldfield went 131.7 mph at Daytona, for the land speed record.



The titanic struggle between DePalma and Oldfield at the 1914 Vanderbilt Cup Race with DePalma victorious by a few yards.

and the win was welcomed like the Fourth of July. Oldfield was the boy from home who had "showed 'em."

With the drawing power of a dime novel hero come to life, Barney broke from company driving and went into business for himself. He toured the country with a circus train type railway car with two foot high lettering: "Barney Oldfield Speed King," an endorsement for his favorite Firestone tires, and a claim of "The fastest racing combination in the world." That old wooden freight car carried an imposing assortment of high performance road machinery: The 120 horsepower Benz, the Peerless "Green Dragon" No. 3, a "Giant Knox," a French Darracq, the "Blitzen Benz" which became the star of the show, a Peugeot, the "Killer Christie," and others. From coast to coast Barney rode the county fair circuit, always just managing to nudge out his own hired drivers at the last dramatic moment, to set a new "record" at the local trotting track, or to miraculously "cure" a sick engine by going

under the hood with a flair and flourish to replace a loose spark plug wire. It was all grand showmanship in the P.T. Barnum style and rural America of 1910 loved every minute of it. How well they loved it was reflected in Barney's bank account. There was a four carat diamond on his finger, a \$1,000 sealskin maxi coat on his back, French champagne and gourmet food sloshing in his stomach, and the trademark Havana specials clenched in his teeth were now delivered in cases of two thousand.

But it was not all fun and fluff. Barney spent his share of time in hospitals, and once he woke up to read his own obituary in the newspaper. He moved a little closer to a real death notice when he bought the "Killer Christie," the last of a bizarre series of front wheel drive cars which had brought more grief than glory to their drivers. Although dangerously unpredictable and hard to handle, the Christie was a violently fast car. Naturally, the death-defying angle was played up in Oldfield's poster art which plastered barns

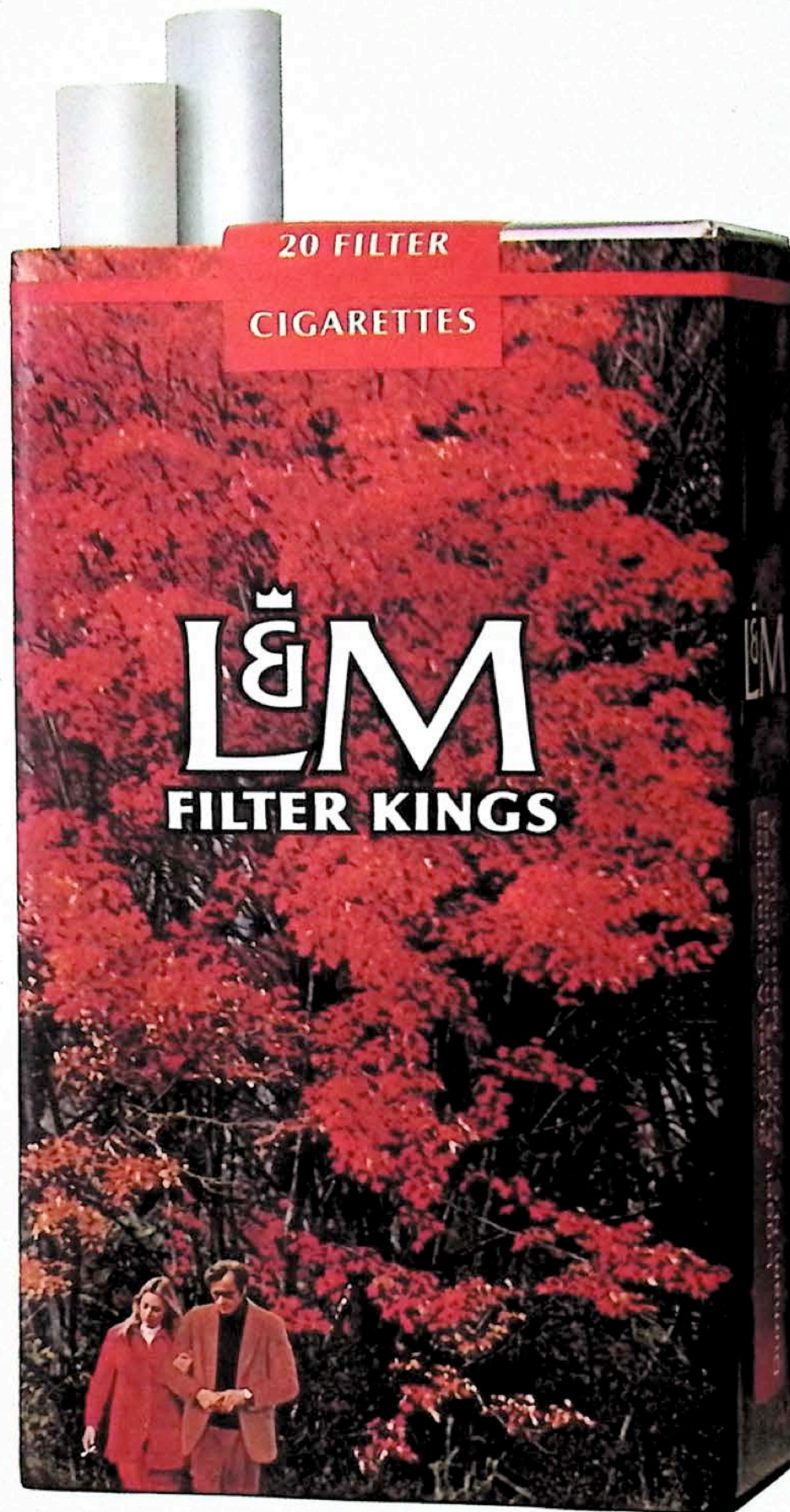
and board fences. Barney became a mechanized Buffalo Bill and the Christie an ornery mechanical bronco. Ballyhoo aside, the Christie was no picnic. The real danger lay in its front heavy imbalance which could pull the rear end out from under you without warning and spin you out into the nearest fence or tree. With patience and practice, cajoling and cursing, Barney "broke" the Christie and it became a featured part of his act. The Speed King thrilled many a gasping audience with the homely red car, and even set a track record at Indianapolis Speedway of 102.6 mph in 1914.

Barnstorming had made Barney a rich man but the thrill of real racing had largely vanished for him. Maybe there really was more to this business than just money; something else he would "risk his neck" for. Back in 1904 the country's leading motor sport fan, Willie K. Vanderbilt, founded the Vanderbilt Cup races which, as the pace and speeds increased, moved across the

continued on page 78

Relax.
Unwind.
Make this the
moment
to take things
easy.
With a whole
new cigarette.
Rich new
blend,
rich new
flavor.

THIS
IS THE
LEM MOMENT



Every Man His Own Reactor

The ultimate solution of automotive air pollution is near at hand — not with steam or turbines, but with reactors under the hood of the piston-engine car you'll be buying as early as 1973.

BY KARL LUDVIGSEN

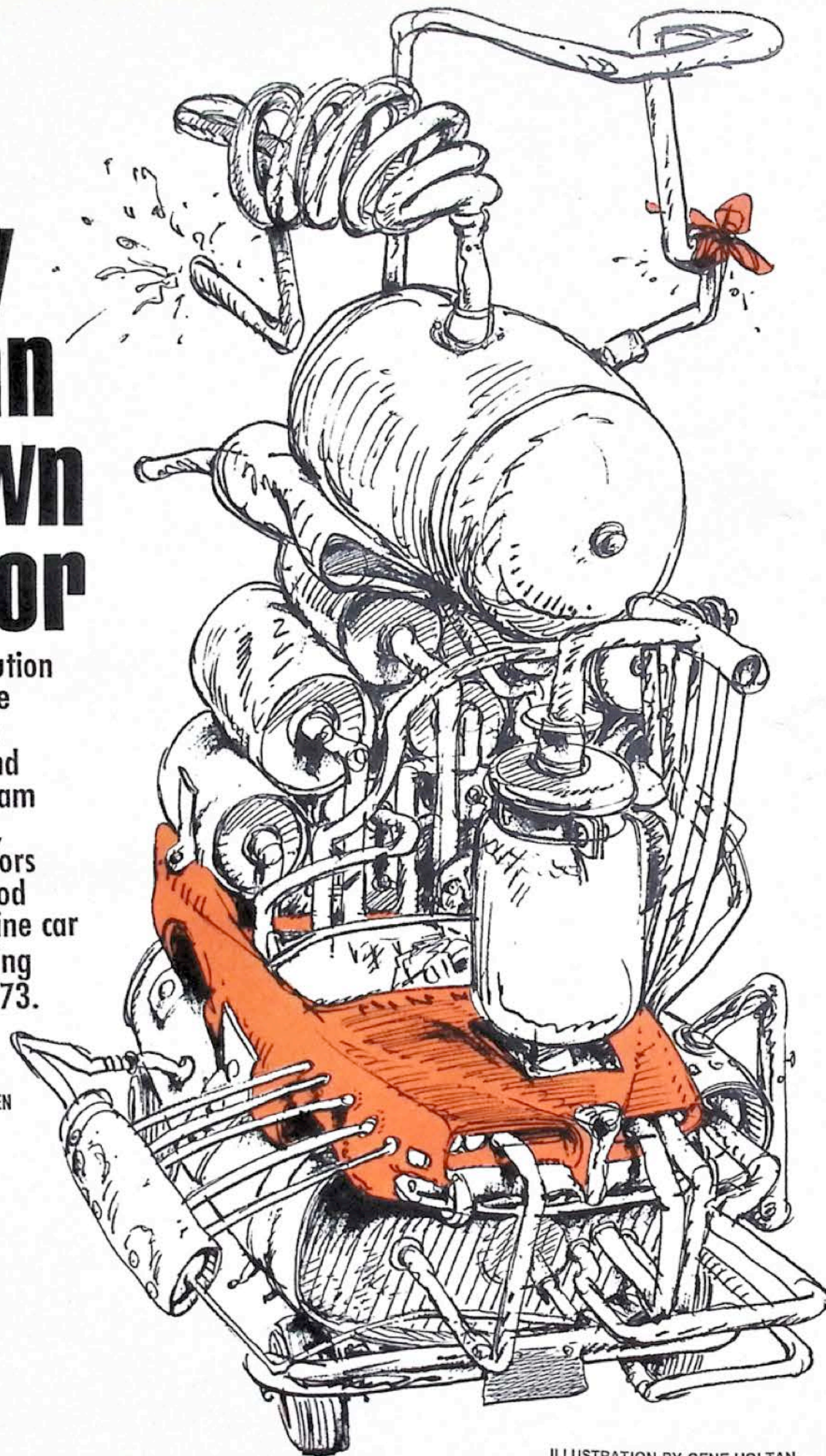


ILLUSTRATION BY GENE HOLTAN

I've got one word for you. Filters. Filters? Filters. They're on our cigarettes, you know, with gas traps and activated charcoal. They're on our water faucets, removing the pollutants we put in, inside air conditioners, removing the pollutants we put in. In two years they'll be on automobiles too, cutting emissions dramatically, stopping pollution at its source so we can throw some of the other filters away.

"Filter" isn't exactly the right word to describe the exhaust-cleansers of tomorrow. They work by heat and/or chemical action. The word "converter" comes to mind but they're probably best described as "reactors," because one way or the other they'll bring about a chemical reaction so your car's exhaust pipe will pump out only the water vapor and carbon dioxide that are the theoretical products of combustion.

Suddenly it was 1975 late in 1970 when 50 cars raced from Massachusetts to California to show off the abilities of emissions-reduction systems that are being developed today for application to-

... the dawn of the reactor could bring back the high performance American car.

morrow. Steam cars didn't make it to the finish. Electrics did but they were far behind. All the top piston-engine cars, including the winning Wayne State University entry, used some form of reactor in the exhaust system. Most were chemical in action, working with fuel not containing lead. To qualify for the Clean Air Race they had to be controlled within the proposed 1975 Federal standards. This wasn't possible without some form of reactor inside the exhaust system.

Nor can 1975 cars be built to meet that standard without reactors because it represents a sharp cut in emissions, especially for hydrocarbons and oxides of nitrogen, the two that most directly affect irritation and smog. Reactor systems will be needed to meet the 1975 rules and, with further development, the planned 1980 standards. Just so it won't be possible for automakers to move toward these goals logically there are additional diversions of new test cycles and measurement methods, supposedly for 1972, and impending Federal legislation to impose standards, that haven't even been reached in the laboratory yet. The politics of ecology and the politics of demagoguery are inseparably linked.

In the past, the automakers have been accused of conspiring to delay the introduction of pollution-reduction equipment. State suits are pending against them on this count. If it was true before it is no longer, not since the dramatic events of 1970 that saw General Motors break ranks to force the introduction of no-lead gasolines and then to announce that it would put reactor systems on some of its cars in 1973 and all of them by 1975.

As GM sees it, these two announcements were closely related. Lead-free

gasoline, it says, is necessary for the chemical reactors it plans to use in its low-emissions cars. Tetraethyl lead, hailed for almost 50 years as a vast advance in the anti-knock properties of gasoline, has been found by GM and others to foul up the working elements of chemical reactors, so in their eyes it was the lead that had to go. There's been disagreement with this in some circles, especially those, like DuPont and the Ethyl Corp., who make tetraethyl lead. They argue that the lead can be left in and they've built reactors to prove it.

All the original reactor work was done to cut down on the amounts of unburned hydrocarbons and carbon monoxide coming out the tailpipe, without worrying much about oxides of nitrogen. This latter pollutant requires special treatment, as we'll see later on. As far as hydrocarbons (HC) and carbon monoxide (CO) are concerned, they're both encouraged to burn completely to form water and CO₂ when they're given some added time at a high temperature in the presence of extra oxygen. This can be accomplished in an extra chamber outside an engine's exhaust ports, one called a "thermal reactor" because its high heat is its most important feature.

Some of the first thermal reactors were literal afterburners, chambers with their own fuel and ignition provisions that consumed pollutants in an actual flame. As early as 1959 Chrysler started work with TRW on one such reactor. It gave very low HC and CO emissions at a penalty of one-fifth more fuel consumption and combustion so unstable that extra enrichment could melt the casing.

Since then, improved thermal reactors have been built and tested. They have similar fuel consumption penalties because they are used with very rich fuel/air mixtures. The extra oxygen needed to burn the HC and CO is flowed into a rich reactor by pumps like those used for many current desmogged cars. Their reactor chambers are made as large as space permits so the exhaust gas can stay there as long as possible. Baffles and insulation keep the gas hot in the core of the reactor. It must be above the 1200-1400 degree Fahrenheit level for oxidation to take place.

GM showed several of its thermal reactors in 1969. One, on a Cadillac, had large-volume chambers that needed two air pumps to feed them and ran so rich that its fuel consumption was up 23 percent. A smaller version on a Chevrolet needed only a single large pump to maintain "luminous" combustion inside each reactor, one for each bank of cylinders.

Some of the best thermal reactor work has been done by DuPont. It closely studied reactor theory and built several types to try out their flow patterns and effectiveness. DuPont also built a close-coupled reactor, smaller and simpler than the experimental models. Starting with a DuPont unit, Esso researchers added a distributor valve to time the air injection to the exhaust port pulses to get the oxygen

where it's needed most. The resulting Esso Synchro-Thermal reactor is one of the most effective consumers of unburned hydrocarbons.

It's also inviting to attach a thermal reactor to an engine that's running extremely lean. It has extra air in its mixture as it comes out the exhaust, enough so it isn't necessary to pump more in. The problem is to get an engine to run well and reliably on lean enough mixtures. It can be done with a special carburetor, like one Ethyl developed for its lean reactor demonstration Pontiac, with an enlarged exhaust manifold and ports insulated to keep the gas hot enough to react well. GM built an Oldsmobile with a similar system but without a special carburetor; its stalling and uneven running were intolerable. Using its electronic fuel injection to meter a lean mixture precisely, Bendix is developing a lean reactor that seems promising.

All these thermal reactors can run on leaded gasoline — though that's no longer very important with the certain swing to no-lead gas. They can also be designed to complete 50,000 or even 100,000 miles of normal operation. But their high operating temperatures call for very good, hence costly, materials and construction. Cost goes up further on a V8 engine which, with today's layout, needs a reactor on each side of the engine. Estimates of the cost to the car buyer of a thermal reactor system are in the \$150-\$250 range.

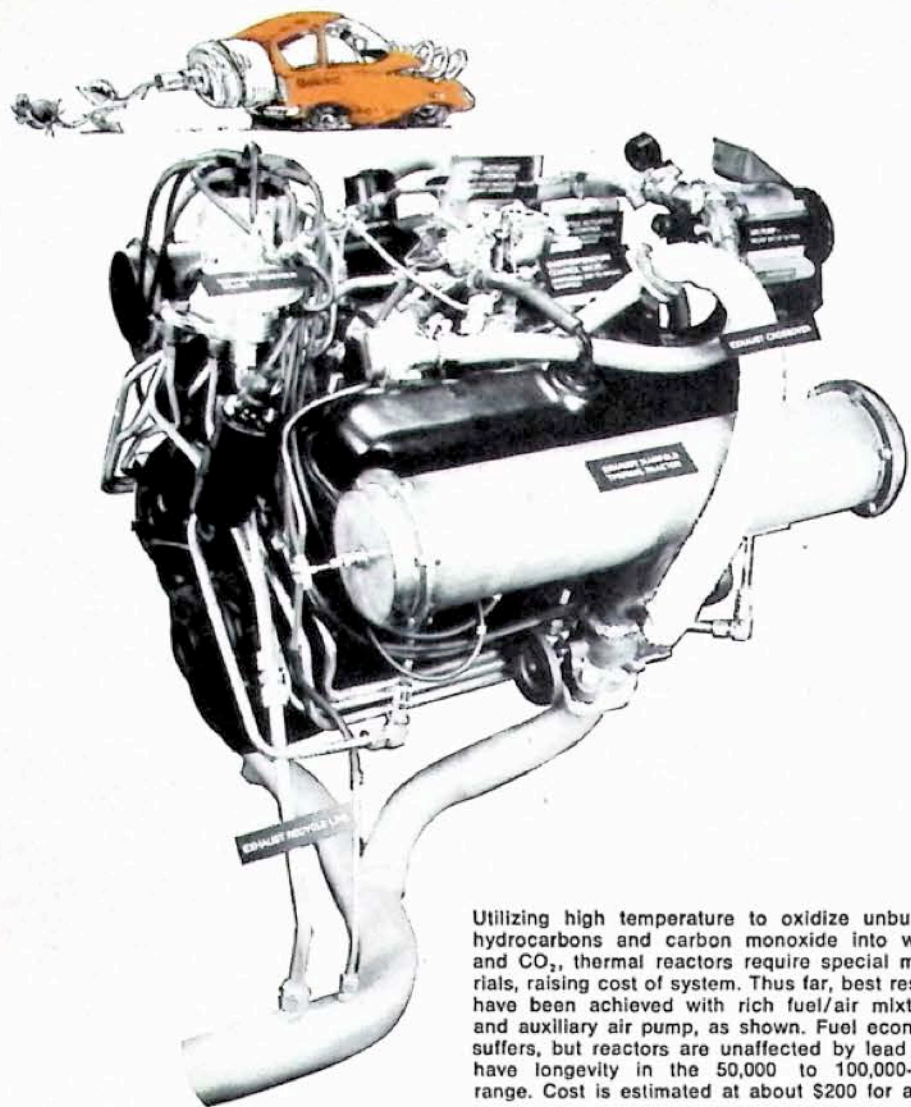
There are ways to cut the cost. Du Pont found that its reactors are "moderately effective mufflers of the high frequency portion of the exhaust sound spectrum." This allowed them to get effective muffling with a low-frequency resonator only, saving some exhaust system costs. Also if a V8 engine were designed around a reactor it could be placed at the center of the vee, as a

Reactor systems will be needed to meet the 1975 and 1980 standards...

single unit, instead of being split into two more costly sections.

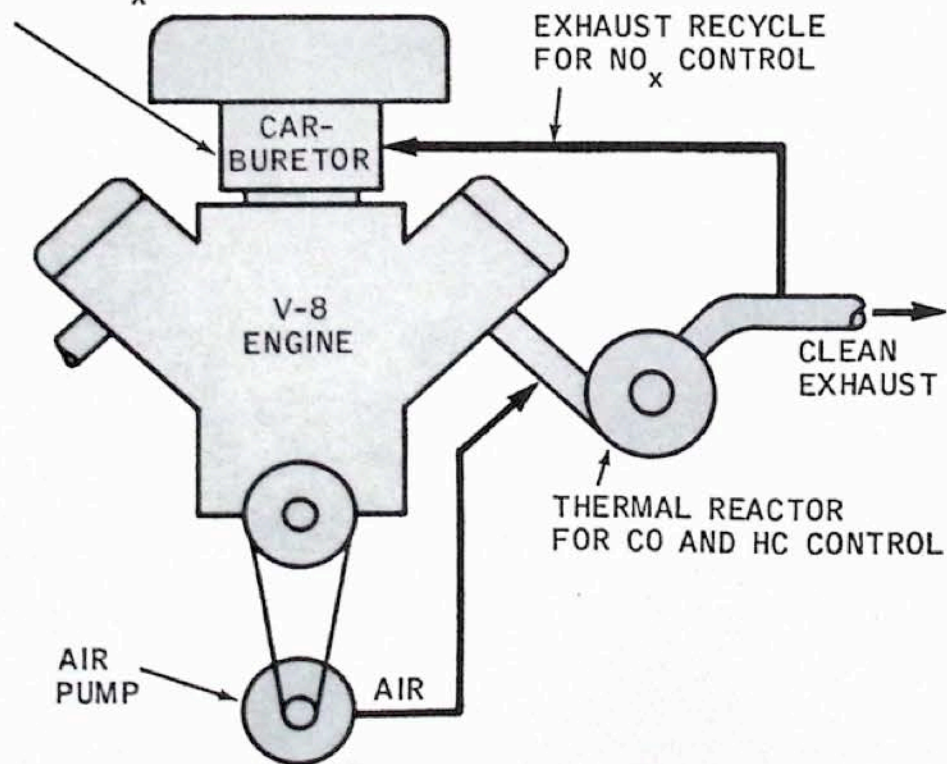
Automakers are also worried about the higher under-hood temperatures a thermal reactor could cause. They feel it's hot enough under there already, and plenty crowded too. But the returns on this are mixed so far. Du Pont's tests show there isn't much difference in the heat under the hood. Bendix found that its 1970 Thunderbird was actually cooler in the engine room with its experimental lean reactor than it had been before.

There's one way to take the heat off, and Detroit is very high on it. Instead of increasing the gas temperature to bring about a faster reaction with oxygen, a chemical means is used to accelerate it. This is done with a chemical element known as a "catalyst," one that speeds up the reaction by being present in it but without becoming part of the end product. The catalyst



Utilizing high temperature to oxidize unburned hydrocarbons and carbon monoxide into water and CO₂, thermal reactors require special materials, raising cost of system. Thus far, best results have been achieved with rich fuel/air mixtures and auxiliary air pump, as shown. Fuel economy suffers, but reactors are unaffected by lead and have longevity in the 50,000 to 100,000-mile range. Cost is estimated at about \$200 for a V8.

ENGINE OPERATES RICH FOR NO_x CONTROL



doesn't get used up chemically, though it can be worn away or "poisoned," reducing its effect, in ways a chemist doesn't fully understand.

Catalysts had their first major impact on the auto industry in the late Twenties when they were used to accelerate the production of high-octane gasoline by "cracking" the long petroleum molecules. Named for its founder, the inventor of catalytic cracking, Houdry Process and Chemical marketed this revolutionary process. Then, in 1950, the elder Houdry founded Oxy-Catalyst, Inc., run now by his son Jacques, to develop catalytic controls for auto exhausts. He has to go down in history as a very far-seeing individual.

Late in the Fifties Oxy-Catalyst got together with General Motors and even licensed the automakers to produce its catalytic muffler. But despite their best joint efforts they couldn't come up with a catalyst that would stay effective for more than 6,000 miles — on leaded gas. So GM wasn't shaken when several companies decided to compete for the favor of the state of California early in the Sixties by designing catalytic mufflers.

On June 17, 1964, the California Motor Vehicle Pollution Control Board certified as effective four catalytic mufflers that met the early control limits, twice as liberal as today's. Each was the joint effort of a chemical company and a muffler maker. The combinations were: W.R. Grace/Norris-Thermador, Chromalloy/American Machine and Foundry, Universal Oil Products/Arvin Industries, and American Cyanamid/Walker Manufacturing.

The certification of these systems set the 1966 deadline for emissions controls in California, one the automakers met by other means. All these catalytic reactors worked fine when new, but after 12,000 miles, all were above the limit then of 3.75 grams of HC per mile, their catalysts "poisoned" by the lead deposits that were also deteriorating the ceramic linings.

Licking their wounds from this multi-million-dollar financial injury, some of these firms swore "never again" to the enticement of competition for the potentially vast market presented by Detroit's pollution problem. W.R. Grace kept at it, developing a catalytic muffler for diesel buses that's been used in Boston, and they're still on the scene today. Oxy-Catalyst and Universal Oil Products put their know-how to work with emission-control mufflers for lift trucks and mining equipment; UOP has some 6,000 of these in use. This market has also been friendly to Englehard Industries, which had made an unsuccessful run at the 1964 California program.

Some noted a return to favor for catalysts in mid-1969. In its Progress of Power show GM displayed a 427 cid Chevrolet equipped with an Arvin/UOP catalytic muffler, used in conjunction with air injection into the exhaust manifolds. It was "very effective," GM said, "with unleaded fuel." In 1970, when the lead started to come out, this suddenly meant something. On September 16 the California Air Resources

continued on page 48

OPEL GT: THE ONLY THING IT'S DESIGNED TO WIN IS PEOPLE.

Our car may not win at LeMans or Sebring, but it's great if you just want to have some fun.

The Opel GT has a speedometer, odometer, tachometer, ammeter, oil pressure gauge, fuel gauge, temperature indicator, simulated wood-grained steering wheel, retractable headlamps, console-mounted gearshift (four-speed manual or an avail-

able three-speed fully automatic) and high-backed contour bucket seats with adjustable seat backs.

The peppy 1.9 litre engine gets great gas mileage. And it has new hydraulic valve lifters to make it run quietly and eliminate the need for adjustments.

Front power disc brakes come as standard equipment. Our car may

not accelerate like a race car, but it stops (snap!) like that.

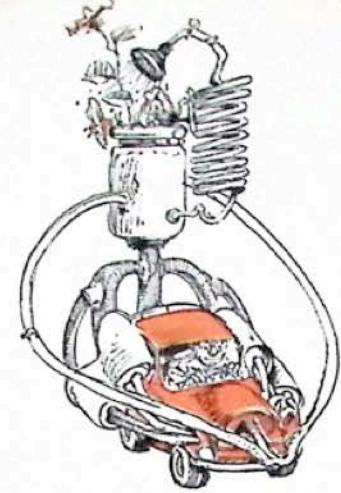
See for yourself.

See the Opel GT at your Buick-Opel dealer's now.

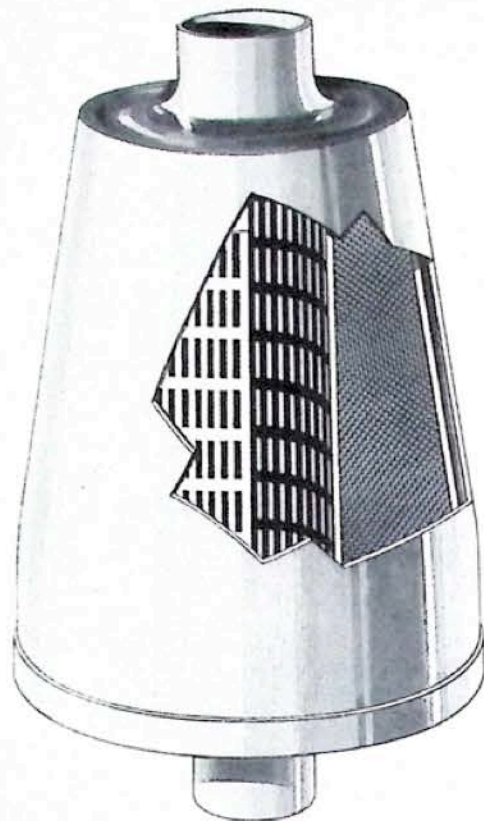
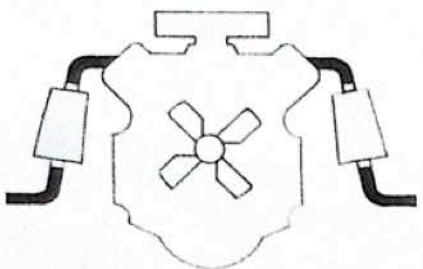
It's designed to let you know the joy of driving, without monstrous fuel and maintenance costs.

Which leaves you more money to know the joy of living.





Conical reactor is one of several designs developed by Universal Oil Products to contain its catalyst. Shape allows catalyst to be placed close to exhaust ports.



Board learned from Dr. Fred Bowditch that his company, General Motors, would be catalytic across the board by 1975. Jacques Houdry estimates this will create a demand for 100 tons of catalyst per day — just for GM. This has not escaped the notice of the chemical industry.

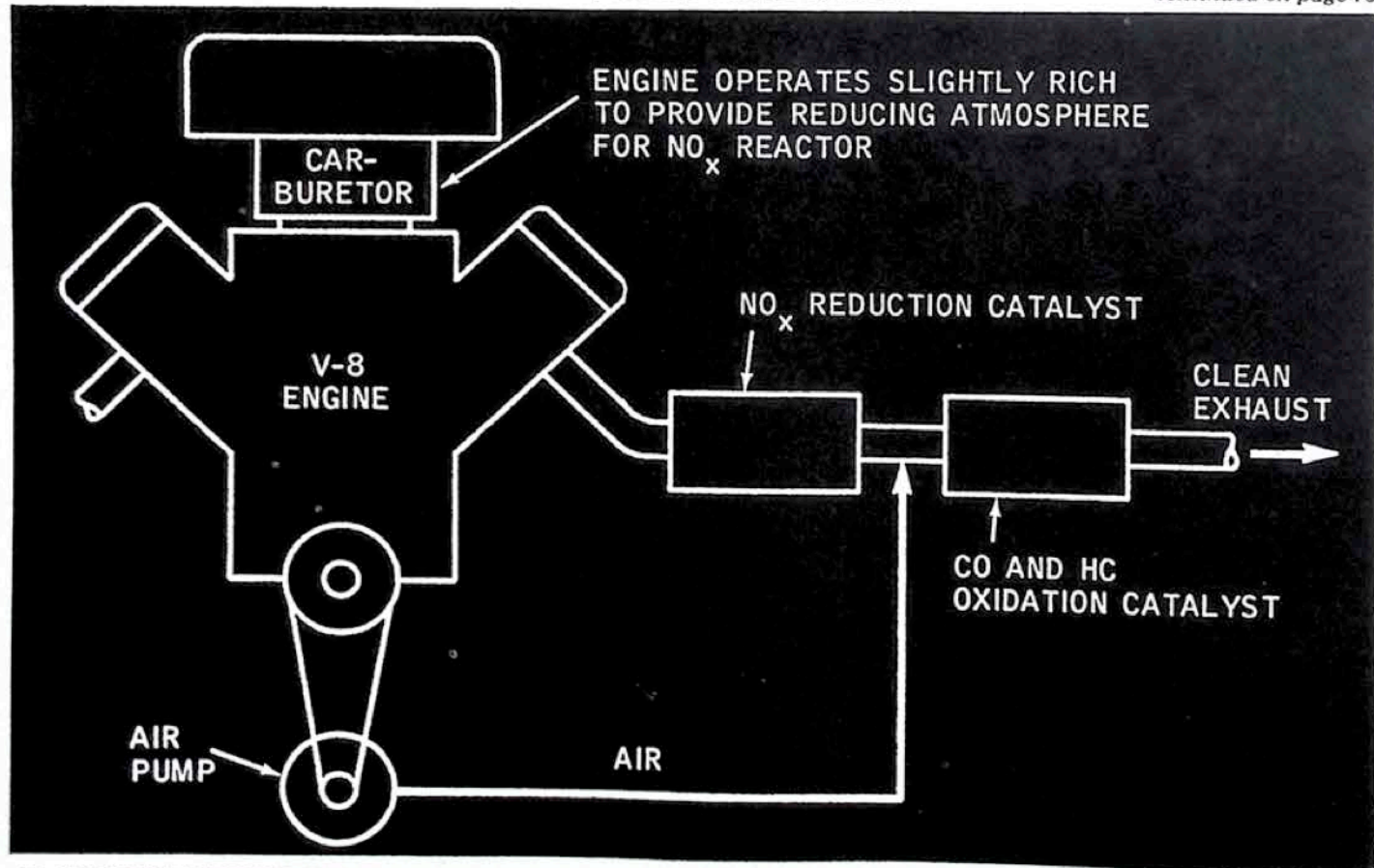
The UOP catalyst used in that '69 Chevy was based on platinum, just plain, ordinary platinum. It's also used in petroleum cracking; that's where "platforming," e.g. Shell's Platformate, comes from. It's a fine catalyst for oxidation of HC and CO, taking effect at as low as 350 degrees Fahrenheit and working best in the 1,200 degrees Fahrenheit range.

GM has consistently doubted that it would be practical to use a rare noble metal like platinum as a catalyst. UOP's president, John Logan, says some of his firm's experimental reactors use as little as 0.05 ounce of platinum. At the rate of \$130 per ounce that's \$6.50 worth of the metal per car. And since the platinum is never consumed in the reaction it's recoverable, technically, from a used car. "There exist known reserves of platinum in excess of 200 million ounces," Logan points out, forgetting to add that most of them are in the Soviet Union.

Englehard Industries also uses platinum for its patented PTX exhaust purifiers. Meanwhile, under the pressure of GM's colossal purchasing power, UOP, Oxy-Catalyst and others are looking for cheaper catalysts. Copper oxides and copper chromates are mentioned as possible competitors. Either way it seems possible to produce a catalytic reactor system that will do

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Current interest centers on catalytic systems, which side-step problems of high underhood temperatures accompanying thermal reactors. In dual system, exhaust is first treated in reducing catalyst, which neutralizes oxides of nitrogen, then passes through oxidizing atmosphere, where hydrocarbons and carbon monoxide are detoxed. High back pressure is unwanted by-product.

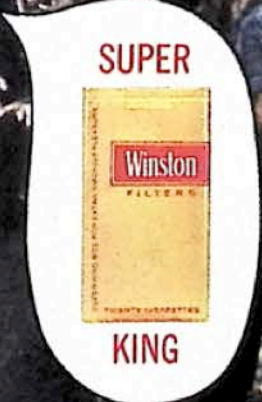


1. Winston tastes good like a cigarette should.

2. You mean... as a cigarette should.

3. What do you want, good grammar or good taste?

4. I thought you meant a sports car rally.



Winston may not say it right, but they sure know how to make it right with specially processed **FILTER BLEND** tobaccos



'71 Mustang. New Style and Handling from the Trans-Am Winner.



MUSTANG MACH I

MUSTANG



Mustang has always meant outstanding roadability and nimble handling. Proof comes from three Trans-Am and two SCCA National Rally Championships.

And 1971 brings you even more Mustang. Wider tread. Lower stance. All-new body-chassis. Super slippery Sports-Roof. New optional 351 Boss HO and 429 CJ-R 4V V-8's with Dual Ram induction. And improved handling that **MOTOR TREND** describes as "... a definite tendency to hug the road much tighter in cornering."

Mach I has the pole position. Standard thin-wall 302 V-8, all-synch 3-speed floor shift, low restriction honeycomb grille, sport lamps, tuned competition suspension with high rate springs, shocks and stabilizer bars, E70-14 belted tires, color-keyed spoiler bumper, dual racing mirrors, High Back buckets, more. With options to match. Go for the action. Test one of the six new Mustang models today at your Ford Dealer's. Find out which of these great road cars is for you.

How can a pickup work like a truck, ride like a car?

Consider these facts:

Ford pickups give you better ideas. And better ideas are what make a Ford a better buy. For example:

Biggest cab of any pickup. Combined headroom, legroom, shoulder room and seat height dimensions exceed those of any other pickup cab.

Only Ford has Twin-I-Beam independent front suspension. Wheels step over bumps independently to smooth the ride.



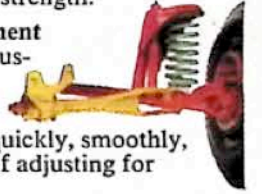
Levellest, quietest ride of them all. Virtually no nosedive on braking, less side-sway on curves. Independent tests proved Ford is quieter than all other leading pickup makes.

Most luxurious. Choose from four levels of luxury... all the way up to the unique Ford Ranger XLT, most luxurious pickup ever built. Distinctive good taste marks the XLT: wood-tone accents, thick-pile carpeting, deep-cushioned seats upholstered in pleated cloth and vinyl, plus luxury options like AM/FM stereo and air conditioning.



I-beam front axles. A Ford exclusive. Both axles are drop-forged I-beam design. Everybody's big trucks use I-beam front axle design for greater strength.

Radius rods help hold alignment better than any other front suspension system. Only Ford pickups offer radius rods.



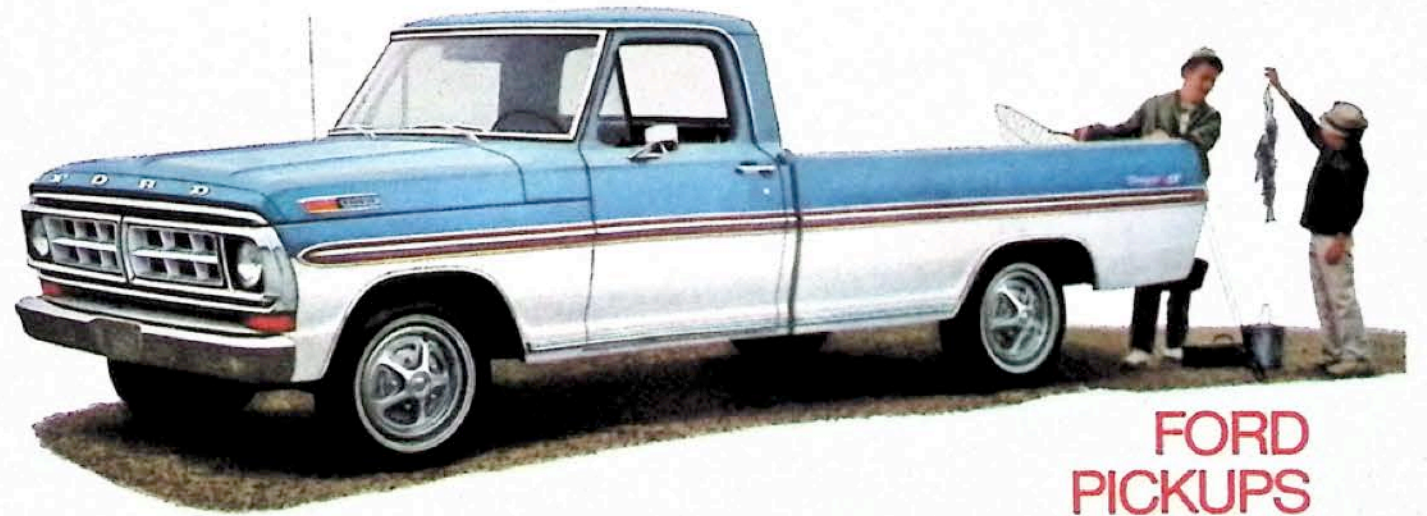
Self-energizing brakes stop quickly, smoothly, with little pedal pressure. Self adjusting for lower service costs.

Welded, instead of bolted, pickup box stays strong, resists working loose, means greater quietness, less chance of rust.

Leaf-type rear springs, like all big trucks use, for better stability. Exclusive Flex-O-Matic rear suspension, standard on F-250 and with heavy-duty springs on F-100, keeps the ride smooth, with or without a load.



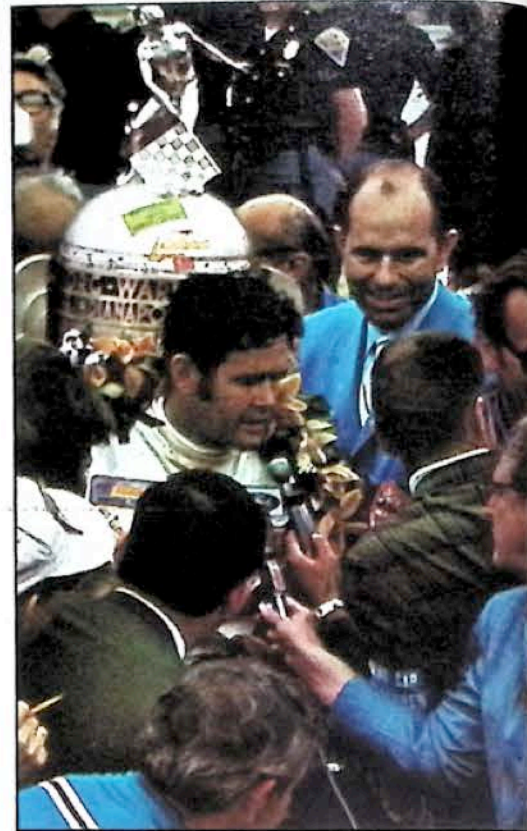
Make sure your next pickup includes the better ideas you get only from Ford. See your Ford Dealer for the pickup that works like a truck, rides like a car.



A better idea for safety: Buckle up.

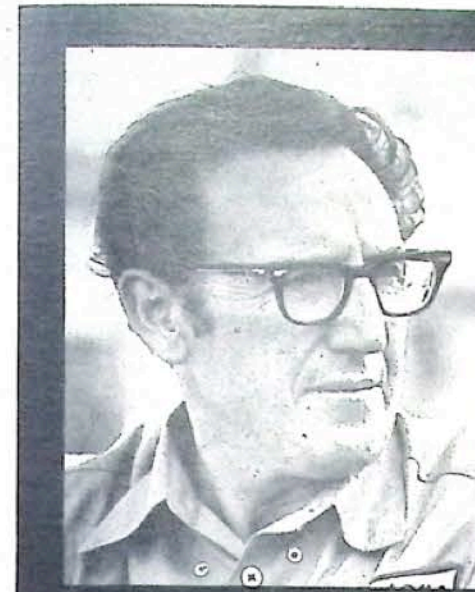
**FORD
PICKUPS**





WHY THE REST OF YOU ARE LOSERS

The Johnny Lightning 500 ate the competition alive at Indianapolis and Trenton and Milwaukee and most of the comfort stations on the championship trail. The people who did it, Al Unser, Parnelli Jones and George Bignotti tell the secret of winning everything.



"I build it!
The car is the result of three years' development and sweat."



"I drive it!
Every mistake you make is just one less that you have left."



"I'm the Boss!
I have nothing more to prove; I just want to keep learning."

Editor's Note: The day after Mario Andretti won Indianapolis in 1969, Clint Brawner was washing down the STP Hawk outside his garage. George Bignotti walked up and talked with Brawner about the race and why Mario had won. Bignotti made some observations about the Hawk, and Brawner listened silently. After a few minutes Bignotti walked away. His car hadn't competed because the driver, Al Unser, fell off his motorcycle and broke a leg. But somehow you knew it didn't matter. He looked like a man who knew something, a man confident of the future. In 1970, the Vel's-Parnelli Jones, Johnny Lightning 500 won ten races of eighteen on the USAC Championship trail, using basically the same raw material as their competitors. With McLaren-like consistency, the blue car, with the jagged lightning on its cowl, arced through America's heartland with electric speed, scattering would-be challengers like so many straw men. We thought you'd like to know why.

By Jim Brokaw

What makes Johnny Lightning run? Not an easy question. Something like asking why Johnny Unitas is unique, because, after all, is he not human like everyone else, give or take a few muscles? So you have to look beyond a driver, a mechanic, or a name, to a complex matrix of skills, determination and cohesion the likes of which has never before shred rubber dust across the nation's asphalt theaters. Johnny Lightning is a team.

According to Mr. Webster, a team is a group of people banded together to achieve a single aim. Key in the defini-

tion is: "The characteristic which makes it a team is the subordination of personal prominence to the efficiency of the whole." More than any other group on the "Trail," the title of "team" is best applied to the men of Johnny Lightning.

Like any organization in the public eye, there are those you see and those you don't see. The men on the surface are the ones who put the car together, keep it together, and prod a steady progress and growth. The primary contribution of the men you don't see, the nut and bolt men, beyond their many skills, is simply that they really care about their work and what happens to it. In words of one syllable or less—Pride. Pride and loyalty are the cohesive qualities generated by the men you see on the battle line, spurring on the men you don't see.

The men you see are Al Unser, the smoothest, coolest driver on the circuit; Parnelli Jones, former Indy winner, fierce competitor, fledgling car owner; and George Bignotti, engine builder, chassis man, a super-wrench who's always looking for the better way.

The ones you don't read about so often are Joe Leonard, the man who drives the other Johnny Lightning Special, and Vel Melletich, Parnelli's business partner and mentor. Joe Leonard has won a couple of races in his time, including one this year at Milwaukee. He's the steady old hand who keeps the opposition nervous and the Johnny Lightning name in the headlines on the rare occasion that Al fails to finish.

Unser pulls the trigger; the guy who

puts his hide on the line every time he buckles himself into the blue and gold, lightning striped product of the team. To the non-racing nut, Al is a young man who walked out of nowhere, broke his leg falling off a motorcycle at Indy in 1969, then cleaned up everything in sight ever since. It would make a great script, except that things didn't happen that way.

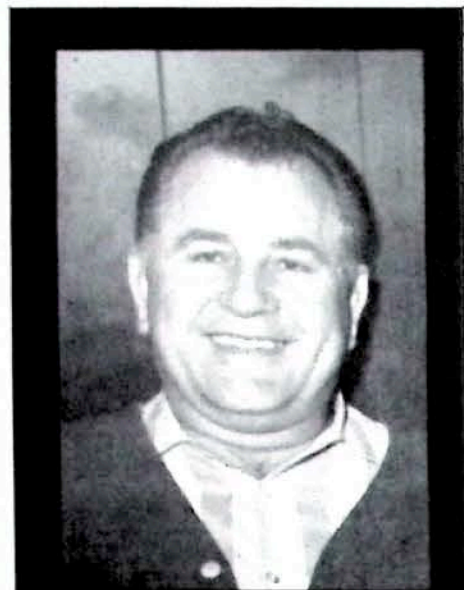
For openers, try the Unser family; they're all racers, right? Al's father and uncle were drivers as were his brothers Louis and Jerry. Brother Bobby won at Indy in 1968. When I asked Al why he went into the racing profession, he said he didn't really know; it's just something the Unsers do.

Much of the fame of the Unser family came off the top of Pikes Peak. An Unser has held the Pikes Peak record since 1934. Winning at the Peak is the "bar mitzvah" of the Unser clan. It is the thing they do to prove that they are ready to move on to bigger things. Al is the youngest of this generation and, as such, has been able to benefit from those who have gone on before. Second generation racers are a new breed. The current edition includes Richard Petty, and Buddy Baker in NASCAR; Billy Vukovich competing with Gary Bettenhausen in USAC, in addition to the Unser brothers. They approach racing with an inbred knowledge and acceptance that most of the first timers don't acquire for years.

Al became aware of the possible price to be extracted from those who choose to live on the fine line of competition when his brother Jerry died at Indy at 19. The experience has engendered a

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REST ARE LOSERS



**"I pay the bills!
Everyone runs his own
part of the show; mine
is the money valve."**

stoic acceptance of the scheme of things that belies his years.

"It was one of those things that was meant to be. Jerry was enjoying what he was doing. He knew what goals he wanted to reach and he just didn't make it. Bobby and I are aware of the danger but we just put it aside and don't think about it."

Brother Bobby taught Al how to drive and gave him tips on the way up. Now, when either of them is up against it and can't quite figure out why, the other is ready at hand to help out.

"Bobby and I are very close. People don't realize that. We are top competitors against each other, but we don't let it carry over off the track."

Instead of an exploding star who suddenly achieved fame, Al is a very knowledgeable, dedicated young man who went through the apprenticeship of the family tradition, wearing out his first pair of driving gloves on the gravel road that twists up the side of the Peak, then acquiring the seasoning which sharpens inherent skills.

In 1966 he drove a Lotus at Indy for Colin Chapman, finishing twelfth. Rodger Ward announced his retirement at the banquet that evening, so Al went to see Lola crew chief George Bignotti the next morning and asked him for a ride. George hired him, but that afternoon he was fired. Car owner John Mecom wanted Larry Dickson to drive for him, so Larry got the number one car, which had been built for Graham Hill, and Al was relegated to the Offy, recently vacated by Ward. Dickson decided that he wasn't quite ready for the car after a race or two, so Al wound up

in the number one machine.

This was the actual beginning of the Johnny Lightning team. George Bignotti had a long and rich experience with racing cars and racing drivers. He wrenched for A.J. Foyt in 1964, when A.J. brought in ten winners. He and A.J. disagreed on a few things the next year so George moved on to Texas and Mecom. When Al began driving for him in 1966, he could not accurately relate what was happening to the car, so George set about teaching his new driver the art of testing. In the long run it was the best thing that could have happened. Al is a rare breed of driver who is his own severest critic.

He listened to George and he learned to interpret the inputs received through his hands and the seat of his racing suit, and translate it into suspension corrections and engine performance analysis.

While Al was developing his ability to analyze the car's behavior, George was doing some heavy thinking about the best type of machine to take advantage of Al's skill. George had run Lola machines at Indy and in Can-Am competition. He liked the car and he liked Eric Broadley's approach to race car design. He got together with Broadley and they created a new machine for Indy. Eric did the basic structure and George helped out with the suspension design, locating points and the engine and means of attachment. They also incorporated a new wrinkle, four-wheel-drive built by Hewland. Like all unfamiliar things their potential success in the 4WD vehicle confused the USAC rules makers into outlawing it.

By this time George had acquired a reliable engine builder, George DeBucci, who did things the way Bignotti wanted them. With DeBucci bolting them together, and Jimmy DeLamotta working the chassis with Johnny Capels, the boss was able to concentrate on fine tuning. All three assistants had the sufficient skill to get the job done and intelligence to do it Bignotti's way.

As the imminent threat to outlaw four-wheel-drive grew, Bignotti was faced with the task of converting a basically good machine into a better two-wheel-drive machine. At this point Parnelli Jones entered into the picture. The Vel's-Parnelli Jones race team was looking for new hardware and a new driver. Why?

Vel Melletich, successful Ford dealer in Torrance, California, had gone into a business partnership in 1964 with his old friend Parnelli Jones. Parnelli had long been under contract to Firestone as a driver and when his driving activities diminished, he and Vel opened a Firestone retail tire outlet close to the Ford dealership. Part of the deal included the distributorship of racing tires for the West Coast. Attacking the business world with the same ferocity with which he had attacked the racing world, Parnelli's enterprise prospered and in 1967, he bought into Vel's dealership.

Al Unser and Parnelli Jones are diametric opposites — Unser the cool, methodical, deeply introspective driver;

Parnelli intense — and aggressive, competitive to the point where it often jeopardized victory. With business thriving, it was a natural for Parnelli to become a car owner when he decided to cease his driving activities at Indy. He initially acquired a Lotus turbine car which was short lived due to the omniscient rules that govern the efforts of those who challenge the Memorial Day midwestern festival more creatively than others. At this point in the game, George's need for backing and Parnelli's need for success arrived at the same place at the same time.

In January, 1969, the Vel's-Parnelli Jones race team took on George Bignotti, his driver Al Unser and George's crew. Just to make life a little easier, they also leased George's shop at Indy for a year. The union of the two forces brought together Bignotti's confidence in the Lola machines and Parnelli's experience in the STP Lotus-based wedges. The machines the V-P team acquired from the STP race team were four-wheel-drive.

The 4WD system was technically sound but very expensive and very complex. Their additional weight was penalty enough, but just to remove any doubts remaining, USAC announced intentions of giving them the heavy thumb at the end of the year.

The revitalized V-P race team set about constructing some two-wheel-drive machines, covering the best of the Lola and the Lotus with a wedge body. By the time Indy came along, the team was ready to do some serious racing, when disaster struck.

While engaging in a bit of early practice competition with the boss, Al Unser fell with his motorcycle and broke his leg. That wrapped it for Indy and, if everything ran true to form, the rest of the season. It was highly unlikely that a driver could miss the heart of the season and regain enough polish to be competitive with the drivers who were sharpening their skills and timing and working out their machines. In the case of a driver who had barely reached his stride, it was unthinkable. Except for Al Unser.

Al came back flat out, caught the field and very nearly left them in the dust. Winning five out of the last six races on the schedule, Al finished second to Indy winner Mario Andretti in the USAC points championship.

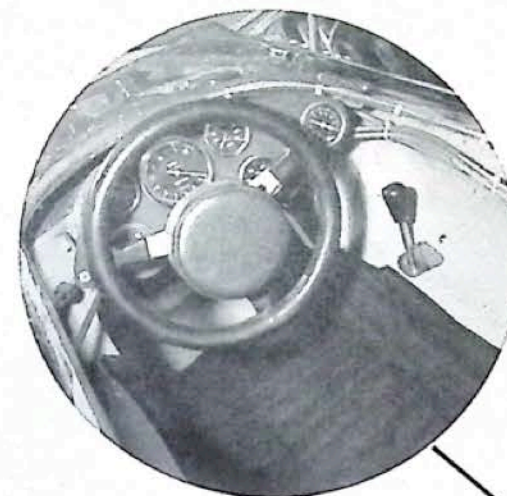
No one has been able to figure out how Al was able to do the relatively impossible task of walking out of a cast and stomping the opposition. Even Al didn't know.

"I was the same driver after the accident that I was before. I didn't do anything different. I was trying as hard as I could before I got hurt, so I couldn't have done any more after I recovered. The car improved a little with every race, but it was great before I got hurt."

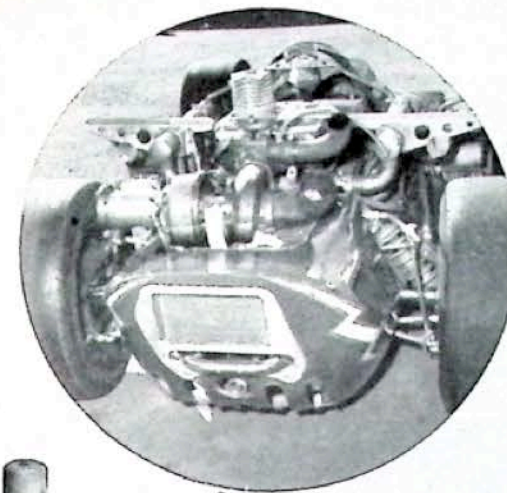
Later on in the conversation, Al mentioned one little point that he really didn't consider to be significant, a point that separates him from other drivers.

"I felt that I had let the team down."

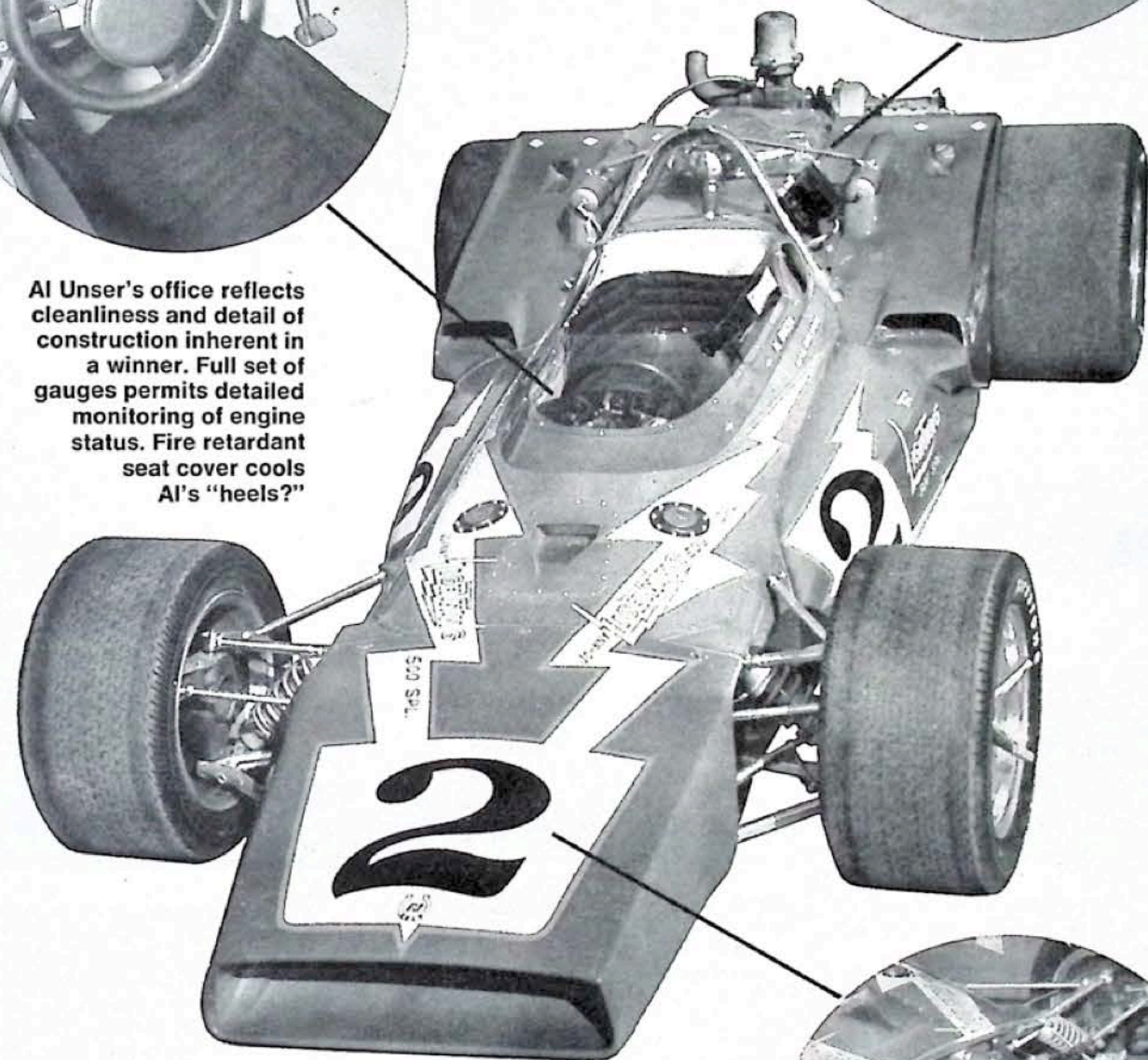
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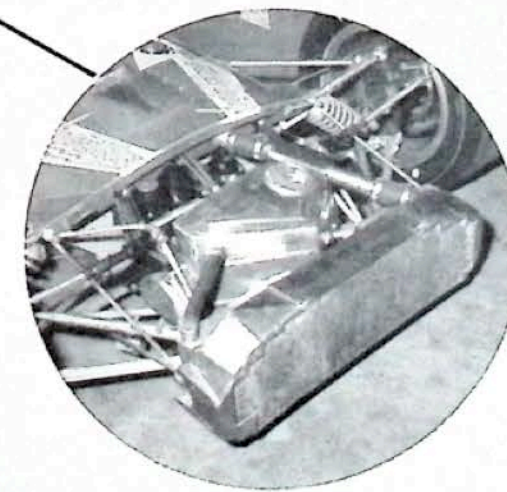
Al Unser's office reflects cleanliness and detail of construction inherent in a winner. Full set of gauges permits detailed monitoring of engine status. Fire retardant seat cover cools Al's "heels?"



Business end of the lightning bolt incorporates a few refinements not found on the average race car. Transaxle oil cooler exhausts at extreme low pressure point. Upper radius rod anchors forward of engine mount.



Vertical placement of radiator permits max flow of cooling air. Dry sump oil tank has coolers behind radiator. Magnesium front upright retains hole from 4WD set-up for lightness. Hydraulic reservoirs are safely mounted behind oil tank. Unequal A-arm suspension incorporates single trailing upper link.



REST ARE LOSERS

While the young man from Albuquerque was doing his thing, George Bignotti, now free of the time consuming chores of trying to run a team at the same time he was doing the wrench work, was able to concentrate on tweaking up the Lola-based wedge and its turbo-Ford engine and ponder the refining he felt the combination required.

While George was fine tuning the chassis and pouring little ampules of black magic into the engine, Parnelli began to notice something about him-

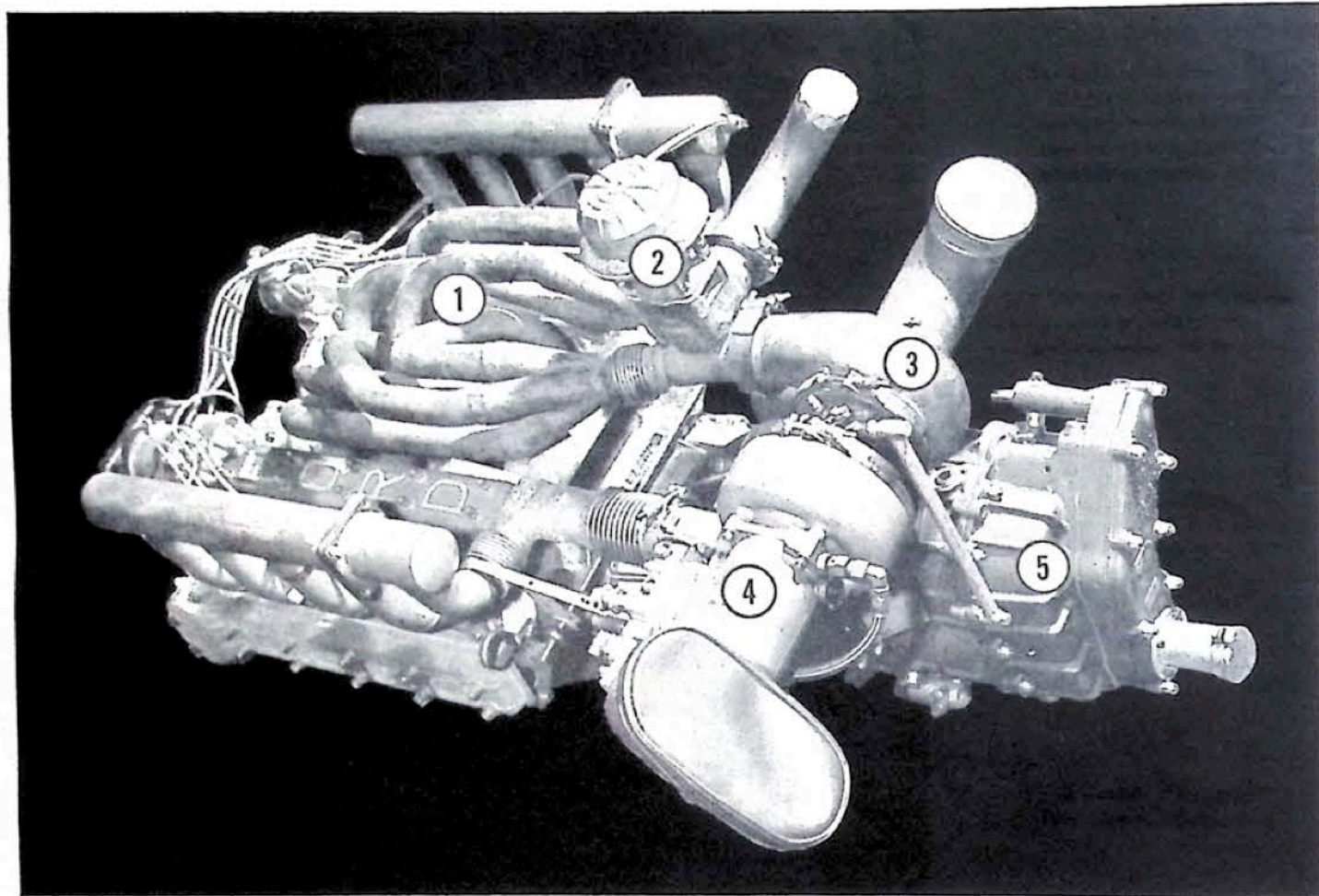
"I told Al, 'Don't do as I do, do as I say. Learn from a guy who made some mistakes so that you don't make the same ones.'"

"Early in the season Al was shy and a little hesitant to insist that the car needed an adjustment. I tried to help him through this period. Most of the time, the mechanic thinks the car is right and the driver is wrong, simultaneous with the driver's thinking it must be the car. Al was never like that and he and George have established a good relationship. They trust each other's judgment."

Parnelli grinned a bit as he acknowl-

When I asked George how such things were resolved, he explained, "If it was something I felt very strong about, I would argue the point with a great degree of force. If I saw that it just wasn't going to sell, then we did it Parnelli's way. He is the boss and it's his money that is at stake."

Parnelli confirmed this, but not in an overbearing manner. "Sometimes I had to insist that an adjustment be made when George didn't want it made. So far I've been right, but sooner or later I'm going to fall on my keister. No one can be right all the time, but I still have to do what I think is right."



1 Snake pit exhaust forms equal length runners from engine exhaust ports to the turbo charger intake.

2 Schwitzer waste gate controls turbo inlet pressure with relief valve.

3 Pre-heated exhaust gases drive impeller wheel of AiResearch turbo charger that incorporates the

4 Bendix fuel control system. All fuel lines are aircraft type armored flex.

5 Bignotti manicured four-speed Hewland transaxle.

self while thundering across the wasteland of Baja in practice for the 1969 1000.

"Al is the kind of driver I wish I could have been. He's the coolest man I've ever seen in a race car. He never gets excited. When they dropped the green flag on me I'd turn into a wild man. I had to lead. I couldn't stand to have anyone in front of me. I didn't even realize it till I ran the Baja. Now I cool it, but it's hard to do."

Even as Parnelli was describing his insatiable drive to lead every lap of every race, his eyes flashed fire; he hunched over his half finished plate of mexican stomach destroyer and radiated intensity. Some of the "lines of maturity" disappeared from his face as he compressed an imaginary box of ideas with his hands, trying to make it small enough for me to understand.

edged that maybe once or twice he broke while leading the pack too far, too early in the race.

"Al knows just how fast to run to keep up front or within striking distance without hurting the car. Lots of guys can get a car around the track in a big hurry but the smart ones don't put themselves in a position to get in trouble. There's a big difference between being fast and being good. Al is good."

With two strong minded individuals like Parnelli and George working on the same crew, differences of opinion are inevitable. Both men are quite knowledgeable in the field of chassis set-up and there were a few times George did not want something that Parnelli did. In spite of the volatility, the anticipated explosion never reached the point of detonation.

Between the three of them, Al, George and Parnelli, the chassis was perfected, the engine ran strong with unusual durability and the opposition fell by the wayside. At the end of the 1969 season, the development stage of the team had ended and they were primed for a McLarenesque domination of USAC 1970.

Between seasons, George took a few aerodynamic ideas he had nurtured to his long-time friend, Roland "Whitey" Haubold, manager in charge of subcontractors at McDonnell-Douglas. Whitey has known George for 40 years and is just as big a racing nut. The difference is that George earns his living at racing and Whitey gets his recreation from it. Whitey has an additional advantage of being detached from the daily chores of car building and racers' secrets which often cloud objectivity.

George had worked out an idea for a completely different approach to the aerodynamic design of the car's outer shell. While the wedge was the most efficient shape for going fast while in ground effect, it did little to compensate for cross winds and actually reacted adversely while decelerating. For a racer to consider what to do while slowing down is about the same as a quarterback practicing getting tackled in the end zone — and race cars do slow down.

Whitey poured over George's ideas, consulted a few of his cronies from the plant in their off time, and eventually declared the concept sound. While nei-

ers and concepts which compute well don't turn good lap times; however, strength of materials and stress loading is their bag and that is what Whitey and friends produced for Bignotti. It gave the V-P team quite an advantage to know precisely what thickness of fiberglass would support the anticipated loading, and what gauge and alloy mix would provide sufficient structural integrity for the tub without wasting an ounce of extra weight.

One of the little extras which gives the V-P race team its edge is the fact that they deal in ounces, millimeters, and the amount of drag produced by flat head rivets as opposed to flush rivets. They are deeply concerned over the weight of a sloppy weld against a smooth weld. There are no sloppy welds. Every piece is the lightest and smoothest possible which will provide the required strength.

The 1970 cars were built at the V-P shops near the corner of Hawthorne Boulevard and 190th St. in Torrance, Calif. George Bignotti and Parnelli combined their ideas and provided direction to Joe Fukushima, Gary Koike, Steve Frays and Mike Underwood for the metal work, while Mike McQueen did all the fiberglass body work, including making the necessary molds. Another little plus for the team: by using their own molds, there is no chance of anyone else gaining access to them for duplication. As a result, the fiberglass nose, tail and spoilers are unique to the Johnny Lightning car.

Suspension locating points were slightly changed for 1970 to give better toe steer and roll steer. Inlets and outlets for cooling air are precisely located to take full advantage of the body's natural high and low pressure points. The radiator is vertically mounted to produce the maximum rate of flow of cooling air. There are no losses induced by laying the radiator at a slant and having to duct air through with three or four direction changes. The air simply rams straight through to an exit vent located at a low pressure point.

The windscreen is on a non-rigid mount to allow flexing in the air stream. The upper section of the windshield is vertical for additional strength. They didn't crack a windscreen in 1970.

Not only were aircraft grade fittings and armored lines used, but the components in the fuel system were originally designed for use on light aircraft. The basic components are an Airesearch turbo-charger, Schwitzer fuel pressure regulator, Airesearch injector pump, and a Bendix fuel control unit. The turbo-charger produces 21-28 lbs. boost @ 10,800 engine rpm to generate a 10:1 air compression ratio.

An example of the detail planning that goes into the Johnny Lightning car was illustrated when George had an opportunity to pick up some surplus aluminum rivets for the car. With the price of aluminum being rather steep, it sounded like a good deal. Whitey advised George to pass up his good deal since aluminum hardens as it ages, and all of the metal had been carefully selected and matched. Rivets with the

incorrect malleability would cause the joined pieces to flex improperly and loosen the riveted joints.

A Cuno oil filter and Fram fuel filter keep the operating fluids free from contaminants. The gear box oil cooler is located directly behind the Hewland transaxle at a point of extreme low air pressure for positive air extraction and maximum cooling.

The gearbox itself gets a thorough rebuilding before it is installed. The gear faces are reground and adjusted to eliminate any slop, either while accelerating or decelerating. Not only does this reduce the adverse torque loading on the drive system, it also reduces stresses within the box. They haven't lost one yet.

The transverse bulkheads, longitudinal box sections and the engine/transaxle mounting supports keep body flexing to a minimum. This reduces movement of the suspension locating points allowing an almost vibration-free set-up. Once the suspension is set up for the track being run, adverse body flexing will actually change the set-up through a turn. The Johnny Lightning cars are fully controllable throughout the entire length of the track including entering and exiting turns. Bump steer was eliminated by setting the suspension to permit the wheels to move only in a vertical plane.

The reduction in vibration, partly ascribed to the retention of the hollowed cast magnesium front uprights from the four-wheel-drive cars, allows the fully instrumented cockpit other would-be competitors only dream about. By monitoring the engine so completely, Al is better able to judge just how close he is to the Ford's operating limits.

Although the basic engine comes from A.J. Foyt, it is completely blueprinted by Bignotti and Jimmy DeLamotta and imbued with the Bignotti magic he cares not to reveal. George completes the set-up by tuning the entire rig on their dynamometer.

George does all of the final set-up and personally checks the suspension for caster, camber and toe setting before the car takes the track.

The other minor little point in their favor — when the Johnny Lightning team arrives at a track — they are ready to race. Bignotti keeps a little book of notes on every track on the circuit, which includes the complete chassis set-up for a dry fast track or a loose oily condition. The car is so well balanced that they use the same machine for flat ovals, high banked track and road courses. The only changes are the springs and shocks for the flats and high banks; and the engine, springs and shocks for the road courses. Being ready for the race when you arrive is such an obvious point of preparation, it wouldn't be worth mentioning except for the fact that so many teams aren't ready until the day of the race — or worse.

In spite of being prepared, there is so much at stake at Indy that Bignotti has another ace up his sleeve. Longtime

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A Reasonable Alternative

Insurable street muscle with just enough spice to make it interesting

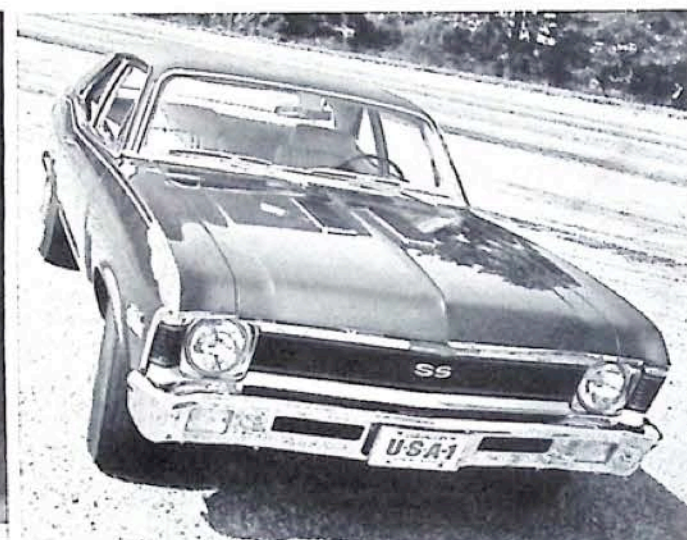
By Jim Brokaw



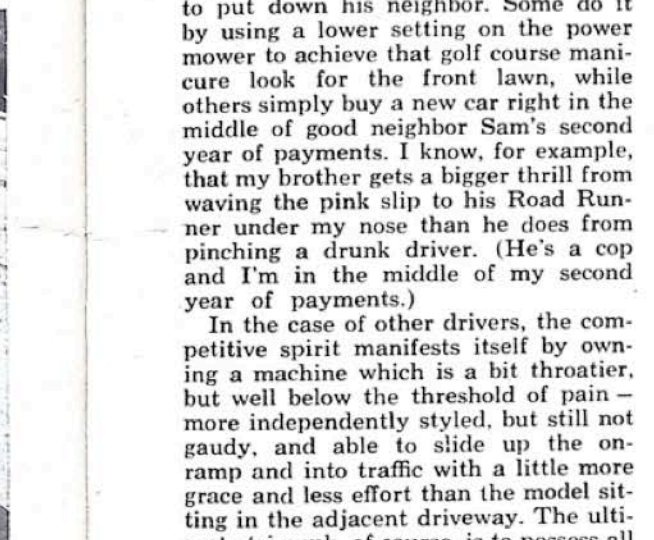
COMET GT



DEMON 340



NOVA SS 350



HORNET SC 360



With the entire civilized world voicing indignant outrage over the smog problem and insurance companies, safety experts and anyone who can't afford one sniping at the super cars, we decided to take a look at some reasonable alternatives. The machines which seem to hold the most promise are the Nova SS 350, Dodge Demon 340, and the Hornet SC 360. These cars were specifically tailored for the go-fast-but-stay-honest market. Just to make it interesting, we threw in the new Comet 302 GT. The Comet isn't really in the same class as the other three, but we were curious as to just how far it had to be brought along to be competitive. Much to our surprise, it is closer than you might readily suspect.

The original concept of the little hustlers was very simply a cheaper way to get your mini there quicker than your small-car owning neighbor. While the expression "get there quicker" will likely offend the prophets of falling skies, I think were obligated to recognize the fact that the median American car buyer has a competitive soul. He likes to put down his neighbor. Some do it by using a lower setting on the power mower to achieve that golf course manicure look for the front lawn, while others simply buy a new car right in the middle of good neighbor Sam's second year of payments. I know, for example, that my brother gets a bigger thrill from waving the pink slip to his Road Runner under my nose than he does from pinching a drunk driver. (He's a cop and I'm in the middle of my second year of payments.)

In the case of other drivers, the competitive spirit manifests itself by owning a machine which is a bit throatier, but well below the threshold of pain—more independently styled, but still not gaudy, and able to slide up the on-ramp and into traffic with a little more grace and less effort than the model sitting in the adjacent driveway. The ultimate triumph, of course, is to possess all of this ego booster at a lower cost than the window sticker filed away by your neighbor's lien holder.

While the quicker-but-cheaper market was the original target, the ecological revolution opened new horizons. If that wasn't a sufficient boon, the insurance industry's muscle purge kicked open a few more consumer doors. In keeping with society's penchant for deifying that which is necessary, it is now the in thing to own a car which is large enough to accommodate your needs and family posterior count but not one square inch larger. It is not only the in thing, it may be the only means of conveyance that you can afford to insure.

The four little guys under consideration here fit the bill with enough individuality to satisfy the most discriminating of tastes. The base prices of all the cars, F.O.B. Detroit, range from a low of \$2,217 for the Comet, up to \$2,721 for the Demon. For a starter, these are ground zero in most everyone's fiscal ballpark. However, before you send a telegram to your bank and rush off to your favorite dealer, be advised that these are prices for the base

cars, which are not born quick steppers. You have to bolt on a few "optional extras" to get the desired performance and comfort level. The dollar outlay to bring the cars up to the conditions as tested, range from a paltry \$634 for the Comet to a numbing \$1,944 on the Nova.

Each manufacturer has taken a slightly different approach to the problem and, logically, achieved a slightly different result. Dodge went the route of the antecedent Super Bee—simple machine, void of frills, with a basic, balanced styling, tailored to taste with options. Using our common denominator of the quarter-mile acceleration test, modified to include intermediate speeds along the way, the Demon ran the quickest, with a 14.49 elapsed time for an end speed of 98.25 mph. That's not too bad. You don't need all the goodies listed to achieve this.

The only necessities required, if running quick is what you want, are as follows:

Bucket seats—not to discourage social enterprise, but for better lateral

to know what your engine is up to. **NOX exhaust emission control**—nice for ecology, necessary for California.

Radio Music Master AM—even if you have a tin ear, it's great for traffic advisories and staying awake on long trips.

Power steering—all the better for quick response on slippery streets.

Tuff steering wheel—more necessary than nice, sometimes those sweaty palms get loose on the wheel. If your palms don't sweat, you might consider replacing your passenger.

E70x14 bias belted tires—the best tires available are the most essential option for continued enjoyment of your car.

One bright light on the Dodge scene is that the 340 engine is included in the base price. Not to forget side and rear stripes. The choice of transmission is really up to the driver. We set our times with a 4-speed stick. The 3-speed Torqueflite automatic trans will just about match any time you can set with a manual mixer.

The same reasoning applies to the



Loose suspension in Comet allows car to take a set going into tight turns but it holds stability all the way, regardless of power application. Comet is best package for the money.

retention of the operator, which they do marginally.

High performance package—which consists of stouter springs, shocks and bars to eliminate adverse body motion.

Front disc brakes—obvious option.

Power brakes—equally obvious.

Tinted windshield—reduced glare, safety feature.

Racing mirrors, left and right—another safety bit (there's no substitute for knowing what's happening around you.)

Mirror, inside, day-night—personal option; it isn't needed often, but is an invaluable asset when followed by a high beamed somnolent.

Hood tie down pins—another personal option, they simply preclude any ill effects resulting from careless hood latching and show you mean business to the drive-in kids.

Undercoating—not essential, but helps keep everything tight and rattle free.

Tachometer—should be a delete option with a stick shift. It's always nice

Hornet, which turned the second quickest time of 15 seconds flat at 94 mph. This is also quite respectable. The Hornet was equipped with a 3-speed automatic trans, referred to in the sales brochures as "Shift Command." This lofty labeling means that you can shift by manually selecting the desired gears in proper sequence, or you can let it shift for itself. We tried both ways and found that the box was a little balky on a manual shift from second to third. It required a bit of a nudge on the gas pedal to complete the job without any hang-ups. In full automatic, or "D," we did not encounter the lag problem. This may have been an idiosyncrasy of our test car, but the impression was that it is an inherent problem.

AMC goes at their price packaging a little differently from Dodge. The 325 hp, 4-V engine is an extra cost option, but the \$207.25 price tag includes the dual exhausts, suspension handling package and the tachometer. Since all of these items are necessary comple-

Reasonable Alternative

ments, it is a handy package for the price. Other no charge "standard" options are the D70x14 bias belted tires, that do not grip in the wet, rallye side stripes and the convenient little space-saver spare.

Like Demon, the Hornet has the required safety and performance options at a slight additional charge. Among the more desirable items are the power steering, power disc brakes, tinted glass, sports steering wheel, radio and HD cooling package. An insurance plus are the bumper guards. They won't handle the mythical 5-mph barrier crash, but every little bit helps. NOX control is achieved through a transmission actuated spark retarder. A twin-grip differential is also available, for \$43.00, but was not included on the test car.

Nova came replete with options as you can judge by the stout price increase of \$1,944 over base. Don't despair, Chevophiles, most of the high priced things are for dress-up or luxury.

The engine is an extra cost option under the "SS package" label. This includes such helpful additions as dual exhausts, power disc/drum brakes, simulated hood scoop, E70x14 bias belted tires, and 14x7 wheels. The price is steep, at \$327.55, but full value is received.

The HD, or sports suspension, package of beefier shocks with heavy front and rear stabilizer bars rings in at \$30.55. Evidently Mr. DeLorean's product planners feel that the springs need no heavier option and we agree with them. The undercarriage is stout.

Bucket seats are desirable due to the aforementioned lateral retention feature; however, in Nova's case they come attached to the custom interior with a price tag of \$247.55 for the whole thing. If you want the buckets, the fluff comes with it. Turbo-hydraulic puts the power to the rear end at \$205.95. It gets the job done as evidenced by a quarter-mile time of 15.92 at 87.63 mph — swift enough for any on-ramp. It too has an individual shift feature, which produced the best times.

Positraction, power steering, tinted glass, engine monitor instruments and a simple AM radio round out the desirables.

Comet, by comparison, is spartan. The option list is small but you need the whole thing to make it perform and do it safely. The 302-2V engine, 3-speed, floor-mounted manual trans, HD battery, power steering, AM radio, and D70x14 tires are all extra with suitable price tag. Comet's handling package has beefier springs, heavy shocks, and a big front stabilizer bar, all of which is quite a bargain at only \$12.00. What is nomenclature as the GT package includes bucket seats and racing mirrors as functional items, and stripes, phoney hood scoop and blackouts at strategic locations as frosting. While the machine is simple and decoratively unassuming, it does get most of the job done.

Quarter-mile times of 16.30 at 83 mph are not really in the ball park with the



Above: Backside '71. Demon is repainted, striped Duster with a bit more styling flair and a lot more quality control. Soundness of body and absence of chassis rattles typify construction. Below: Responsive 360 V8 and broad racing stripe convert boxy little Hornet into attractive surcharge beater. Overall styling is appealing to most, and performance on regular gas is good.



other three mighty mites, but the third generation Comet is breathing through only two venturis, while the others have four barrels.

Screaming down the drag strip at Orange County International Raceway produced a bit more information than the posted times and speeds. The Demon tended to bog slightly coming off the line, but quickly picked up the pace. Its four-on-the-floor has quite a long throw between gears and is stiff in spite of the Hurst shifter on our test model. You can get through the gears in good time, but it takes a little more muscle than you expect. The 340 is strong all through the range covered.

Hornet comes through the staging lights spinning and smoking. The 360 works best at the lower end, with not too much left as it nears the timing lights. This really is not a bad feature, since common sense dictates that you don't need too much more after you pass the 90 mph mark.

Nova was consistent throughout the run. The 3.07:1 rear end ratio didn't do much for the times, but it is a much more civilized gear for the street. We think a gear in the 3.25 area would be a nice compromise.

Comet in its tested configuration is

not a drag racer. While the time is respectable, the shifter has too long and wide a throw for rapid gear changes and if one goes from second to third without pausing momentarily, there is a disconcerting *gronch* from the box. This was true of two different Comets we tried, so it appears to be an inherent problem. We welcome the return to yesteryear with the placement of the 3-speed shifter on the floor, but conditioned reflexes keep wanting to shift into 4-speed first at a light, and there ain't no way to get the box into reverse while you are still rolling forward. A lockout for reverse would be a great boon. Once you get used to your own machine, it will be no problem, just don't lend it to any friends used to 4-speeds. The Mercury engineers have partially remedied the problem by installing an angled gate which guides you up to second for normal shifting. This prevents an inadvertent selection of reverse while downshifting from third to second.

While all the cars were good at going, they were equally proficient at stopping, with a few minor side effects. From 30 mph, locked up, though Hornet made a very slight right turn out, all made it in under 30 feet. This is nothing to go blowing horns over, since any mod-

ern car should be able to lock up at 30 and stop quick and true.

Locking it up at 60 is a whole different adventure. This is where brakes and tires return the dividends on your investment. Demon stopped second shortest, but generated a little rear wheel hop. It's annoying but little else. The stop was quite straight.

Hornet was third shortest at 124 feet, but the stop was dead straight with no adverse effects. Nova stopped well at just under 132 feet with no wheelhop, but it did display a consistent tendency to turn out to the left. In spite of the turn, the body stayed in what would be the equivalent of a normal traffic lane. Nothing unsafe, just an added thrill if you ever have to stab hard at 60.

Comet was the trickiest of all. While it turned in the shortest stop of all at 113 feet, the suspension requires a bit of technique. Unlike the other machines, which are fairly solidly suspend-

ed, the Comet is loose. Not soft or mushy, just loose. Translated, this means that it is free to work to a greater amplitude of body displacement to any given input. If you lock it by slamming quickly to the floor, there is an adverse tendency to turn out. The correct procedure is to apply the brakes firmly initially, allowing the chassis to complete the weight transfer, then continue on to the floor. While it sounds complicated, it all occurs in micro-seconds. As soon as you apply firm pressure, the chassis sets immediately. Just don't get club footed and slam it home on the first shot. What the car needs is a little less suspension compliance.

Handling characteristics were unique to each machine. Demon is a bit harsh, but corners well. This is due to the HD package. If you like to hustle through corners, the standard set-up takes some getting used to. An under-shocked Demon will take a set with the front first

instead of the customary rear set. This increases the tendency to understeer. Our test Demon was very forthright in the corners.

Nova has a somewhat choppy ride and cornering, though firm, is not awe inspiring. There is a great sense of having most of Nova's weight under the seat level. It may be an anatomical illusion, but it gives the impression of possessing a very low center of gravity.

Hornet is great below 60. Handling is firm and positive, but the ride is very harsh. Above 60 the little beast gets skittish and tends to overcorrect for road inputs — not really comfortable.

Comet has a loose suspension that works a lot, but once you set up for a corner, you can come on with power almost at will and come through very nicely. The ride is comfortable, but a little familiarity with the cornering will be time well spent.

On the negative side, Demon and Hornet share the same vague power steering with no road feel, Hornet's brakes are too sensitive for comfort and Hornet's front seatback arrangement requires outside help for adjustment of rake or entering the rear seat area.

As far as quality control goes, AMC has replaced Chrysler as the prime bad example. Dash pieces are off just enough to notice, and the driver's side window leaked air and water. The basic running gear is fine; it is the finish work which is lacking. It's too bad because the Hornet is an attractive package for the price. The folks at AMC just have to learn to finish their work.

Chevrolet's quality control has long been one of their stronger points and Nova is no exception. Comet is basic and slightly stark, but what is there is done well, except for the rather obviously awkward steering wheel/pedal arrangement. We'd guess that because of the V8 engine, the steering column was offset slightly and this in turn killed what might have been good driver positioning.

With the addition of a 4-V carburetor and a high- or medium-riser manifold, both of which are available at Muscle Parts counters, Comet will come on as the best package for the money, although not the best appointed. An interesting comparison is between the current version of the Comet and the old SS-22 of 1963, the car that signaled Mercury's disenchantment with pure economy in the early '60's. It may come as a bit of a shock to you to note that progress has been made. The new Comet is cheaper than the old one by \$506 and it outperforms the old one all the way down the line.

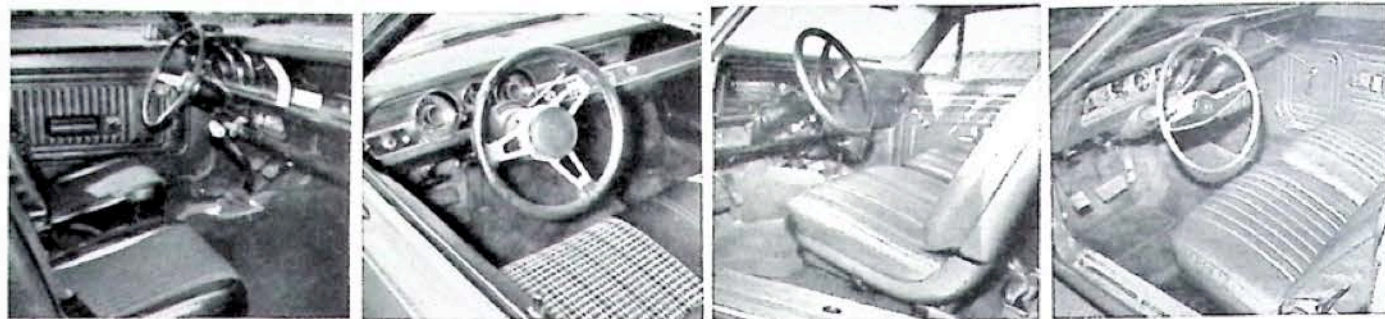
All cars tested use regular fuel except the Demon 340, and all escape the stigma of the dread 10:1 weight to horsepower ratio which the insurance industry uses to define a muscle car. Hornet is the only one which is close, with an 11:1 figure. Demon is "safest" at 12:1. If the net horsepower figures are used, all four are well out of the surcharge zone. The figures shown on the spec page are gross figures, showing you can sniff high performance without paying through the nose.

/MT



Above: Mercury displayed shrewd planning by utilizing many existing parts to convert Maverick into latest Comet. Taillights, hood scoop, and center grille section all come from Cyclones. Below: Nova is unchanged from moderately popular '70 version, with exception of such trim details as clear back-up lights and new bezels for headlights. Interior quality ranked highest.





SPECIFICATIONS	DEMON	HORNET	NOVA	COMET
Engine	90° OHV V8	90° OHV V8	90° OHV V8	90° OHV V8
Bore & stroke — ins.	4.04 x 3.31	4.08 x 3.44	4.00 x 3.48	4.00 x 3.00
Displacement — cu. in.	340	360	350	302
HP @ RPM	275 @ 5000	285 @ 4800	270 @ 4800	220 @ 4600
Torque: lbs.-ft. @ RPM	340 @ 3200	330 @ 5000	360 @ 3200	300 @ 2600
Compression Ratio	10.5:1	8.5:1	8.5:1	9.0:1
Carburetion	4v	4v	4v	2v
Transmission	4-spd stick	3-spd auto	3-spd auto	3-spd stick
Final Drive Ratio	3.91:1	3.54:1	3.07:1	3.00:1
Steering Type	power	power	power	power
Steering Ratio	18.1:1	19.4:1-15.7:1	15.8:1-12.9:1	21.3:1
Turning Diameter (Curb-to-curb-ft.)	37.2	36.0	41.4	35.6
Wheel Turns (lock to lock)	3.5	3.3	2.3	3.7
Tire size	E70-14	D70-14	E70-14	D70-14
Brakes	Power, disc/drum	Power, disc/drum	Power, disc/drum	Drum/drum
Front Suspension	Torsion bars with stabilizer bar	Twin ball joint, coil with stabilizer bar	coil with stabilizer bar	coil with stabilizer bar
Rear Suspension	leaf	leaf	leaf	leaf
Body/Frame Construction	Unitized	Unitized	Integral Body-frame with partial frame	Unitized body platform chassis
Wheelbase — ins.	108	108	111	103
Overall Length — ins.	192.5	179.26	189.4	181.7
Width — ins.	71.6	70.58	72.4	70.6
Height — ins.	52.8	52.40	52.5	52.6
Front Track — ins.	57.5	57.46	59.0	56.5
Rear Track — ins.	55.5	57.00	58.9	56.5
Curb Weight — lbs.	3360	3105	3168	2596
Fuel Capacity — gals.	17.0	16.0	16.0	15.5
PERFORMANCE	DEMON 340	HORNET SC 360	NOVA SS-350	COMET GT 302
Acceleration				
0-30 mph	2.8	3.1	3.1	3.2
0-45 mph	4.5	4.6	5.5	5.5
0-60 mph	6.5	6.7	8.5	8.7
0-75 mph	8.6	9.8	11.6	13.5
Standing Start ¼-mile Mph	98.25	94.00	87.63	83.00
Elapsed time	14.49	15.00	15.92	16.30
Passing speeds				
40-60 mph	2.7	3.2	3.3	4.2
50-70 mph	2.8	3.6	3.9	5.5
Speeds in gears				
1st mph @ rpm	41 @ 5500	45 @ 5200	42 @ 5000	41 @ 5000
2nd mph @ rpm	59 @ 5500	73.5 @ 5200	69 @ 5000	70.5 @ 5000
3rd mph @ rpm	78 @ 5500	109 @ 5200	107 @ 4900	99 @ 4000
4th mph @ rpm	106 @ 5500			
Stopping distances				
From 30 mph	28.2 ft.	27.5 ft.	29.- ft.	29.4 ft.
From 60 mph	123.4 ft.	124 ft.	131.11 ft.	113.3 ft.
Gas mileage range	11.5-12.6 mpg	13.0-17.0 mpg	13.0-14.4 mpg	14.6-15.8 mg

Selecting the Motor Trend Car of the Year is a complicated process of testing, comparing, evaluating. It demands the attention and skill of authorities. We judge not only on styling and performance but also in engineering, market value and on a dozen other factors listed on the score sheets of each of the judges. This year, as last, the editors of Motor Trend were

assisted in their final selection of the Car of the Year by an authoritative four-man panel of experts who operate under the hefty title, Conference of Automotive Research Specialists (CARS). We've pictured them below and give you a little background on each, to show you the value of their knowledgeable influence in determining the 1971 Motor Trend Car of the year.

CAR OF THE YEAR

MIKE JONES — Mike Jones is an engineer, with a sheepskin to prove it, but he gave up the slide rule-at-my-side route of most grads who troop into anonymity at huge aircraft or auto plants, to choose instead the exciting world of racing as a career. First running a Corvair in SCCA for Bill Thomas and later the famous Cheetah, he next went into the drag racing side as VP and General Manager of Orange County International Raceway. Mike is constantly on the phone arranging track dates for famous drag racing personalities to appear, or looking through field glasses to observe the testing activities of magazines like Motor Trend, the filming of movies or TV commercials on the track's straight or handling courses, or the testing of tires on the track's new skid pad. Mike Jones typifies the new breed of drag racer—exceedingly polite, well-groomed and well-informed *outside* his main field of interest. As such he is a popular speaker at service club gatherings, as well as an author of magazine articles and a book. Mike's willingness to try new ideas was illustrated in 1970 when he provided the L.A. Street Racers with their first chance at on-track competition, successfully carried out at OCIR. If our young man of today can be said to be on top of what's happening in drag racing, it's Mike Jones a returning member of our CARS panel.



ROY RICHTER — Because he was there at the start of it all, Roy Richter may be the oldest member of our CARS panel, but he isn't the kind of guy who will eat anybody's dust. His days in the automobile sport go back to the pre-WW II days when Californians raced souped-up Model A's on the dry lakes beds. Later, he raced cars for sponsors and designed and built racers for others. Working at Bell Auto Parts, a company he now owns, Roy was one of the first people to visualize the billion-dollar bonanza that the speed equipment industry is today. He also directs the activities of Cragar Industries and serves as President of the Specialty Equipment Manufacturer's Association (SEMA), an organization concerned with setting standards for the quality of speed and racing safety equipment. He also puts on a designer's cap while up at his mountain cabin and thinks up the Bell helmets and mag wheels of tomorrow. He's a traveler too, going to Japan or Europe to check out the latest developments in metallurgy. Richter has always had strong opinions on the engineering and safety of automobiles and has been working to improve both all his life. When he isn't thinking about cars, Roy is toting his trail bike-packed fishing gear off into the boonies. He's a man with opinions who knows of what he speaks. A rare combination.



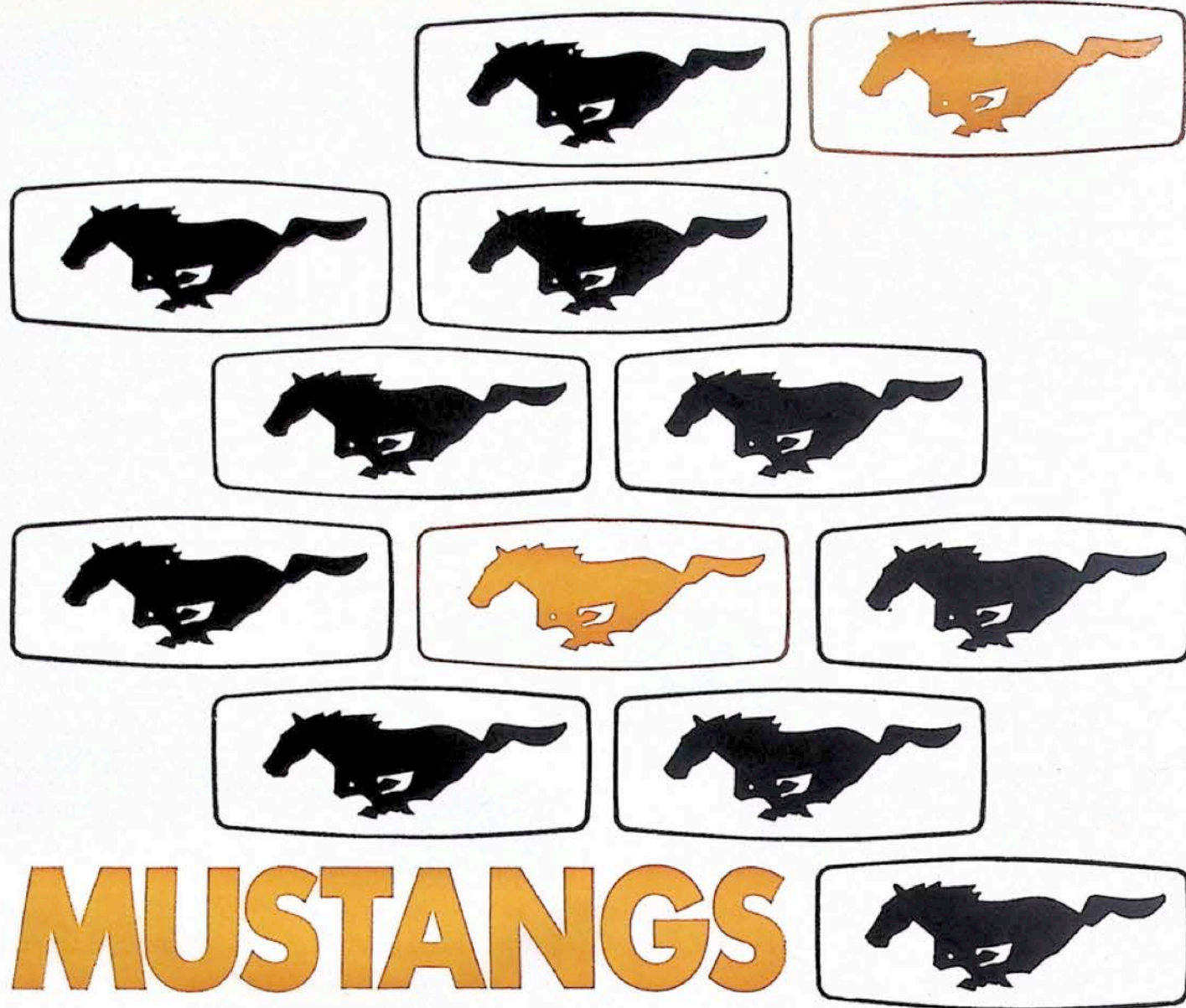
CARS PANEL

BOB BONDURANT — Bob Bondurant sometimes seems as if he's perfect for the part of the race driver in Lelouch's *A Man and a Woman*. Wearing ascot ties with his sports jackets, driving a street-sized GT40 Ford and residing in an oceanside pad in swinging Newport Beach, he seems the complete devil-may-care type. But, then, this is only one side of this well-respected member of our CARS panel, for Bondurant is a serious racer—having won the GT prototype class at the 24 Hours of LeMans with Gurney in a Cobra coupe in '64, then competing there a year later with a Ford GT-40. He's also one of the few Americans who has driven for Ferrari (a P-3 in '66), campaigned in Formula One (2-liter BRM in '66) and worn colors for the Porsche factory (in GT prototype class). Bondurant still competes occasionally, having fielded a Group 7 Can-Am car this year with the sponsorship of Paul Newman. Bondurant's racing led naturally to the development of his School of High Performance Driving based at Ontario Motor Speedway. Recently he expanded the curriculum to include a one-day Safe Driving School course, including a skid session and simulated accidents, for people who want to learn how to drive better on the highway. Besides that, he holds special driving clinics for the California Highway Patrol and L.A. Police Department. Having strong safety and engineering opinions, he's also a popular T.V. speaker.



KARL LUDVIGSEN — Ranking far up among the world's famous automotive writers, Karl Ludvigsen is somewhat of a universal man. Having started out as an engineering student at MIT, he later became interested in automotive styling and switched to Pratt, where he majored in Industrial Design. It was as a stylist that he was hired by General Motors Corporation, but, characteristic of Karl's active, enthusiastic love of automobiles, he drifted into writing and left GM for the fledgling *Sports Car Illustrated*, now *Car & Driver*, where he honed his hard-hitting let's-see-what-this-car-is-made-of style. After a two-year hitch at C & D, Karl returned to Detroit to work in public relations for GM styling and later for GM's Overseas Branch. In '67, Karl resigned from GM to become a full-time free lancer. How well he succeeded can be seen by leafing through magazines from a dozen countries, Japan to Brazil, and seeing Karl's byline. He's also into manufacturing, as President of Formula One Systems, Inc., a firm which originated and manufactures Freon on-board fire extinguishing systems for race cars. He's also President of the Motor Racing Safety Society, a subject he's deeply involved in. We find it hard to believe that Karl still has time for his family of exotic cars, but then any man who already works in three careers at once ought to have no trouble stretching 40 hours out of a 24-hour day.





MUSTANGS



THAT DIDN'T MAKE IT

Editor's Note: The Mercedes 300 SL Gullwing coupe was designed by Karl Wilfert and Rudolf Uhlenhaut at home in their spare hours unbeknownst to the factory. It became a classic. The Ford Mustang was designed by hundreds of engineers and stylists under the direction of Lee Iacocca and full resources of the Ford Motor Company. It became a classic. Perhaps one way is preferred, perhaps not. Both achieved their goals. The only thing to be said is that Ford emerged from the program with a raft of interesting alternatives. We thought you might like to see what might have been.



BY WALLY WYSS

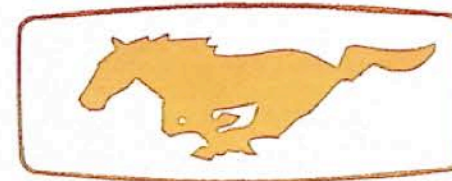
The way it is in the American auto styling business is frustrating. Every time some Ford designer sees the new Mustang or Torino, he probably has these little twinges inside, remembering his pet design, frozen forever in the studio's archives, that didn't make it. Still, maybe a part of his design, like the hood scoop, or taillights or the glove-box lock, did succeed, punched into immortality by every clomp of a twenty-ton press ramming home. Half a loaf is better than none, they say.

Because the design of the original Mustang has already received its just gallanage of ink, we'll skim over that, concentrating on the development of the later models.

The concept of the Mustang was born at Ford's Corporate Design Office back in 1961 with a number of drawings being made of small, sporty cars. Product Planning looked the drawings over, picked a few they liked and asked that several mock-up cars be built, including two-seater, four-seater and two-plus-two designs.

"Hey, that's great," we can hear you saying as you look at the Allegro or Mustang I. Unfortunately, these cars are about as practical as one of GM chief stylist Bill Mitchell's Mako Shark Corvettes. There are a million reasons why all the features of a prototype can't be put into production.

Some of them are niggling as "The Kansas City plant won't be able to



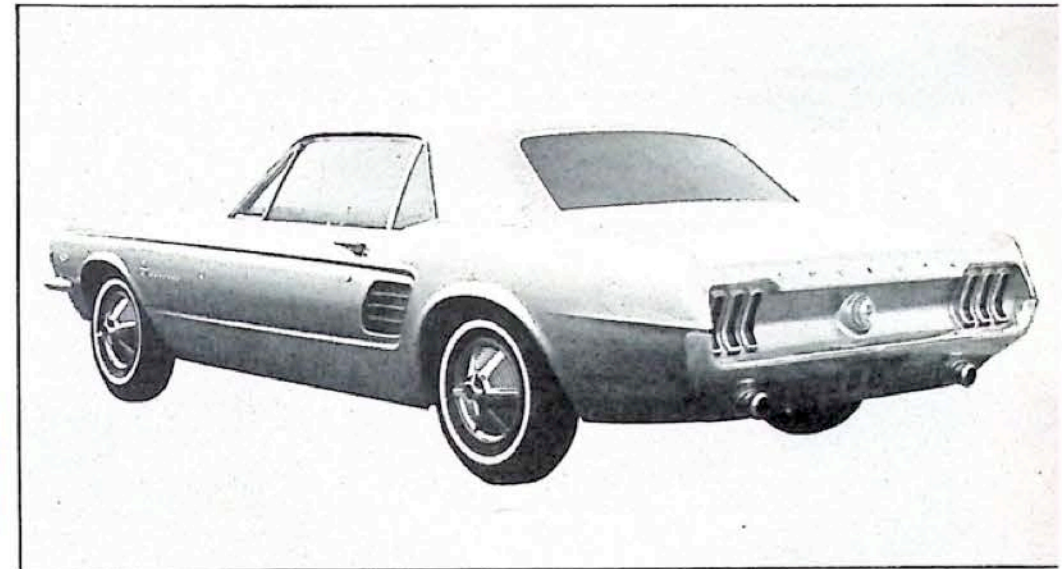
fit those into their spray booths" or "We won't be able to ship them if they have that kind of bumper." Just as the Post Office has rules about wrapping packages, the auto companies, and the Feds, have rules about packaging people. Combined, these standards reduce many a dream car to a more mundane, practical reality.

The Allegro was the first of the Mustang predecessors shown to the public. It had a sloping fastback top, a rectangular, recessed Ferrari-type grille and "frenched" or tunneled headlights. Except for the Ford identification emblems, it could've easily been mistaken for something from the Pininfarina or Bertone studios of Italy.

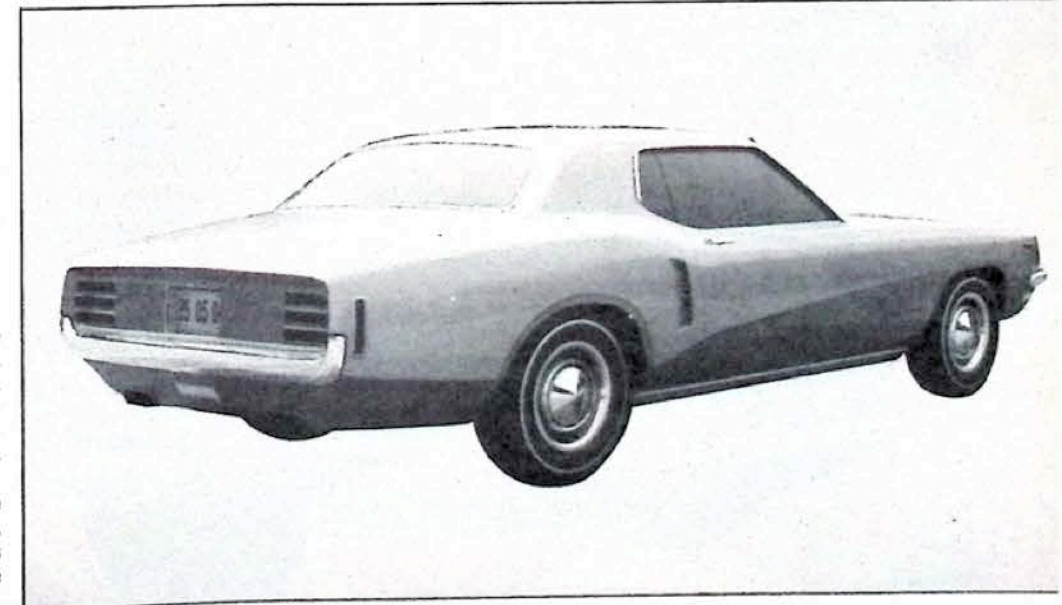
Then there was the Mustang I experimental car. This was one of those projects that's more engineering than styling because it actually ran, and incorporated quite a few unique engineering features, too. A two-seater mid-engine design, it had a Ford Taunus engine and a Grand Prix type suspension. Its slope nose pre-dated the Dodge Daytona by several years and its permanent roll bar structure was reflected in the Corvette coupe five years later. >>>



1964 Mustang — A balanced, rather pretty car, highly styled but not exceptionally new in any specific area. What was new was its high fashion ornamentality at a modest price and the fact that it was a coupe with no wagon or sedan sisters. Since then, a market bloomed and faded.



Top: 1967 Proposal — Nearly all efforts for the first face-lift were stylistic and based on the first theme. Good ideas were made "better" by making them more elaborate, thus the car became tacky. Ford at this point didn't fully know themselves what the Mustang success was attributable to — styling, size, price — and thus, the original concept was kept at all costs and simply embellished. Below: 1969 Proposal — Of interest is this early attempt to move away from traditional Mustang styling, while still retaining the overall proportion and contours.



1970 Proposal — More sure of themselves by this time, the designers started working on overall concept, not individual gimmicks. A meatier, more unified design emerged. Everything "worked together."



The Mustang II was the next step, a world away from the exotic qualities of the Mustang I but more within the realm of production. Its grille was actually deeper than that which appeared on the first Mustangs, being more like that used on the '68-'70 series. It had the long hood, short rear deck look down solid. While the hidden headlights were dropped, the Mustang II's basic lines were very close to those introduced in 1964 models.

What the Ford designers were after was an expensive looking car but priced far below the T-Bird. They showed drawings of proposed Mustangs to over 10,000 people and many guessed the car would cost \$7,000 or more. While this was a credit to the stylists' handiwork, it was paramount that Ford emphasize the machine's low cost at introduction time or lose the impact of perhaps the '60's single best value. The \$2,368 retail tag became the catch price of the age.

One of the subtleties of the first production Mustang was the lack of a column-mounted shift lever. If you ordered it with the standard three-speed manual transmission, you got it with a shift lever poking up out of the floor. Automatically, you had a floor shift, which to youth-cult Americans equated with "sporty." Never mind that it equated with "hopelessly

antiquated" to a preceding generation. Another key decision which figured in the car's popularity was the inclusion of wall-to-wall carpeting as standard in every car. This helped avoid the "cheap" interior look, even in the low-back model.

The Ford stylists who developed the first Mustang were not entirely satisfied with the final choice of a notch-back roofline, so, in secret, they developed a fiberglass mock-up of a fastback and presented it to top management. The car won instant approval and was introduced to the public half a year later as the 2+2.

The transition from the first series of Mustangs to the '67-'68-'69-'70 models was purposely subtle. Crucial to the car's continued success, Ford had to maintain identification from year to year, yet still be able to change the car. One hard and fast rule was that the long hood/short rear deck look should hold, with the hood taking up one third of the car's length.

In addition to the enlarged grille area in the second series of Mustangs,

the taillights were changed, metamorphosing from single to separate units, and simulated wood paneling was offered in the interiors. By '70, high-backed bucket seats in the Mach 1 models gave a very contemporary, jet-age look to the "cockpit."

The influence of racing car design has always been evident with the Mustang but became more pronounced as time went on, at first with minor details, then gradually through the entire body form and silhouette. For instance, the very first Mustangs had exposed gas filler caps, characteristic of competition cars. The indentations in the side suggested the logical place for an air scoop, gradually growing into a full integral scoop housed into the flare of the rear fender's bulge.

When you speak of race cars in connection with Ford, you must speak of the Mark II and Mark IV, LeMans winners, and the J-car, which never raced but which had a strong influence in the styling department.

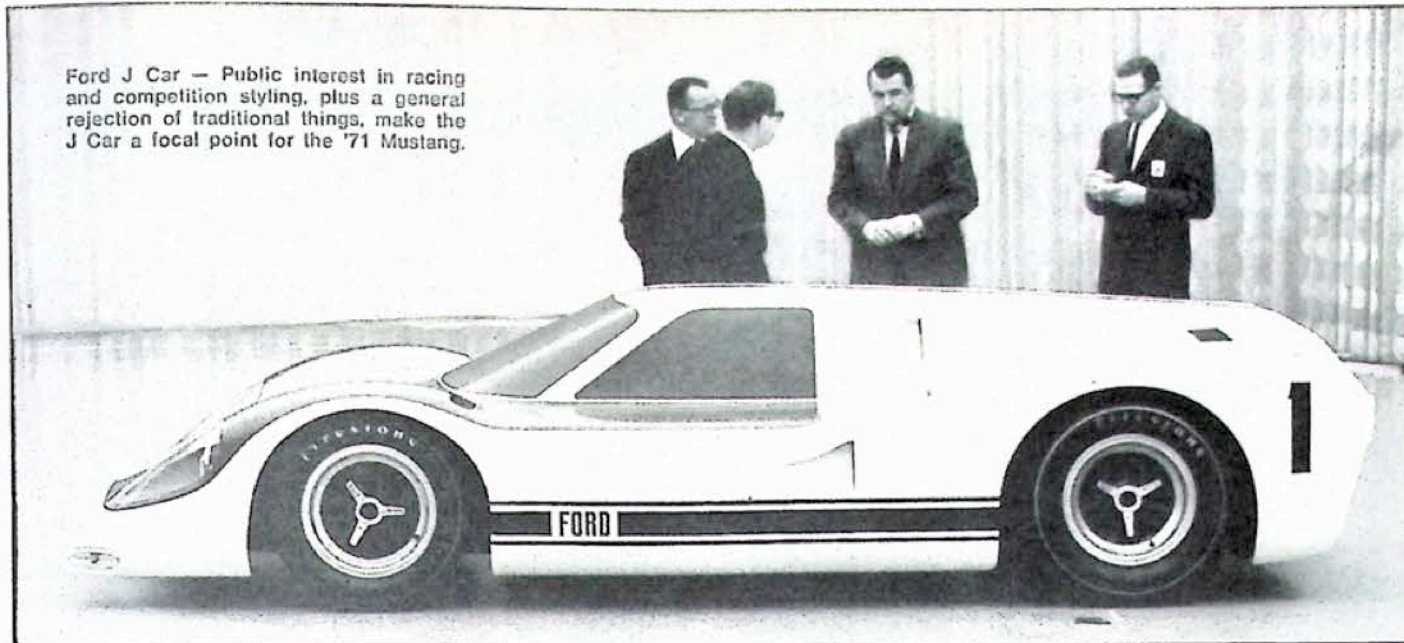
These racers all had fastback or "flatback," practically horizontal, rear

continued on page 68



Sports Station Wagon — Everyone's styled proposals of this kind in Detroit, but tooling costs and apparent limited consumer markets keeps this and other efforts from production reality. Such proposals will continue until one manufacturer takes the big gamble.

Ford J Car — Public interest in racing and competition styling, plus a general rejection of traditional things, make the J Car a focal point for the '71 Mustang.



'71 Fastback Proposal — While the concept was very basic, it had been rejected time and again by management all over town until Chrysler nodded "yes." Public acceptance reinforced this and Ford took a second look at the body side treatment. Deemed too organic in character for such a small car, it was then dropped.



1971 Fastback Proposal — The J Car emerges victorious, plus some '70 Shelby Mustang items such as the loop grille-headlight workout. Strong GM influences are seen here in surface development and the fender/windshield transition.

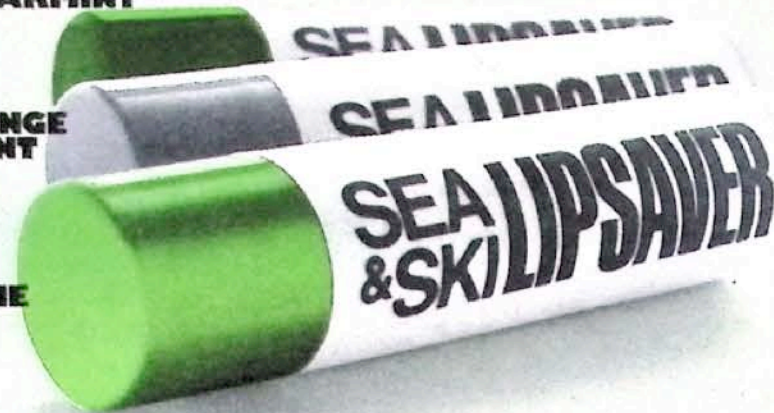


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GENERAL  ELECTRIC

DIDN'T MAKE IT

continued

windows, leading inevitably to the '71 Mustang fastback design. All the race cars had NASA-type scoops, recessed instead of bulging out. This type of scoop was eventually offered on the '69-'70 Shelby Mustang, modified Mustangs built by the A.O. Smith Company with fiberglass-molded bolt-on parts.

The Shelby Mustangs, also designed by Ford Styling, were a "practice ground" for many of the scooped hood and spoilered tail treatments later used on other Mustangs.

The availability of a color-coordinated urethane front bumper for the '71 Mustang freed Ford stylists to mold the bumper in the shape of a diplane, or front air dam. Its rubber-like qualities will be appreciated by those who "park by ear." Also, with the new material, Ford stylists earned more practicality and more styling.

The hood scoops on the '71 Mach I and Boss 351 Mustang represent sort of a compromise between the flush-deck pure NASA intakes of the Shelys and the above deck "shaker type." The new hood design splits the air flow to either side of a central "spear" and rams into dual intake passages to the air cleaner.

The "Boss" striping for '71 has been changed to a horizontal instead of a vertical theme but still gives the Boss 351 (the Boss 302 is no longer offered) a distinctive "special supercar" appearance, not unlike the stillborn NASCAR Super Cobra Jet Talladega.

Because drag racing figured very large in the sale of supercars in the late '60s, Ford stylists contrived to develop the "shaker" thru-the-hood style scoop, first offered with the 351 Mach I engines and later the 428's and 429's. Looking for all the world like a "bug-catcher" atop a blower, this scoop could be seen leaning as the engine torqued right on acceleration. Perhaps it was a psychological step helping the driver to once again relate Mit-tishly to his car.

The sleek look of the '71 Mustangs, with the windshield wipers and door handles hidden away, and the headlights tucked safely inside the grille cavity, reflects Detroit's increasing concern with "wind tunnel" cleanliness and safety.

The '71 Mustang interior continues the "built-for-the-driver" feel of past Mustangs, with the controls located on a central console. For drivers who want to know everything that's happening under the hood, Ford will install oil, water temp and alternator gauges in the console.

Where Mustangs will go from '71 can only be guessed. The so-called sporty-car market has declined, yet it will not die. No matter what the record shows there will still be sporty cars. Mustangs of the future will still be recognizable, both in styling and performance. A lot of imitators have appeared on the scene since 1964 but Ol' Running Horse has got some tricks he ain't tried yet. You should see the pictures we didn't show you . . .

/MT

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MT 171

Pat Moss Carlsson

THE WORLD'S FINEST WOMAN DRIVER TALKS ABOUT LIBERATION IN BAJA AND OTHER TRIALS



"... I enjoy competition for a start, and this is an event where you see cars all around you, which is nice. In Europe it's different."

The shower of spiny masts bob gently in their slips at King Harbor and behind, guarding the entrance, is the Portofino Inn, a marina hotel hard by the massiveness of the Southern California Edison generating station and Redondo Beach pier, which the city council is destroying in order to save. Most of the foreign car people and the racers and automotive writers stay here because owner Mary Davis is a long-time car nut and, in fact, the first woman to win the Mobil Gas Economy Run.

The 1970 Baja 1000 has been over for one day and team Saab, already on their way back to Europe, is here this night at the Portofino. We have had an interview scheduled with Pat Moss Carlsson, Saab driver Erik Carlsson's wife and teammate, but the team's timetable is tightened up so we are joining them for dinner - Pat and Erik, Lin Lonnegrin, Saab's public relations man, West Coast Manager Runar Ekman and his wife, and Mrs. and Mrs. Millet, who run the distributorship in America.

This was Pat Moss Carlsson's first appearance in the Baja, participating at her husband's urging. Neither had good luck. But another semi-factory entry, Igar Lindquist, won the sedan class for the second time and they were happy to go home with at least that much, although an overall win would have been sweeter. As a newcomer, Pat's reactions to the Baja bore some similarity to her husband's of a year ago (MT, Jan., 1970), yet tempered from the woman's view. Most people do not think of her as the wife of one of the world's all-time great rallyists but as the younger sister of unceremonious world driving champion, Stirling Moss.

A brother and sister more unlike you can't imagine. Stirling, thin, cerebral, delicate. Pat, short and heavy, oriented toward action. But both with the same competitive nature. The offspring of a successful dentist cum country squire in North Surrey, England, the Moss children grew up doing whatever it was they wanted - but always at great speed. With Stirling, it was cars, and no wonder that he became a legend of modern Grand Prix racing. With Pat, it was horses, show-jumpers, specifically. Being thrown occasionally didn't dampen her enthusiasm and at one time she was a member of the British National Show Jumping team, hopeful of competing in the Olympics. But then she discovered cars. "I hated them until I was 17," she recalls. "Then I was invited on a rallye and I loved it." That was it - her new thing. After taking the Liege rallye in '62, she was on her way and now - eight years later - she can look back upon rallyes in a dozen countries on three continents. - Editor.

MT: Well now you've run the Baja. How did you finish?

PAT: I've not got the final tally, but I think I finished fifth in our class.

MT: And what did you think of Baja?

PAT: I thought it was fabulous. I must say I loved it.

MT: What did you like about it most?

PAT: I don't know, I enjoy competition for a start, and this is an event where you see cars all around you, which is nice. In Europe it's different. You have the public road section, then you have a test on closed roads, and you go one at a time. They're usually quite short, and you don't see anybody for hours maybe.

But in Baja there are people around all the time, so you get more of a feeling of 'Oh boy I'm racing them.' You know what I mean. And the roads are, well, there's a bit of everything. I've never seen a salt lake before in my life, or run a beach and so on like that. It's something we don't get in Europe at all, or even in Africa or Australia.

MT: Do you think that this run is harder than the one in Africa?

PAT: It's so difficult to say really. Africa is much longer, 3,000 miles about and this is 800. And of that say 300 is good tarred road. So then you get down to say 500 miles of motoring on rough stuff, and that is quite rough. You can find rougher bits maybe in Africa, but this is more concentrated.

MT: Did it bother you much, the roughness?

PAT: Only when we didn't have all the shocks, but the Saab is really very good on the rough, normally.

MT: Did you have a 99 or a 96?

PAT: A 96. They haven't run 99 yet as a factory. The 96 is good on the rough, and it handles well in the sand and things like that. And the sand is lovely.

I love that. But I don't like the big, big stones. That's not for me; it's just going to break the car up.

MT: Last year when the Saabs ran, they had driveline problems. Why did they have difficulties with shocks this year?

PAT: I think the straps that stop the back axles were too long.

MT: Were they longer this year than they were last year?

PAT: Erik thinks so, and I wouldn't know. You know it's my first time in a Saab for three or four years. But he thinks it was that, and that would figure. If the back axle was dropping too far it would break the shocks.

MT: What do you usually drive?

PAT: Well, this year I've had a mix because I had the baby last December, so I haven't done much this year. We don't have a nanny or anything so I look after her. That means Erik has to be home to look after her or we have to catch a friend, and so I've done three rallyes this year. One in a Lancia, one in a Renault, and now this, in a Saab. All front-wheel-drive.

MT: You like front-wheel-drive better?

PAT: Yes, I love it. I've been driving it now since 1962, and I've got sort of used to it. I find it more predictable, or more controllable, maybe, than the rear. You get used to something like front-wheel-drive; I'm at home with it, so I'd rather stick with it if I can.

MT: Did anything bother you particularly on the run?

PAT: The dust was bad in places; the sand swirls up into a cloud. On the whole it wasn't too bad, but in the sand sections it was terrible. The last section before the finish, from Punta Prieta up to the tarred road, was terrible. We were behind something, a dune buggy, and there wasn't a hope of getting within 500 yards of it, short of going blind and maybe meeting something. It wasn't in the middle of nowhere, it was quite civilized. Either you stuck your neck out, or you sat behind. We sat behind; we had nothing to gain by going mad. On the tarred road we passed them immediately.

MT: I understand you got stuck once in the beach area.

PAT: Yes, yes. That was silly too, because we had practiced another route. Before the bad beach section, you could turn left and miss it, and on the practice we had done that. But during the race we came up towards that and I said to Liz (codriver Elizabeth Nyström). 'Hell, it's so dry, we'll try it.' And we got stuck about 5 yards short of the good ground; that was the worst. We were there nearly an hour.

MT: Do you think you'll come back?

PAT: Yes, I'd love to come back. Whether Saab will do it again, I really wouldn't know. I think it's a good car for the sedan class.

continued on page 72

REST ARE LOSERS

continued

friend Frank Catania takes a month off from his job as engineering supervisor for the Hughes hotels in Las Vegas and trundles off to Indy to do his thing for Bignotti and friends. His thing happens to be the combined skills of a master machinist and sometime inventor. He has the innate skill of being able to fabricate a piece from a description without benefit of drawings or blueprints. Like Whitey, Frank's efforts are a labor of affection that transcend the incentive of monetary gain.

The team is motivated by intense personal loyalties, mutual trust and a genuine love of the sport. Thanks to the efforts of their dynamic public relations man, Jim Cook, the team charisma extends even to the sponsor. Jim had been with Firestone as their racing PR man, when Vel induced him into going out on his own to represent some of the more prominent race drivers. Starting with Parnelli, the aggressive, knowledgeable Mr. Cook soon had such figures as Bobby Unser, Mario Andretti, A.J. Foyt, as well as Parnelli and Al Unser.

Jim had an idea that an ideal tie-in for sponsorship of an Indy car would be with a toy company. He went to the Topper Toy people and laid out his presentation in May 1969. His initial proposal involved endorsements of the Topper racing toys by some of the more prominent Indy drivers. Phase two involved the sponsorships of a real race car. President Henry Orenstein listened to Jim, but he wasn't too impressed. In spite of the fact that they built racing toys, vice-president Fred Pierce was the only key member of the firm who had any real knowledge of racing. Henry bought the endorsement part of it and held off on the sponsorship. Jim is a hard man to put off, so he returned in July to follow his project through. He learned then why Topper Toys is so successful. Mr. Orenstein had thoroughly researched the racing aspect and was ready to listen. He asked Jim one question, "If your life was on the line and you had to pick next year's Indy winner, who would it be?"

With only a slight quivering of the hands, Jim suggested the Vels-Parnelli Jones team. Urged on by Fred, Mr. Orenstein bought the program. Again, the shrewd business mind pulled off another coup. Henry insisted that the whole project be kept under wraps until the national toy show in March of 1970. Jim abided by his wishes and the whole package was splashed on a nationwide scale just prior to the start of the 1970 racing season.

With unbelievably good timing, Al Unser ran off from the field at the first race in Phoenix. A second at Sears Point and a third at Trenton was good racing but it didn't really get Henry excited. Then he attended his very first race at Indy.

The sight of his Johnny Lightning car leading the race in front of all those people at the track, not to mention the national closed circuit TV, turned him on. Standing in the winner's circle be-

side his car made him a fan. From Indy on, there has been at least one key representative from Topper Toys at every championship race. Mr. Orenstein himself goes as often as he can, including a trip to Langhorne. With the cost of the engines around \$30,000 each and the price of an Indy trip, with car, running close to \$100,000, it is very likely that the folds from Topper laid out \$150,000 to \$175,000 to watch their toy grow up. The timing couldn't have been better. Advertising alone has been worth ten times that amount - both to Topper and to racing. The millions upon millions of kids who watch the Johnny Lightning sponsored cartoon shows each Saturday morning identify with Al Unser far better than they ever did with the Lone Ranger and other heroes of violence, because racing is a positive sport. For the first time in auto racing, a car and driver are household words.

Johnny Lightning wins simply because the team does everything just a little bit better than everyone else. The car owner, Parnelli, was very demanding during the development phase, but has the good sense to let a good thing alone when it's working right. In fact, to illustrate his self perception, Parnelli describes himself as the recreational director of Vels-Parnelli Jones. The crew chief is thorough, innovative, dedicated and knew when it was time to quit arguing with the boss. As a result, he pretty wells runs his own show now.

The silent partner of the team, the Vels of Vel Milletich, is silent only by choice. He uses his skills in his field of expertise, which is money management. He approves all expenditures and pays all the bills. Ironically, Vels is the conservative in racing, always cautioning Parnelli to slow down; in business it is just the opposite. Vels is the gambler, with Parnelli serving as the restraining factor. You can't beat that for a combination.

The car and the team, regardless of quality, is only as good as the driver. Al is a practical young man who knows what the score is and what it takes to win. He trusts his mechanic and he listens to his boss. He has the intense concentration on the track exhibited by only a few very successful drivers. He constantly critiques his own performance.

"I can't let myself make a mistake. Every mistake a driver makes uses up one more between him and the last one."

Totally dedicated to his profession, "I thought about what I would like to do if I weren't driving and I honestly couldn't think of anything else I would enjoy."

Apparently, total concentration is what it takes to be a winner because Al Unser won the Martini and Rossi award as Driver of the Year for the 1970 season. If that weren't enough recognition, he has also been nominated for the Hickock Award as Athlete of the Year. It is high time a race driver won recognition as an athlete, and it took the intelligent professionalism of the Johnny Lightning 500 to do it./MT

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PAT MOSS CARLSSON

continued



"...the best person to do the job should get the right pay whatever they are. What difference does it make if they're man or woman?"

MT: Were you the only woman in the race?

PAT: No, there were some others. We didn't see any, but there were some. I think Mrs. Breedlove was in; she was entered anyway.

MT: Are there more women generally in automobile sports in Europe than there are here?

PAT: I have no idea. I don't know how many you have here.

MT: Very few.

PAT: Well there aren't a terrible lot in Europe; I suppose it's small. It varies. We did a ladies' rallye earlier this year, Liz and I, and they had, I think, 50 cars. Well that's 100 women. That's quite a few. You couldn't say all of them were competitive. But quite a few turned out for it, and that means they have competition licenses.

MT: If you were going to come back to Baja next year, what would you do to prepare differently?

PAT: Well, it's difficult, because I don't prepare the car. I literally meet it here, get in it and go. Well, we try it first, but it's impossible in the States to really test a car because there are no unlimited roads except for Nevada, and you don't go fast because of the speed limits.

MT: Did you practice at all?

PAT: Yes, we had a practice run, but that was not in the race car. The machine we used has been over the Baja course six or eight times. Other than our shock problem, the race car went like a bomb. It used no oil. Nothing. We changed an air filter and that was it. So it's very annoying when the engine's going like hell and you can't use it. We were standing a total of 5½ hours, you see, an hour on the beach and 4½ hours repairing shocks.

MT: What was your overall time?

PAT: 23 hours . . . just under 24 hours

. . . 23 hours and 50 something minutes.

MT: So, if you'd run all the way through, it would have been around 19 hours.

PAT: Less. 18½.

MT: Did the shock problem bother

Erik's car too?

PAT: He had two shocks go, but then his was alright. He used four with the original, we used six. And then we had none at all, you see, for that stretch. He was never without one completely. But we were. We came to the Santa Ynez service and they hadn't any shocks left, so we retired. Eventually, we got some for a Volkswagen and off we went.

MT: How many pages of notes did you have?

PAT: Two or three hundred.

MT: Do you really need that many?

PAT: If you're trying to save the car, yes. Because it's not just road notes. It's everything that's on the road that isn't normal.

MT: Does the course change much from the time you practice to the time you actually run it?

PAT: Yes. Mostly it gets worse with the cars going over.

MT: What place did you start?

PAT: 159 — a bit late.

MT: That's too late?

PAT: I'd be very happy with a number around 100. That means you've got about 60 motorbikes in front. The first car was 61; that would make you running about 40th. If you're too far in the front, the traffic is bad.

MT: You mean the people who live there?

PAT: Yes. Or, people walking across the road or something. By the time they've seen 10 or 12 cars, the excitement begins to fade. They know there is something on. But when you're running in front, maybe they're not expecting you so soon, even if they know the rallye is going through.

MT: Did you come across any of the bikes early?

PAT: Not very early. We saw several in trouble and one that was going, that's all. But I've never seen so many buggies in my life; so many weird, and wonderful sort of sand tops on them, big wheels and little, this way and that way. It's quite something if you see one in Europe. And now to see all these buggies.

MT: Do you think buggies are going to catch on in Europe?

PAT: I don't know. I couldn't say.

MT: Would you like to have one?

PAT: Not if it's a Volkswagen base.

MT: You don't like that?

PAT: Maybe I would like it as a runabout. But then I'd be just as happy with a Fiat 500 with the open body — a Gamine they call it — with no top and with all that type thing. I'd be just as happy with that.

MT: How did you find the other competitors in the event?

PAT: I didn't see a lot; I've met more friendly. They weren't unfriendly; they were just there. Some were very nice. I don't know them, but they didn't strike me as being over friendly.

MT: Erik said that he thought Garner was a pretty nice fellow.

PAT: Yes, he was very nice. He took the trouble to come over and say hello, which I thought was nice of him. He didn't need to. It's more than the others did. They don't have to, but I thought

it was nice of him to go out of his way to bother. He seems very pleasant.

MT: What are the different cars you've driven in your career?

PAT: Well, I've been through the lot. You name it and I've had it. The first one was an Austin A90, if you can imagine anything less for a rallye. Then there were the MG's, the T types, and then the A, Morris Minor A40, Riley, Sprite, Austin-Healey—the big one, the Mini and assorted other things. All of them I think I drove some time or another. But the best were certainly the Healey and the Mini, the big Healey.

MT: The 3000.

PAT: Yes, that was very, very successful in Europe, in its day.

MT: Was that back in the early '60's?

PAT: Yes, late '59 to '62. Then, of course, the Mini took over. Anyway, after that I went to Ford, and then to Saab, and later to Lancia with a few odd ones in between.

MT: How did you start rallying?

PAT: That is a long story, really. Back about '53 or '54, Ken Gregory, who was then Stirling's manager, used to do some rallyes. One night he came out to the farm at Loring, my parents' place, and he was on his way to one. I asked what a rallye was, and he said come along and see. It was one of these treasure hunt type of rallyes, not serious, just go out for fun; the marshalls hide up in trees and underground — that sort of thing. It's done on mock references. Anyway, it's fun, so I went along in the back seat. I had a Morris Minor and began to enter it. I started with the little ones and they got sort of bigger and bigger.

MT: Did you ever drive against Stirling in a rallye?

PAT: Yes. I drove at Sebring against him in a Sprite. That was a race — they had a little four-hour race for small cars, 1,200cc or 1,000cc or something. Anyway, that was a while ago. Then he was in the Safari with Erik, so it wasn't really against, because Erik was driving really. But they retired anyway. So did we, I think, later. Other than that, no.

MT: Well, you must have been interested in cars in order for you to go to the rallye in the first place.

PAT: No, I hated them, passionately, because I was always horse mad.

MT: Because you lived on the farm?

PAT: Well, we had horses and I started riding at two and you know it goes on from there. Most small girls are horse mad I think. And I was. Stirling was car mad because my father used to race. To crown it all, Stirling used to have a race car in those days and he would tune it next to the stables to make me mad, so I hated them really. I learned to drive because Stirling thought it was amusing to teach me when I was about 11. And then I didn't bother anymore until I was about 16. I used to drive the Land Rover around the farm. I was very trucky and jeep in those days. I wanted to drive literally for transport to the horse shows; that's the only reason. Otherwise, I'd never have bothered. It's funny really.

MT: It's interesting.

PAT: I don't know why I really ever

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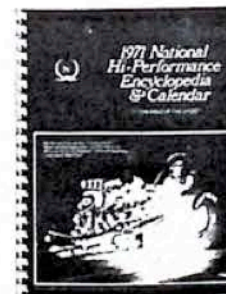
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PAT MOSS CARLSSON

continued



"If a Saab gets stuck, anything will get stuck, really. It's very, very good...."

started. Because I was quite happy with horses now?

MT: Do you do anything more with horses now?

PAT: No, I sold the last one last year. But up until we were married, for a while and after, we used to do a lot. I used to have six jumping horses and six other ones, hunters and things. We had two truck loads going around.

MT: Were they jumpers?

PAT: Yes. Jumpers and a few hunters. When I began with cars it used to be half and half. The horses came first, then the cars. Then I discovered that one can live off cars and not off horses, and so the cars came first and the horses came second. Eventually, it got so professional over there in Europe that you had to practice a month for a three day rallye. There's just not enough months in the year to do it all. And if you want to go on, you must do it properly or not at all. Not if you're on a factory car anyway.

MT: It seems to me that it would get a little boring after awhile if you do the same thing.

PAT: Yes, terribly. The practice kills you, it's so boring, but of course by the time you get there for the rallye it's different. You're in then. You know, you're in the race or rallye and it's different.

MT: What did you use on the Monte Carlo?

PAT: A Saab, which is very good in the snow. If a Saab gets stuck, anything will get stuck, nearly. It's very, very good, I don't know why. I suppose its big wheels are a help.

MT: Well, for awhile there, the Mini seemed to be just about unbeatable.

PAT: Yes.

MT: Is that because they were inherently a good design or because the factory put so much money in them?

PAT: No, put it this way. It has very little weight and a hell of a lot of engine. In the snow there's no substitute for that; they just had it. The cars handled quite well, in a weird sort of way. They had the best drivers you can have and with the combination of the

lot, they were invincible for a bit.

MT: But they're not any more.

PAT: No, they're finished.

MT: A couple of years ago it was Porsche.

PAT: Yes. Now, still today, it's Porsche or Renault Alpine. If you're in anything else you can forget it, unless they all go out. And then comes Ford, Lancia, and Saab. It's like that. The Porsche and Alpine just like that, and then the rest.

MT: Do you think any of those teams would be interested in coming to Baja?

PAT: Porsche might.

MT: You think so?

PAT: The Alpine is much too light and fragile. Porsche might, Ford might, except they were a bit tight on their budget this year. And Lancia, more than likely, will. They were talking about it this year. But honestly, in this event I can't see anything competitive with the possible exception of the Porsche, if it was very well prepared, and very strong underneath. I can't see anything beating the Saab. Not because it's so fast; it's because it's reasonably quicker for anything. It's sort of an even paced car.

MT: Do you think it's a better car than the buggies?

PAT: It's quite different. Obviously not, because look at the time the buggies did. Sixteen hours and something.

MT: Well, more of the road is paved this year too.

PAT: Is it?

MT: Yes.

PAT: I don't know then. But I'm sure it's hell in the buggy all open. I know I'd rather have a sedan anytime.

MT: Did you wear dirt masks?

PAT: No, we just sat there and took our chances.

MT: Did you have any problem with dust coming in the car?

PAT: Oh yeh, we were floating in it. We were just drowned from head to foot; that was that. The worst I must say for me, honestly, was wearing a crash helmet. It nearly killed me.

MT: Why don't you like to wear a crash helmet?

PAT: It's heavy, uncomfortable, sweaty, you name it. My head is sore now from it. I hate wearing crash helmets at the best of times.

MT: Aren't you afraid though of getting into an accident and needing it?

PAT: When your number's up, you'll go. Sure, it must be better to have it on if you have a big crash — no doubt. But there's a limit to how long you can wear one. How would you like to wear a bowler hat for 24 hours?

MT: Does your co-driver drive at all?

PAT: Liz, yes she can, on the Monte for instance where you have a very long road section, she will drive. But here, she prefers to navigate and I need Liz to keep me on the right road; she's better at that job than I.

MT: Aren't there rallyes as long as this in Europe, as far as hours go?

PAT: No, this is the shortest I've ever done.

MT: Oh, it is.

PAT: Yes. I think most of them are three days or something like that.

MT: Straight through?

PAT: Yes, but some have stops, some don't. The Monte's very nice because then you have two days joining up, then you have a night's sleep, then you do another loop for a night, a day, a night and a day, and then you have another stop, then you do a whole night's motor-ing, which is very nice.

MT: What do you think of the Baja prize money? \$100,000 total. Is it enough?

PAT: That doesn't mean a thing. It might be \$10 to every map.

MT: And I think the first prize was \$10,000.

PAT: I don't know what it was exactly, but it was good money compared to Europe.

MT: What do they pay in Europe?

PAT: \$2,500.

MT: To win?

PAT: About 1,000£ roughly.

MT: How do they pay for 2nd and 3rd place?

PAT: Not bad, about 800 — it's quite even, say 1,000, 700 or 800, 500, 400, 300, 200, 100; especially the top may be much higher, but say usually, 2nd, 3rd, 4th, 5th, 6th — they usually pay about a tenth or something. But then they don't give anything for class — it's just overall. It's worth more here unless you go for the freak ones like London-Sydney and London-Mexico; those are worth 10,000£, that's \$26,000.

MT: You didn't go on that did you?

PAT: No.

MT: Why? Was it too long?

PAT: Terrible — it was terrible. Everybody said it was so long. It was three weeks in the car. Can you imagine that? It's not funny. No, I wasn't a bit interested in that, thank you. That's too long I think, don't you? Even with stops. You must be so fed up with that mobile jumping machine. You can get fed up with it after 24 hours. I went back to our Saab this morning and thought, ugh, when you're all about going back to the dust. You think how revolting it looks when you get back in the cold light of day to get back in. Imagine it after three weeks with two or three people.

MT: Are you familiar with the Women's Lib Movement here in the states?

PAT: Yes, but we're behind in Europe, I think. The Dutch women have started to a point where they make passes at the men. Very odd, but it's spreading a bit. They walk about the Hague like men, but I haven't seen any.

MT: They want the same jobs as men.

PAT: I suppose if they do the same job equally as well, I don't see why not.

MT: They want to get paid the same wages.

PAT: Yes. If they do the same job, as well, why not.

MT: Do they pay in Europe the same for women as men?

PAT: No. Normally they do not. I think really if they're the best person to do the job, they should get the right pay whatever they are. I don't think a man should have it if he's not as good and I don't think a woman should have it if she's not as good. I think it's the best for the job. What the hell. What difference does it make if they're man or woman?

MT: Straight through?

/MT

EVERY MAN

continued

the job at a cost to the car buyer in the \$50-100 bracket. That's why it looks so much better than the thermal systems now.

Just as important as the catalysts are the methods used to support them. Since only the exposed surface works, you don't put lumps of platinum into a muffler. UOP, for example, coats the outer surface of 1/8-inch ceramic pellets with its active metal, then pours the pellets into position in the reactor. Competitors argue that the pellets can be lost, that they pack together during use, thus increasing exhaust system back pressure, a major performance problem with catalyst systems, and that the pellets have poorer efficiency than more advanced support designs. Englehard, for example, uses a honeycomb-pattern ceramic with holes spaced as closely as ten to the inch. UOP and others are well along with competitive honeycomb concepts.

On unleaded fuels these catalysts have shown they can keep their reactivity well beyond 50,000 miles of normal driving. Interestingly, researchers stress how hard it is to be sure test cars don't get an accidental dose of leaded fuel. In one GM test running a leaded tankful caused a temporary jump of HC emissions by 59 percent and a permanent 10 percent increase in the HC level. It had no effect on the CO emissions. There will still be some leaded fuels on the market in 1973 and drivers of reactor-equipped GM cars, perhaps Rivieras and Toronados, should give them wide berth.

So far the reactors we've looked at, both thermal and catalytic, have been designed mainly to handle CO and HC emissions. Now there are requirements, directly conflicting ones, to cut down oxides of nitrogen (NOx). In most proposed systems these are reduced, brought back to free atmospheric nitrogen with the removal of oxygen, either inside the engine or immediately outside the exhaust ports.

Actually, the objective inside the engine is to keep the peak operating temperatures low enough to prevent the formation of NOx in offensive amounts. The favored method now, the one GM plans to use in '73, is exhaust gas recirculation (EGR). Developed by Atlantic Richfield researchers and refined by Esso, EGR feeds exhaust gas back into the intake side of the engine to cool the combustion flame.

Exhaust gas recirculation works, but it is mechanically unwieldy and inefficient by definition. Catalysts may have a part to play here too. One of the first to think so was a California researcher named Milton Farber. In 1969 his Anti-Pollution Corp. of America demonstrated a system with a NOx-reducing catalyst first in the exhaust line, followed by an HC/CO oxidizing chamber, also with a catalyst, provided with an external feed of extra air.

Others tried the Farber approach, among them Esso's Research and Engineering Company. Their dual-catalyst

continued from page 76

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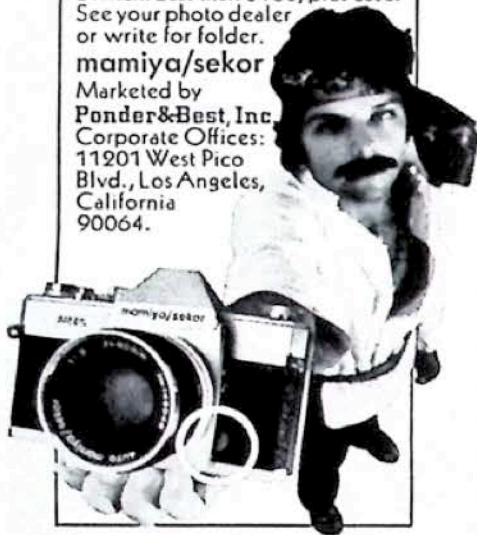
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EVERY MANS

continued
system is of exactly the same type. It led Esso to the discovery of a highly effective NOx catalyst, a nickel-copper alloy in the Monel family. Stamped from Monel sheet valued at about \$1.50 per pound, it's formed into complex little shapes like "saddles," used at the rate of 10 pounds per large V8 engine.

The Esso NOx catalyst doesn't lose its reactivity. Instead it gradually loses its mechanical strength, after a maximum of 15,000 miles, collapsing the "saddles" enough to increase the exhaust back pressure beyond the limit of twice muffler back pressure that Esso considers tolerable. Many improvements can certainly be made in the mechanical shape of the Esso catalyst to stretch its ultimate life.

If it can live to 50,000 miles or more, the Esso NOx catalyst could be used in a compact hybrid detoxing system. For example, each exhaust port could contain its own supply of catalyst, literally inside the engine, and the exhaust manifolds could be simple thermal reactors to oxidize CO and HC. Farber's system, now under test in three vehicles, combines two catalysts in a single muffler-like casing.

In March, 1970 Universal Oil Products announced it had perfected a single catalyst that would simultaneously detox CO, HC and NOx, seemingly an unattainable ideal. The fine print in its press release noted, however, that this was done "with the fuel system tuned to achieve a balanced mixture of fuel and air." What this means is that the engine must receive an exactly ideal or "stoichiometric" mixture, by weight 15 parts of air to one of fuel. If run exactly at this mixture an internal combustion engine has very low CO and HC emissions but maximum output of NOx. Hence the UOP catalyst, like that of Esso, is mainly effective on oxides of nitrogen.

It would take advanced fuel injection to meter fuel precisely enough to meet the UOP criteria, and fuel injection is just what GM's planning to use for some of its catalytically-controlled cars. At first it will be there to permit very lean fuel/air mixtures in large-displacement engines, lean enough so a supplementary air pump won't be needed for oxidation in the CO/HC reactor. Other GM models will have a special lean-mixture carburetion system with an auxiliary air pump encouraging the oxidizing catalyst.

What's most worrisome to the reactor makers is their occasional tendency to go out of control under the most extreme conditions. As an Esso man put it, "If you're hauling a house trailer across a desert at 90 miles-per-hour and you lose ignition to two cylinders you'll have a fireball in that reactor." Some makers are working on automatic bypass devices for these special occasions. GM says it doesn't think that will be a problem and doesn't plan to build in a bypass.

At this moment exhaust reactors are starting to see some of the highway mileage they'll need if they're to be

considered ready for production. Late in 1970 DuPont turned over to the California Air Resources Board the first of six cars intended to give its thermal reactor a two-year service test. Chicago has taken delivery from UOP of the first of a planned 100 cars equipped with a platinum-based catalytic reactor for CO/HC, to run on unleaded fuel. Englehard has similarly equipped two New York City cars and more are on order. Most of the top finishers in the Clean Air Car Race, including the winning Capri, were purified by Englehard's catalytic reactors.

The reactors are very much on their way. Builders abroad realize this too, at least those incredibly perceptive and competitive ones in the Orient. Toyota has a reciprocal agreement with UOP covering advanced catalyst work, and Toyo Kogyo is developing both thermal and catalytic reactors for its reciprocating-engined Mazda cars.

Believe it or not, the dawn of the reactor age could bring back the high-performance American car. We'll see a return to higher compression ratios as unleaded gasolines rise again in octane, and well-designed reactors should offer a minimum of back pressure and little deterioration in gas mileage. It's taken a while but it looks as if we're on the track toward low-emission cars that work. Now, if Washington would just make up its mind about those standards, our auto engineers could get on with the job. /MT

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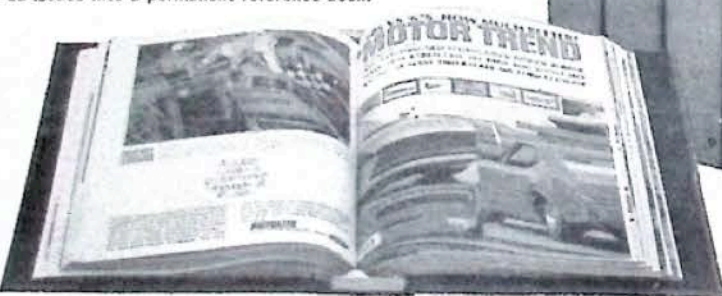
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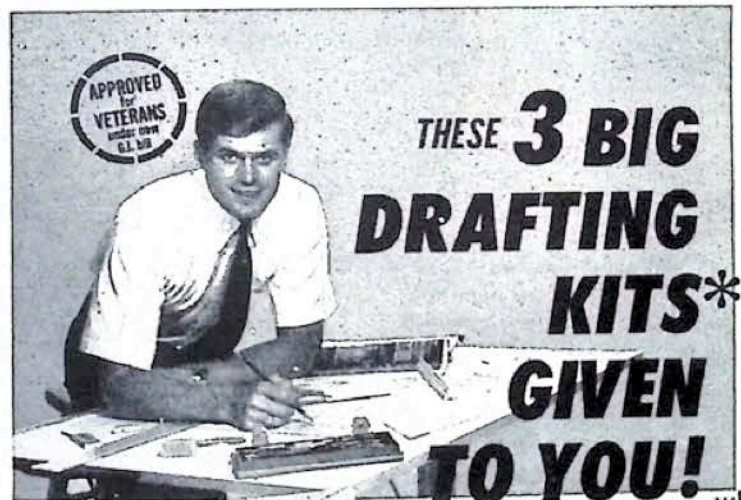
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BARNEY OLDFIELD

continued

country from Long Island to Milwaukee and, finally, to California in 1914. Open road racing had reached a crest of popularity and car manufacturers were all eager to see their cars in the winner's circle. And nowhere was there more eagerness than in the epic Mercer versus Stutz duel which had raged over dirt tracks and road races all across America. "You have to be nuts to drive a Stutz!", cried Mercer fans, and Stutz supporters retorted, "There's nothing worse than a Mercer!" Mercer had Spencer Wishart and the great Italian-American driver Ralph De Palma behind their wheels, and with Barney Oldfield now added, Mercer felt invincible. But the Mercer strategy that hired Barney overlooked one small detail; a long standing feud between Oldfield and De Palma which rivaled the Mercer-Stutz donnybrook itself. So, when Barney joined the team De Palma stalked out in search of another car. The 1914 Vanderbilt Cup would be a grudge race.

The change came too late for De Palma to join Stutz or one of the other completed teams, so he sent back East for a gallant but battered old Mercedes which he had driven to victory in the Vanderbilt Cup and Elgin road races and then wrecked in the 1912 Grand Prix race. The great 12.8-liter Grand Prix model of 1908 was the final expression of its monstrous chain-driven breed. It was a well engineered car with off-set connecting rods to shorten the engine length and had accounted itself well in both European and American competition. Yet, despite De Palma's rebuild job for the Vanderbilt Cup in California, the big Mercedes was obsolete and easily outclassed by Barney's smaller but faster Mercer. De Palma's Mercedes: 597 cubic inches; Oldfield's Mercer: 445 cubic inches. In practice Oldfield racked up the best times on the course, while De Palma was still ironing the bugs out of his "antique." Because of past disagreement with the American Automobile Association over his commercial approach to motor sport, this would be the first Vanderbilt Cup race Barney would drive and he was determined to win.

The cup course ran through 8.4 miles of countryside around Santa Monica and the cars had to cover it thirty-five times to complete the 294 miles. On February 26, 1913, fifteen of them took the starter's flag and from the very first lap the grueling pace began to take its toll. The Italian Isotta-Fraschini went out on lap one with a broken piston, and as the race progressed highly vaunted machines fell by the wayside with ailments like cracked cylinders and pistons, burned out bearings, and even a broken drive shaft on the lead Stutz. Out of the starting field only four would even finish.

By the second lap Oldfield's Mercer teammate, Eddie Pullen, had taken the lead and held it for twelve more laps until he crashed. Since Spencer Wishart's Mercer had gone out on the second lap with a cracked cylinder, this left

Barney with the only Mercer in the race to fight off the Stutzes and De Palma's Mercedes. Cars were pulling in for pit stops like commuter trains; all except De Palma's, that is. De Palma was setting no records but he was doing a brilliant job of pacing his car to take just enough - but not too much - from it. As the race worked to a climax he found Barney on his trail, apparently finally aware of what was going on. Lap after lap the battle raged between the two greatest names in American racing. Only a few laps remained now and De Palma had not made a single pit stop. His tires now showed the wear of even his cautious and paced driving, and he signaled for a pit stop on the next round. Barney saw the signal and breathed a sigh of relief; his own tires were dangerously thin and couldn't last another round. In fact, before it could get back to the pits the Mercer blew a tire and Oldfield limped in, at least secure in the knowledge that De Palma would suffer the same delay. But the big Mercedes, chains rattling on the sprockets, blithely rolled on by with Barney's curses swirling in its wake.

Once back on the course Barney burned it up with a vengeance and gained steadily on De Palma. He gained right up to the finish, but De Palma's plan had worked by the thinnest margin and he swept over the line a few yards ahead of the Mercer. Both men had given their best and it was a great race, something the more than 100,000 spectators could tell their grandchildren about. In a way it was also a symbolic race. It marked the coming of smaller, more refined racing machinery like the Mercer, Stutz, and Mason (Duesenberg) designs, and it marked the passing of rough and tumble, unplanned driving that had flourished in earlier days. Curiously, the two ideas got mixed up in the Vanderbilt Cup and fate put Barney's "classic" driving in a modern car and De Palma's strategic driving in the obsolete car. It was a combination not to be repeated, and it made for one of the most exciting races of Barney Oldfield's career - even though he did finish second.

The next four years saw Barney through many a mile at speed, and some of them sad and frustrating miles. He was at Indianapolis in May with a new Stutz but his gallant, even heroic, efforts could only bring fifth place. He went back to California for the 1915 Vanderbilt Cup with a big Maxwell and came in seventh. A millionaire admirer bought him a new French Delage which would hopefully break his bad luck streak, but only prolonged it. Mishaps and malfunctions more than once cheated him of victory, but never of his public image. When he would stand up in his car and shout at the bleachers, "You all know me, Barney Oldfield!" the response was still overwhelming.

But there was still one more surprise in the "Old Master," as people called him now. Barney's "ace" was a special new car with an advanced lightweight alloy engine built by engine expert Harry Miller and a radically enclosed body. Closed racing cars were unheard of in 1917 and the bulbous driver's

compartment with glass slits all around made it look like a diving bell on wheels. It was painted metallic gold and people soon started calling it the "Golden Sub." The idea behind the unusual appearance was that the interior was stoutly braced with roll bars and supposedly "crashproof." Barney put a lot of faith in his Miller special, and the publicity story went out that it would do 180 mph - which made even Barney blush. After some teething troubles, the snickers died away as the "Golden Sub" began to win races and smash records just like the old "Green Dragon" and "Blitzen Benz" days. Barney Oldfield's smiling, W. C. Fields-like face was in demand at every track in the country. Then, at the height of the Sub's success it missed a curve, smashed through a fence, and exploded into flames. Barney barely escaped with his life, but his affection for the Sub - with the "protective" canopy removed - was undiminished and the car carried him through the 1918 season.

It was the last season for Barney Oldfield. Overage at forty, he wisely decided to step down and let his record and reputation for over two thousand races speak for itself. Oldfield was never officially the champion driver of the U.S., yet the majority of the people who cheered him from the stands across America probably never quite realized that. If they did, they cared little and would remember his name with a smile long after they forgot who was "book champion" for a particular year. In sixteen years of racing Barney Oldfield had climbed beyond the record book and AAA point counts; he was a legend.

/MT

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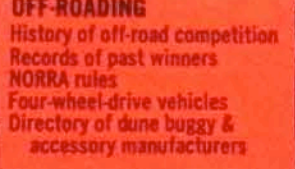
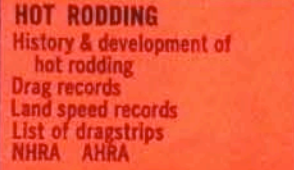





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TRACKSIDE '71

FORD QUILTS RACING 1962-1970

Dearborn, Mich. — FoMoCo sources have announced that all direct support of racing will cease immediately. Rumors have swept through all levels of competition concerning cancellation of contracts, future competition engine development and the closing of specialist facilities.

Warning signals have been flying since early September when driver contracts were not renewed. The official explanation was that the budget for fiscal '71 was still under review and had not been approved. Apparently it won't ever be.

It's no secret that Lee A. Iacocca, Executive Vice President of Ford Motor Company, questions the value returned for each racing dollar invested. It is also no secret that deposed former President Bunkie Knudsen was a staunch supporter of racing, and anything that was in to Bunkie is currently out.

The same song was played last year in the middle of the annual ritual at Daytona, throwing the fast Ford world into a state of catatonia. The difference is that last year financial commitments had already been incurred which could not readily be abandoned. No such condition currently exists.

The strongest guess at present is that there will be limited support of drag and off-road racing, as yet undefined, and limited parts support for NASCAR. Trans-Am appears doomed unless some outside sponsorship can foot the bill for

renovating last year's equipment. It would cost too much to update the sheet metal for pseudo-'71s.

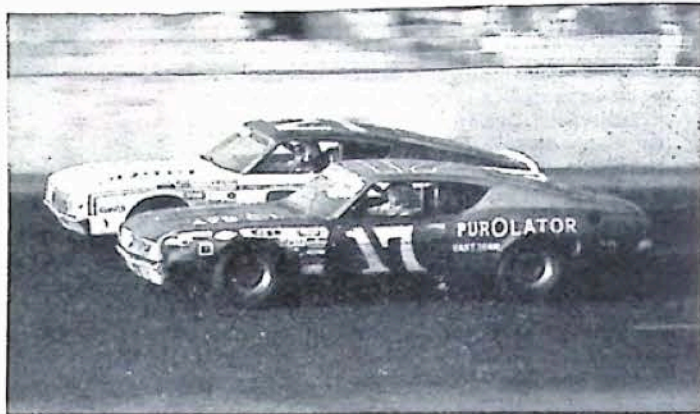
Limited parts support has been linked to availability of high performance items through the local dealerships. It may be of interest to note that every part used on the Grand National stockers is available in the Holman-Moody parts catalog. It may be of further interest that virtually all the necessary development on the new 366 c.i. NASCAR engine has been completed.

Special Vehicles Division is expected to continue in operation, at a greatly reduced scope, in the field of safety and emission control. Former Director Jacque Passino may assume a top level marketing position.

Kar-Kraft, the mini-factory which cranks out the competition and limited production items, has a gloomy future. While nothing is firm, its current function would appear to be superfluous if Ford's pull back is as complete as indicated. While on the surface this has all the earmarks of a disaster for NASCAR and the Ford teams throughout racing, much of the hardware is already built, requiring only the necessary operating funds.

Whatever the degree of Ford's non-participation, the net result will be a true test of the popularity of the various forms of racing as well as the enterprise of the contestants in the ensuing scramble for the available sponsorship bread.

CALE CAPTURES SEASON FINALE



David Pearson (17) strains to inch his Ford Torino by the red and white Mercury Cyclone of Cale Yarborough (21). Cale held him off.

Rockingham, N.C. — Cale Yarborough captured the hotly contested season finale at Rockingham in his Wood Brothers prepared Mercury Cyclone. David Pearson vainly pursued his cross-company rival right to the wire, but had to settle for second place in his Holman-Moody Torino Talladega.

Ford has been taking their licks for most of the second half of the season, barely struggling to third place finishes while the Chryslers grabbed all the big money, carburetor restrictor plate notwithstanding. Lee Roy Yarbrough broke the ice at Charlotte by outlasting the uncrashed Mopars for his first major win of the year.

Ford changed their tactics for the Rockingham affair by abandoning the tunnel-ram manifold in favor of a plenum-chamber box manifold, similar to the one Chrysler has been running all year. The big difference was the ability to pull more power coming off the turns. A bit of instant equality for the Fords.

Charlie Glotzbach grabbed an early lead in his pole sitting Dodge, but the necessity of making a pit stop under the green foiled his race plan as well as a few of his competitors. Falling heir to a bit of racing luck, David and Lee Roy held off for a few laps and were able to pit on a fortuitous cau-

tion flag.

This gave them an edge for awhile, but it was all to no avail. David contracted some brake problems which slowed him up and required a pit stop for adjustment. The stop was on a caution, which didn't hurt, but the brakes were never up to snuff, which did.

Lee Roy ran well and undoubtedly had visions of two in a row until he lunched his engine on lap 343.

Richard Petty lead on laps 257 to 280, but he encountered a few handling problems, hitting the fence so many times it looked like Benny Parsons had run tire tests in it at Riverside. Showing an uncommon adroitness and dexterity, Richard managed to bang up all four corners of the car and still keep running. He eventually finished 6th. Teammate Pete Hamilton crashed on lap 449 to finish up his chores for the day. A rather dismal season finish for the two nice guys from Plymouth.

Rockingham is always an interesting track because there are many places to pass, and side-by-side racing is what the sport is all about. This time Mother Nature stepped in to spice up the action. Two weeks of rain washed the track clean of rubber, leaving it "green." On race day, an early wind

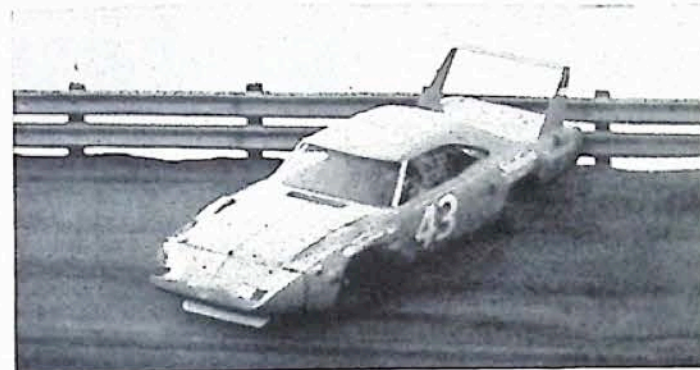
had deposited enough sand on the track to blast the windshields to the point where vision was half imagination and half memory. Midway through the race Pearson came off turn two with a healthy lead, lost traction, did a 360 down the back straight and went into turn three with a short lead. He allowed as how it gave him a bit of a thrill, but was definitely an unplanned maneuver.

The sandblasting of the windshields eventually combined with the uncertain footing to slow the pace toward the end; Yarborough went slicing around Pearson going into turn one when David was momentarily blinded by the sun, then Cale immediately suffered the same problem, got loose for an eyeblink and let the Blue and Gold Ford retake the lead. Since it was impossible to see clearly through the near opaque windshields going into the low afternoon sun, both hot-shoes mutually backed off a

couple of notches.

For the last 15 or 20 laps, Pearson labored under the false impression he was leading the race. David had enjoyed a one lap advantage over Cale earlier in the race and was unaware that Cale had unlapped himself while David was in the pits. When the caution flag came out for the last time, some 10 laps from the finish, David slowed to fall in behind the pace car assuming his rightful place as leader. He very nearly soiled his driving suit when he was waved on to join the rest of the pack as a follower. When the green came out, there were two laps remaining and no chance for David to get by the red and white Cyclone with a happy Cale at the wheel.

Cale may very well have won the last big factory bash for some time to come. Less than a week after Ford's final triumph, the brass at Dearborn announced their withdrawal from active support of racing.



Richard Petty hooks the tail end of his Plymouth Superbird into the rail. Richard had handling problems all day, hitting the wall twice.



Petty nurses his battered machine back to the pits after his second trip into the barrier. Hasty repair of all four corners cost 10 laps.

RESULTS

1. Cale Yarborough	Merc	6. Richard Petty	Plym
2. David Pearson	Ford	7. Bobby Isaac	Dodge
3. Bobby Allison	Dodge	8. James Hylton	Ford
4. Donnie Allison	Ford	9. Friday Hassler	Chev
5. Buddy Baker	Dodge	10. Buddy Young	Ford

Bobby Allison Wins MT Supertrack Crown

MT Special — Bobby Allison drove to a third place finish to wind up the big track season at Rockingham, picking up enough points to firmly establish himself as the undisputed champion of NASCAR's supertracks. In spite of only one victory, the first race at Atlanta, Bobby finished in the top five with enough consistency to take the checkered flag with an eight point lead over runner-up Richard Petty.

Dodge won the supertrack manufacturer's championship by a substantial 24 point margin. Plymouth and Ford were tied for second with 68 points each. Mercury, of course, wound up at the tail end with 30 markers.

Petty had the most wins, with five. Although Richard caught the checkered more often than anyone else, he failed to finish in the top five with equal consistency. Plymouth teammate Pete Hamilton captured three big ones, at Daytona and Talladega (twice). Cale Yarborough and Donnie Allison won two apiece while the best of the rest were able to get the whole job done only once each.

The single race winners were Bobby Allison, David Pearson, Charlie Glotzbach, Buddy Baker, and Lee Roy Yarbrough.

Bobby Isaac was the only one of the top ten drivers who failed to win a big one. Inasmuch as he wound up as NASCAR's overall points winner, the implication is that Bobby does his best work on the short tracks.

Young Richard Brooks turned in an admirable performance by finishing eleventh in the standings in an independent machine. He's tabbed by his contemporaries as one of the future greats in NASCAR. There is strong speculation that in a factory ride he could have equalled or bettered the amazing performance of Pete Hamilton. This is no small praise from "the good old boys," who are unashamedly blunt and direct in their evaluation of their fellow drivers. Even higher praise came from an influential Detroit resident who

bemoaned the fact that young Mr. Brooks failed to receive closer scrutiny during the pre-season evaluation period.

All in all it was an exciting season, full of surprises and good racing. With the '71 withdrawal of most factory support, 1970 may very well have been the final fling of the old dynasty. The advent of television and the rebirth of independence are bound to bring about some startling changes.

SUPERTRACK DERBY FINAL STANDINGS

1. Bobby Allison	36
2. Richard Petty	28
3. Pete Hamilton	27
4. Cale Yarborough	27
5. David Pearson	25
6. Bobby Isaac	20
7. Charlie Glotzbach	18
8. Donnie Allison	15
9. Lee Roy Yarbrough	15
10. Buddy Baker	13
11. Richard Brooks	13
12. Benny Parson	9
13. James Hylton	7
14. Fred Lorenzen	3

MANUFACTURERS SUPERTRACK DERBY

DODGE	92
PLYMOUTH	68
FORD	68
MERCURY	30

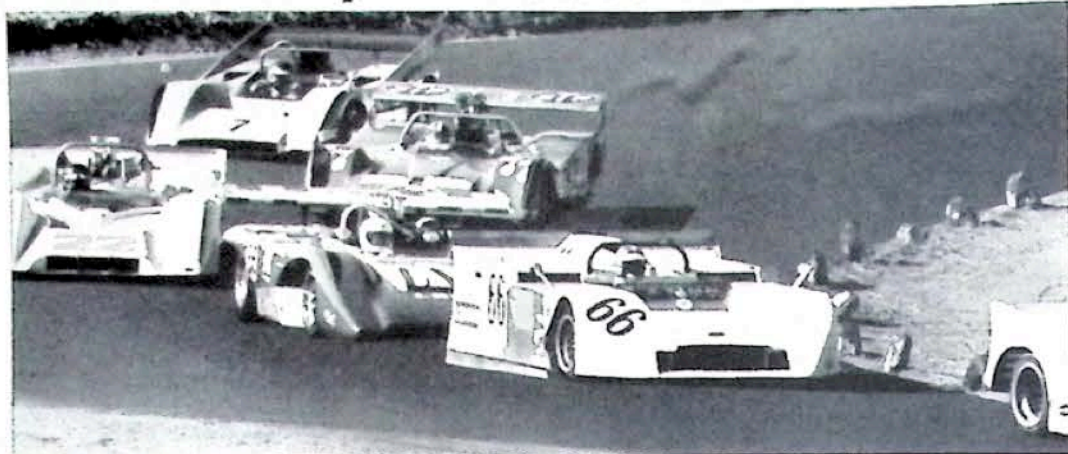
THE WINNERS

Richard Petty	5
Pete Hamilton	3
Cale Yarborough	2
Donnie Allison	2
Bobby Allison	1
David Pearson	1
Charlie Glotzbach	1
Buddy Baker	1
Lee Roy Yarbrough	1

SCOREBOARD

RIVERSIDE	Petty
DAYTONA	Hamilton-D. Allison
ROCKINGHAM	Petty-Yarborough
ATLANTA	B. Allison-Petty
TALLADEGA	Hamilton-Hamilton
DARLINGTON	Pearson-Baker
CHARLOTTE	D. Allison-Yarbrough
MICHIGAN	Yarborough-Glotzbach
TRENTON	Petty
DOVER	Petty
TEXAS	CNX-CNX

Great White Hope Disappoints Fans; Kiwi Flies to First



Chaparral (66), piloted by Vic Elford, assumes the unaccustomed role of traffic hazard. Faulty blowers slow machine while Revson (26), Oliver (22), Amon (77) and Gethin (7) attempt to pass early in the race.

Riverside, Calif. — You would think Jim Hall might learn. You can't build race cars with four or five gadgets that have never been tried before and expect to have any sort of reliability. Once again, at the last Can-Am Race of 1970 at Riverside, Chaparral fans watched gloomily as the men in white from Texas fiddled with snowmobile engines as the competition roared by at nearly 200 mph in their more conventional machines.

But, in direct contradiction to this, and hard on the heels of winner Denis Hulme, was good ol' Jackie Oliver in the Norris Industries (nee Autocoast) Ti-22. Way back at the beginning of the season Oliver got a 2nd in the car at Mosport, proving Americans could build a car that could give the Kiwis a run for their money, but the crunch at St. Jovite resulted in much time lost while the car was completely rebuilt. This car is one big gadget.

The high air dams along the sides and rear were retained in the rebuild, a Bryant brainstorm which reportedly prevents air from spilling over and creates downthrust, though not nearly so much as Mr. Hall's fans. Ironically, miracleman Bryant, who rebuilt the car in time to finish the season on the grid, was fired from the team almost immediately after the race.

Hall's hovercraft in reverse, had, as usual, terrified every one in practice with its record 1:33 lap times,

seconds faster than anyone else, under the hand of Vic Elford. With each practice lap, the opposition to the "ground effects" system grew. It looks as if innovation is great in the Can-Am as long as you're slow. You'll note that nobody mounted an anti-Mac's Special campaign when the four-motor-cycle-engined car showed at Monterey. Also, you'll note that the car was a stone that couldn't go fast enough to make the grid.

The BRM marque, which nobody ever expected to see even as third, got there despite various mishaps. Veteran drive Pedro Rodriguez broke a suspension part in practice, but his crew was able to patch it up. His teammate, George Eaton, Canada's answer to Goldilocks, broke another part of his car but there were no more spares, so he sat out the race.

Hulme, almost didn't make the 29-car grid. According to one report, he blew an engine in the morning warm-up. Fortunately, his mechanics had a spare around and were able to install it before the starting gun fired. Hulme used an alloy block made of Reynolds #390 aluminum, the same stuff you'll find in your Vega, and that may be the biggest news to come out of the Can-Am, Jim Hall, included.

One of the hardest chargers in practice was New Yorker Peter Revson, whom rumor has on the McLaren team next year. Pete pushed his Lola T220 Chev to second place on the grid with

a 1:35 lap and drove hard in the opening phases, only to lose a lot of time in the pits when he went off the road and bent vital things. Cooling problems finished him off, permitting Hulme teammate, Peter Gethin to move into third with his McLaren 8D.

Bob Bonduant, a member of Motor Trend's Car of the Year CARS panel, pushed his ailing Lola T160 to the 6th row on the grid in practice but went out after only 6 laps, with a bad clutch.

The Riverside Can-Am was saved from ho-hum land by the presence of "The Great White Hope" wind machine from Midland. We know innovation costs money but we hope next year's Can-Am will see more of it.



AL UNSER- MARTINI & ROSSI WINNER

New York, N.Y. — Al Unser is the 1970 Martini & Rossi driver of the year. The 1970

USAC champion, conqueror of Indianapolis and former king of Pikes Peak, has been selected for the most coveted award in the world of racing.

The prime consideration for the award is the ability of a driver to dominate his field of professional racing. Al Unser's Johnny Lightning Special has accomplished this feat to an overwhelming degree.

In addition to receiving the M&R award, Unser has been nominated for the Hickock Athlete of the Year Award. If sportsmanship has any influence in the selection, young Mr. Unser is a shoe-in.

JACKIE STEWART has signed a contract with Good-year for Formula I racing and inked a second agreement with Carl Haas to run a new Lola in next year's Can-Am series. Stewart should generate some renewed interest in the prospects of beating the McLarens. Eric Broadley is designing a new Lola for the Haas team.

BUGGY WINS BAJA

La Paz, Baja — It wasn't enough for Vic Wilson and Drino Miller just to win the Mexican 1000. The Costa Mesa-based off-road veterans downed the very promising Chevy and Ford pickups, outlasted Parnelli Jones, and then shattered the old course record by 4 hours, 31 minutes. Covering the 832 miles in 16 hours, 7 minutes, the pair was followed into La Paz by another buggy and three pickups, the lead one driven by Walker Evans and Shelby Mongeon, the only Bill Stroppe vehicle to win a class.

The basis for the win was luck, as always, but well-calculated luck. The pair individually drove a single-seater buggy built by Miller-Havens and powered by a 2200cc VW. Wilson took the first leg down to El Arco, the fifth checkpoint, and the well-muscled Miller ran the



Dust-covered Vic Wilson pulls into checkpoint on first half of the run. Drino Miller took over at half-way point, held off challengers for win.

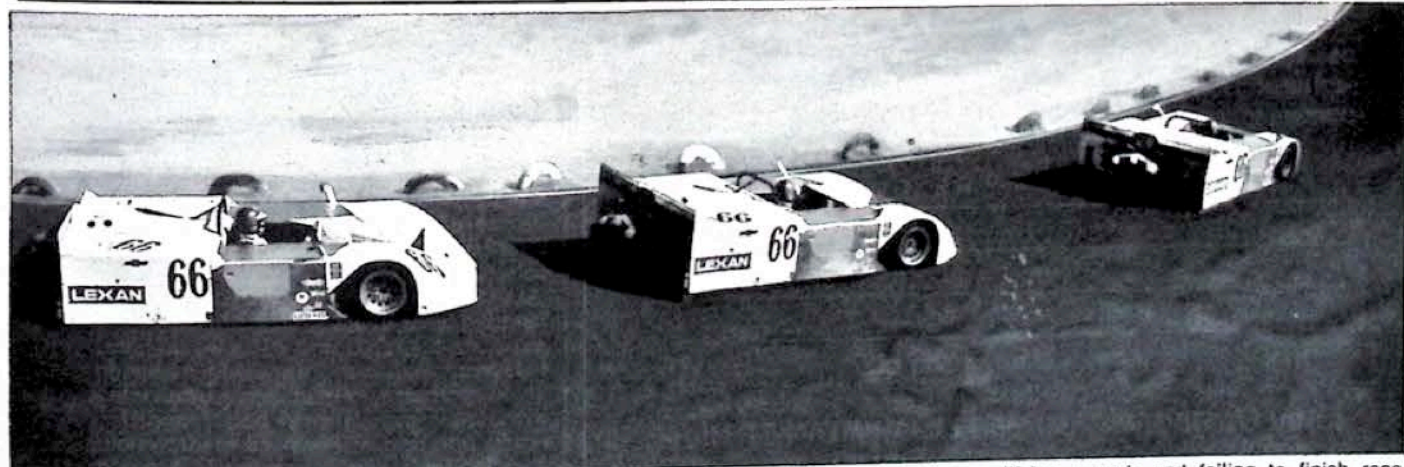
last half. Their secret was light weight. The vehicle weighed 1,200 pounds and they ran with only enough fuel to get them from checkpoint to checkpoint. They carried no spare and left the tools behind, so they planned on either winning or not finishing. Their main problems were two blown tires, one apiece. Wilson's was about 10 miles before El Arco and he drove in on the inner liner. The flopping tires broke the rear brake line, so Miller headed for La Paz with only front brakes. His flat came just before a long beach stretch between San Ignacio and La Purisma; but they happened to have a team on the beach to advise them of conditions, and the team gave him a spare.

It was that beach stretch that ate up many of the top contenders, including Saab driver Erik Carlsson. As many as 20 cars at one time were mired in the tidal mud flats. One team had already checked the area out

and planted a set of easily visible markers along the dry route through the quagmire. MT Publisher Ray Brock, who eventually finished third in class and fifth overall with Ak Miller in a Ford pickup, commented that the only reason they escaped being stuck was that "We kept the truck crossed up and the engine buzzed up and slid across."

Parnelli Jones, in his trick aluminum and fiberglass, space-frame Bronco, led the race until his rear axle housing broke, forcing him to stop for repairs. Actor James Garner and co-driver Cliff Coleman finished third in class in the Olds Banshee after gearbox and carburetor troubles.

Fears that the off-road classic would be destroyed with well-graded roads and more pavement weren't fulfilled, as rains had pretty well negated what good the grader had done, and only 10 extra miles of paved road before La Paz were of any benefit.



Chaparral ground-effects machine motors off into oblivion after terrorizing opponents, setting qualifying records and failing to finish race.

MOTOR TREND'S HOT SHEET

CHRYSLER has leaked that they are still in NASCAR at this time and plan to run two factory cars, both out of Petty Engineering. Richard is expected to run fewer races than ever before (excluding the 1965 Mopar sit-out), meaning that for the first time in about 20 years there will not be a Petty running at the short tracks. Race versions of the Plymouth have been run at Daytona, and the car, with extreme forward rake, is said to look tough, but naturally, does not match the SuperBird aerodynamically. As to performance, Bill France has implied that he will juggle restrictor plates until he is satisfied with the closeness of competition.

The B&M automatic (MT Dec. '69) has been put in a GN car by Chrysler engineers, and looks good, but its only probable use will be in some USAC road race events, like IRP. Since there is some power loss, the trans would be of no advantage in regular roundy-round oval track racing.

CHRYSLER'S cutback in NASCAR competition has left Petty team driver Pete Hamilton without a place to park his racing suit. Reliable sources at Plymouth indicate that the division racing folk are scratching the woodwork to come up with a way to put Pete back in the driver's seat. Can it be that there is a sense of decency and fair play lurking in the depths of the great

Detroit stone hearts? Prophets of doom take note.

USAC has a saviour. Inflation hits racing people, just like us common folk, only a bit harder, because they're living and working in the area often attributed to leisure time. That's one of the first expenses cut by the average man when the economy tightens and so it's been easy to walk around at a lot of races in the last year, looking at less than full stands and hearing the racers complain of rising costs. But Marlboro has come to do for the old USAC Championship Trail what Johnson's Wax did for the Can-Am Series, they brought money — \$300,000. DAVID PEARSON has indicated that he will turn down his ride for the 1971 season if there is any reduction in his percentage. Being realistic, he accepts the fact that the loot from Ford is probably gone forever, but he has little intention of sending his percentage after it. He doesn't really need the money and he's done everything in racing at least once. WE have egg on our face. Last month, Hot Sheet rejected the possibility of Team McLaren's hiring of their best competition, in the person of Peter Revson. Guess what? Right. Team McLaren's second driver for the 1971 Can-Am season will be Peter Revson. Peter Gethin will very likely confine his efforts to the McLaren Formula I car.



WORLD OF WHEELS

We know what it's like — you have car magazines spilling out of your closet threatening to overflow your bedroom if not your whole house. Why can't all the information in them be condensed into one grand book?

It can. Petersen's Book Division has tackled the job of surveying NASCAR, USAC, SCCA, NHRA, AHRA, AMA, NORRA — every major racing organization — and finding out who's holding what record and who's on top.

All this information with the complete racing rules and statistics, has been put into a giant 353-page book entitled the World of Wheels.

Written in a non-technical, informative style, reading the World of Wheels is like sitting down with the racers themselves, some auto designers and engineers and rapping, at length, about where each of the fields of racing has progressed to — where it is today.

In addition, the Petersen World of Wheels has lengthy sections devoted to each of these big new-interest areas:

Street rods. Now that the trend is toward fiberglass bodies and bolt-on dune buggies, this book covers what you need to know and what's available on the market.

Recreation vehicles. What kind of camper is best for you — from the fold-up tent variety to the giant self-propelled motor homes.

Off-road. Starting with the first Baja race, this section tells of the men and machines of the Baja, about the exciting developments in this newest of all two-wheel and four-wheel organized competition.

As a reference volume, as a gift for Dad or a younger brother . . . World of Wheels is an ideal way to please an old automobile enthusiast or turn-on someone who doesn't know the sport. You'll find it at your newsstand (\$3.95) — or you can obtain one directly from Petersen Publishing Co., 5900 Hollywood Blvd., Los Angeles, Calif. 90028 (please add 25¢ for postage and handling).

COMING NEXT MONTH

STUPENDOUS

Motor Trend's 1971 Car Of The Year Award

In a time of consumer groping and a return to practicality, we pick the single best car of the coming year. Complete engineering and styling seminar plus buyer's guide. It's a doozy!

COLOSSAL

Bill Lear And The Steam Dream Live!

Out of the limelight and almost forgotten, Bill Lear is writing another chapter on the saga of steam propulsion. Intrepid Motor Trend correspondent Karl Ludvigsen takes you on the spot.

FANTASTIC

The Return Of The Road Runner

While the profits-of-doom and the nay-sayers burrow in to wait for the end, Plymouth tries to capture a half-million car performance market by itself. We compare their front-line soldiers: 383 and 440 six-paks.

FLASH

Testing The New Volkswagen

Once again Motor Trend steals the march with the first analysis of a car you'll be seeing in the U.S. in less than a year, the VW K-70.

MOTOR TREND

Combined with Car Life
The complete automotive magazine
February issue on sale February 2nd

Better ideas make better cars: 1971 Mercury Montego GT.



1. Start with the best ideas in intermediates.

The Montego Cyclone GT has them all. Handy size: a foot shorter than big cars—ideal for gymkhanas, parking. Sporty styling: a long-hood, short-deck look. Popular price: the fun-packed way to fight inflation.

2. Add big V-8 power and sports-car flair.

The hi-back buckets are in cool, "breathable" Comfort-weave vinyl. Also standard: automatic transmission, full instrumentation including tach, and a 351 CID V-8. Options include a 429-CJ 4V V-8 and Hurst Shifter® shown.



Montego Cyclone GT

3. And you have a better sporty intermediate.

With hood scoop and concealed headlamps standard. Other Montego Cyclone models: a base Cyclone (351 4V V-8) and a Cyclone Spoiler with aerodynamic spoilers front and rear. It takes better ideas to make better cars. Mercury makes better cars—to buy, rent, or lease. Just see your nearby Mercury dealer soon.

MERCURY

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For the taste of your life — Coca-Cola.

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