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FOREIGN CAR GUIDE

## WORLD CAR GUIDE



FEBRUARY 1970

60¢



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VW AUTOMATIC

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**The  
racer's  
edge**



# WORLD CAR GUIDE

February, 1970

No. 144

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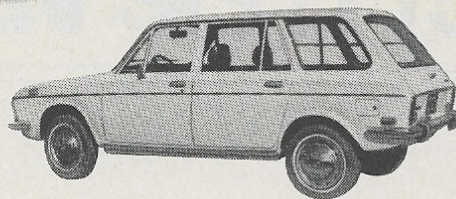
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# STARS

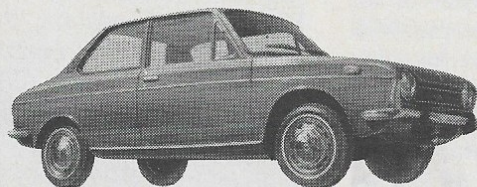
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SUBARU STAR WAGON



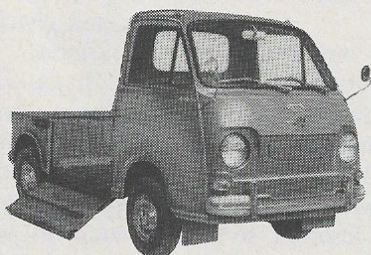
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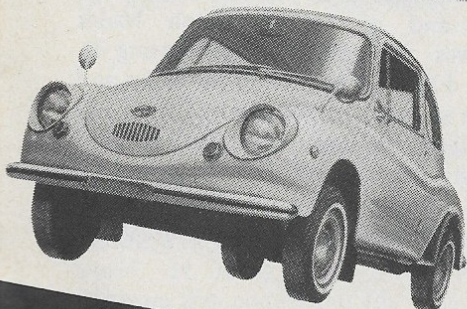
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## A VERY PERSONAL EDITORIAL:

I never thought the day would come when I'd find myself squarely on the side of Ralph Nader but it did at 4 o'clock AM, Saturday, December 6, 1969. I also never thought there would come a time when I would make a bad personal experience the subject of an editorial, mainly because people who voluntarily pay 60 cents for this magazine have a right to be entertained, not harangued.

However, even editors are human, despite the oft-heard accusation that we primarily write for the advertiser, and when one feels that he's been shafted by a subsidiary of General Motors, then perhaps being small gives you the conviction that you can joust with honor against a windmill.

My quarrel with Motors Insurance Corporation will undoubtedly sound familiar to many of you. About a year and a half ago one of our family cars was vandalized to the tune of about \$150 in a well-lighted theater parking lot in a decent area supposedly patrolled by police. My son emerged from the movie to find this going on and attempted to protect his and our property. He was mildly injured in the melee, obtained with witnesses the license number and description of the car driven by the offenders, attended one line-up of suspects without honestly being able to identify anyone and there the matter ended. We thought.

MIC paid for the repairs and continued our insurance without comment. Surely if they hadn't, we would have soon heard about it from the General Motors Acceptance Corp. whose lien, not our equity, was what was really being insured. Then, on the date and time mentioned above, vandals struck again out in front of our house in what is supposed to be a "high income," and therefore low risk, neighborhood. This time, they drove past our car slowly enough so that the passenger vandal could lean out and smash two side windows with a hammer. The damage here was maybe \$100 or so and the police duly came out and filed a report.

"Sorry, but we can't be everywhere at once," said the officer who seemed actually concerned for once about something other than juveniles driving cars with one taillight out. He also established, to my genuine surprise, that no effort whatever would be made by the law to search out the offenders because any vandalism, theft or whatever under \$200 was a misdemeanor and as such, would not be further pursued.

That, I must admit, is a point in MIC's favor, but in reporting the claim I found out that I was *now* liable for the first \$50 of repair. They said I was notified of this last May when the policy was routinely renewed. I claim never to have seen such a notification. They say that California does not require them to send such notification by certified mail which perhaps might have called the change in terms to my attention. I say further that when one party to a contract changes the terms, then the other party to the contract should be made conscious of the change to the extent that he either accepts or rejects it in writing.

However this turns out, and believe me it will be argued beyond the point of economic sense, the fact remains that MIC has received much more money from me than vandals have extracted from them, even without the \$50 deductible provision inserted so conveniently into the policy.

At this point, which is now, I could not help but ask myself what earthly use there is for insurance until you have a claim? Most of us have been paying many, many dollars into life insurance which won't be returned until we die. That we understand, but our car insurance is something else again. In this relatively lightly populated area of the Los Angeles megapolis a package of liability, collision, property damage and comprehensive insurance costs well over \$300 per vehicle annually. Then, after funneling this money in one direction for years, one random incident of vandalism totally beyond my control makes me a poor risk.

Put another way, this MIC subsidiary of General Motors, the richest company

on earth, had to write a couple of small checks out of a built-up reserve paid by me of at least three times the amount of those checks. When I broached this reasonable thought to the man who runs the local MIC office and suggested that perhaps I might contact the appropriate state regulatory body to see if they agree, he kindly offered to give me the address. I said I knew the address, whereupon he pre-emptorily hung up the phone. That, I guess, is his right — or perhaps his instructions from the MIC operating manual on how to handle a customer who has the temerity to suggest that he's being shafted.

Now my point, as you may have gathered by now, is this: If you can't be dealt fairly with by a subsidiary of General Motors, where in this bewildering world of enforced insurance can one turn? The Rock of Gibraltar? The Umbrella? You're Safe in the Hands of All-state? State Farm? Maybe, but I suspect Diogenes would use up the fuel in his lantern searching for an insurance company that prints the same slogan on claim checks that they use in soliciting business.

Let's face it! They'll cheerfully accept your premium checks but when it comes time for most of them to fulfill their reason for being which, simply stated, is to pay a claim, then that is the moment when the payee becomes an unwanted customer. He is guilty of temporarily reversing the one-way flow of cash.

So, I can't help but read with relish current reports that Congress has begun an investigation of car insurance practices and of course, Ralph Nader deserves the credit for prompting it. That, I guess, puts me in his camp and he's a strange tentmate indeed for a guy who likes 400-horsepower cars, ignition switches that don't buzz and people who have enough common sense to drive Corvairs and Volkswagens safely and sanely.

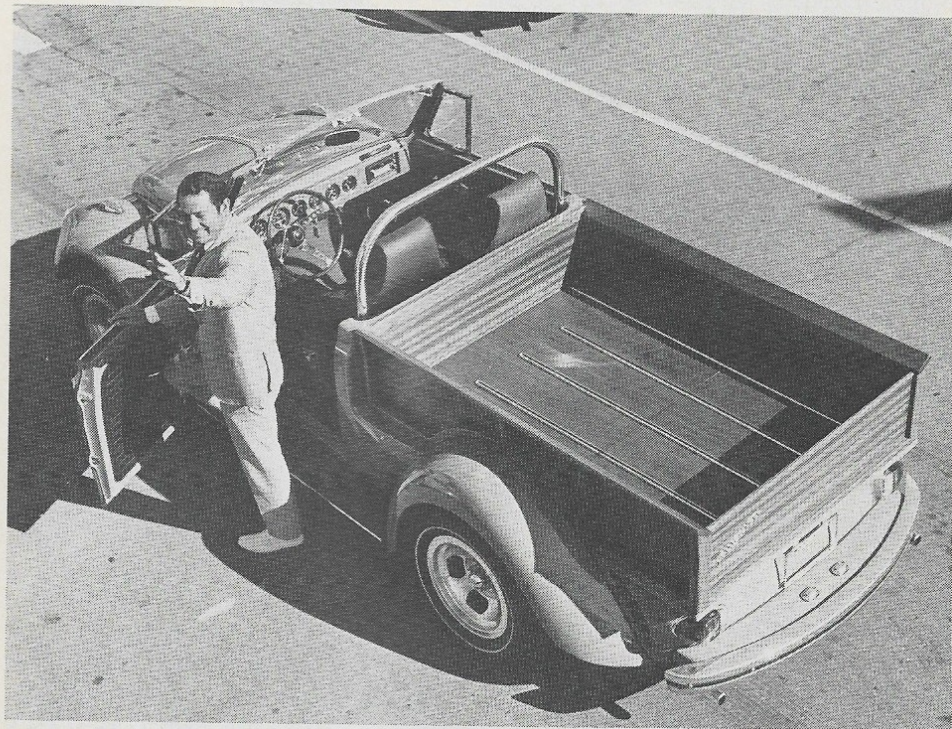
*Don Mac Donald*



# READER'S



# FORUM



## Custom-Built Pickup

Sirs: We believe you'd be interested in our custom-built pickup. It's not for sale at any price but here are the details: The body started as a '65 VW convertible and the front lid and apron are from a '68 but we widened these 2½-inches in front and 4½-inches in the rear. Taillights come from a '68 but have been placed crosswise to their normal position. The engine is from a '66 squareback, the cooling air being circulated through hand-made vents

behind the rear fenders. The box and dash are made of mahogany with Porsche rocker moldings to protect the carrying space.

Jack Foreman, Pres.  
Klein-Foreman Motors  
Van Nuys, Calif.

*It's a beauty, Jack. Can't you change your mind about duplicates for sale? Your body shop foreman, Ellsworth Dunderland, should be publicly congratulated and he hereby is!*

## Better Bumpers for VW's

Sirs: In your November issue of WCG (which by the way, I read religiously) your Tech Clinic column talked about adding current Volks bumpers to older models and you indicated it was really a hassle. It really isn't. With EMPI adaptors this conversion fits with ease.

Emil Welden, Dir. Cust. Serv.  
EMPI, Riverside, Calif.

Emil sent us an EMPI "news

bulletin" which pictured their part No. ABBV-690 which is a bracket kit at \$14.95 to adapt current VW bumpers to '67 and earlier Type I sedans and convertibles. It's a bolt-on job that takes less than an hour. For another \$21.95 you can buy kit No. ABGV-507 which consists of bumper guards for the above mentioned bumpers. So with this information, away! Let's go jousting in the supermarket parking lots!

## The Torraca Affair

Sirs: I was most interested to read the comments regarding my letter on page 51 of your September issue. (Ed. note: Maj. Torraca had a problem with a Volks which one German dealer goofed on, a second compounded the goof and it was finally fixed in England at considerable expense.) I, of course, understand the relative responsibilities of the dealer and the factory. On the other hand, I have continuously maintained that the factory had the moral responsibility to its customer and in a situation like this should take care of the matter without reference to the dealer. As a matter of fact it now appears that they also agree with this as I kept insisting on seeing someone in authority here in England and finally was given an appointment with Mr. Alan Dix, the managing director of VW in Great Britain. After an hour in his office discussing the matter with me he picked up the phone, called Wolfsburg, told them they were being damned stubborn and got me my \$180 back!! It appears that persistence and getting to the head man are the determining factors in a case such as this.

Maj. L. A. Torraca, Jr.  
APO NY 09125

*Maybe your persistence could help our editor get to the "head man" of Motors Insurance Corp. See Commentary, page 6. Anyway, we're glad to have been able to air your views in this complicated argument and we're also glad that Alan Dix knows how to cut red tape.*

## Cars Across The Border

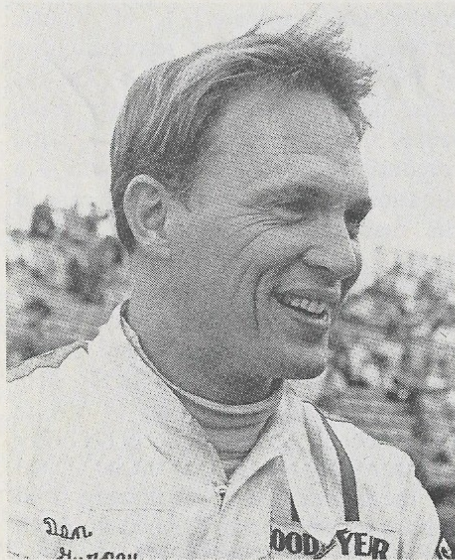
Sirs: Your answer to "Mr. Withheld" in your December issue about the importation of his Mini is technically correct, but he isn't really lucky. I know of at least 10 Minis, a Marcos and an XJ6 Jaguar brought in via Canada. Also Sp/4 Williams can buy a Lotus Europa

(Continued on Page 60)





by David Ash



Dan Gurney

**DAN GURNEY MOVES TO PLYMOUTH...** The recent switch which sends Dan Gurney from a long affiliation with Ford over to Plymouth for the 1970 Trans-Am season had its roots in a long standing feeling of discontent between the Santa Ana ace and Dearborn. There are those who felt that Jacques Passino, Ford's racing boss, never forgave Dan for signing on as team captain and lead driver for the 1968 Cougar team that all but walloped the Mustangs (they lost by a single point) that year. Whatever, it has been painfully obvious, as pointed out in this column previously, that Dan's talents have been going abegging at Ford in the recent past. Certainly, Ford's loss is Plymouth's gain. In making the move, Dan was exuberant, stating that in addition to "looking forward to the season — it will be nice to operate in an atmosphere freer of politics."

**NEW LOCKING SYSTEMS CUT AUTO THEFT RATE...** Speaking in New York City to a meeting of private and public crime prevention agencies, Theodore H. Johnstone, GM's director of product security, reported that National Automobile Theft Bureau figures show a 23% reduction in thefts of 1969 GM cars for the first six months of 1969, in comparison with the same period for the preceding year. These were the first makes to be equipped with the new universal steering gear lock and ignition key buzzer. This is an encouraging figure, especially in view of the FBI's recent revelation that the overall auto theft rate had risen 9% during the same period. I won't be so flip as to knock this, especially since a 25% reduction is very significant, but those new steering wheel locks and buzzer-type switches have got to be the biggest pain in the neck ever perpetrated on the motorist. They could be dangerous, too, if your throttle stuck and you turned off the ignition to control the runaway. On some makes other than GM, this could lock up your wheels! I sure do wish they would come up with something safer than this lock and less offensive than the buzzer. A simple warning light, like Fiat uses, apparently is as legal as a buzzer.

**MORE CITIES INVOKE SNOW EMERGENCY ORDINANCES...** Other major cities including Washington D.C., Pittsburgh, Omaha, Philadelphia, Kansas City and Buffalo to name a few, have all adopted "Snow Emergency" ordinances similar to those used in New York for some years now. Motorists who find themselves stuck without snow tires or chains during snow conditions on major arteries or so called "Snow Streets" are subject to fines, tow-away or both. Some smaller cities have also adopted such local laws including Harrisburg, Pennsylvania, Troy (N.Y.) and Portland, Maine. While I generally am loathe to see increased local restriction on the motorist, this has to be a sensible way to go. Modern snow tires, especially those equipped with what some of us know better as "rally studs," are both highly effective and inexpensive. Where snow conditions exist such tires should be part of every motorist's standard purchase package. Not that any of this will make the tire makers unhappy though. Firestone and Goodyear report that nearly 19,000,000 snow tires were sold during '69 — an increase of some 13% over 1968.

**AUTO OPERATION — MORE INFLATION...** Gone are the days when a

travelling salesman could make a penny or two per mile on his auto operation allowance. The latest figures available from the U.S. Bureau of Public Roads reveal that it costs the average driver 11 cents a mile to operate an automobile. Costs break down as follows: State, federal and local highway taxes — 1.2 cents; garage, parking and tolls — 1.8 cents; depreciation — 2.8 cents; maintenance and accessories — 2.1 cents; gasoline and oil — 1.7 cents and insurance — 1.4 cents. On the national average, that's up more than 20% over the last two years!



Plymouth "Superbird"

**PLYMOUTH COMES BACK WITH SUPERBIRD...** Plymouth's own version of what appeared earlier as the Daytona Charger, a sleek droop-nosed two-door hardtop replete with high standing integral airfoil, will carry the fight in big time stock car racing next season. Part of the Road Runner series, the car is available in touring trim and many more than the minimum number of 1,000 units required by NASCAR will be built before the '70 season gets underway this February at Daytona. The hot rumors still insist that Richard Petty will come back.

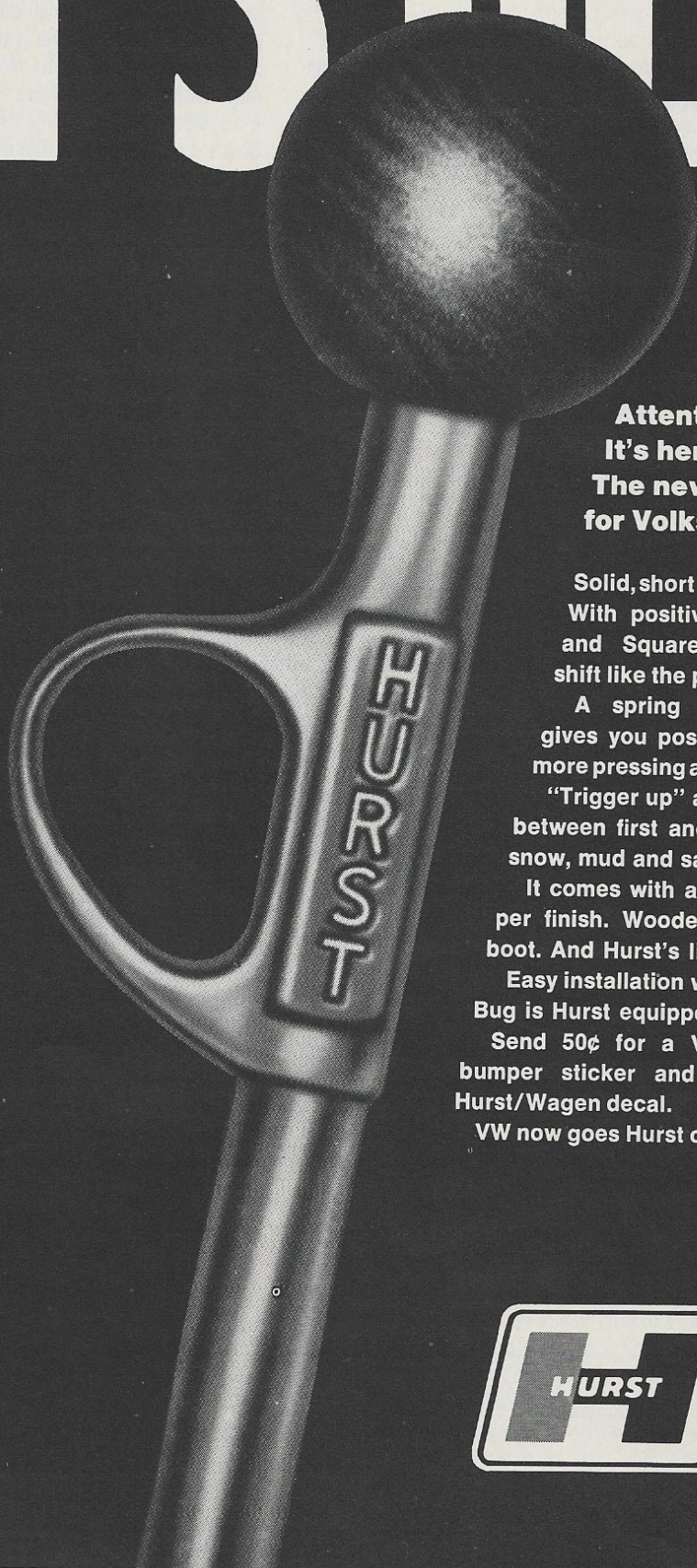
**SUPER TANKER...** Wonder why they sent the Tanker Manhattan poking around in the icy waste of the Northwest Passage? — Americans purchased 81 billion gallons of motor fuel in 1968, that's why.

**ASF, NHUC and AIHSC CONSOLIDATE...** As of January 2, 1970 the Automotive Safety Foundation, National Highway Users Conference and Auto Industries Highway Safety Committee began operation as a single force under the new name of "Highway Users Federation for Safety and Mobility." The goals of the new group embrace the same causes for good previously endorsed, namely: Planning, development, maintenance, enhancement of use, lowering costs, safety, progress and leadership in all of these areas. While the latter two founding groups are trade oriented — in fact, they have been in past

(Continued on Page 10)



# IT'S HERE!



**Attention VW owners!**  
**It's here!**  
**The new Hurst Shifter**  
**for Volkswagen.**

Solid, short throw "H" pattern shifting. With positive stops. Bug, Fastback and Squareback people can now shift like the pros.

A spring loaded "Saf-T-Trigger" gives you positive reverse control. No more pressing and pulling to find reverse.

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VW now goes Hurst class.



**HURST**  
**PERFORMANCE**  
**INC.**

WARMINSTER, PA. 18974



# WORLD NEWS

(Continued from Page 8)

referred to as pressure groups — this can be a very useful development. But no really significant progress will be made on any of these fronts until some way can be found to relate the savvy and experience the trade has, but without its self-seeking interests, to federal legislation. This is a step in the right direction, but we've got a long way to go.

**CAN-AM — THE BIG-TIME BY ANYBODY'S STANDARDS.**... Expanded to 11 races in '69, the Canadian-American Challenge Cup series set new records in just about everything. 401,260 spectators, up from 276,000 the previous year, attended three events in Canada and eight staged Stateside. A whopping total of \$814,384 in prize money, more than double that of 1968, was paid to drivers. With contingency awards of \$66,000, the Johnson's Wax championship award of \$200,000 and purses of \$547,784, the grand total of prize dollars swelled to \$941,534! That's a bigger number than the one they use at Indy — I know, I know, Indy is one race, this is an eleven race series — but stop and think about it for a second. Indy ties up a whole year's planning, and uses up more than a full month of testing time and involvement so maybe it's not such a crazy comparison after all. But putting this last point aside, just think of how this sport of road racing has come on since the first club races at Watkins Glen and Pebble Beach. Seems almost unbelievable when you contemplate these enormous purses. The final SCCA audit shows champion Bruce McLaren as having won \$160,950 and his teammate Dennis Hulme taking home \$151,534. That's one third of a million bucks — even with a dull pencil! Gosh.



12 millionth Oldsmobile

**OLDSMOBILE — ANOTHER BIG MILESTONE.**... It's a long way too,

from the curved dash Olds to a '70 Cutlass, and in more ways than one. The Lansing based GM division announced that their 12th million car left the company's production lines in November of last year. The unit was a red Cutlass Supreme Hardtop Coupe, number 170,581 of Oldsmobile's 1970 model run.

**AUTO SPORTS FOR THE OLYMPIC GAMES?**... Maybe. Amateur drivers competing in the American Road Race of Champions at Daytona took time out to sign their names to a petition circulated by the Competition Depart-

ment of British Leyland Motors which asks the International Olympic Committee to recognize and include road racing competitions for amateur drivers in the 1972 games in Germany, or in those to be staged in 1976, by the latest. The proponents contend (and who can argue?) that motor sports meet the basic I.O.C. requirement... "that an eligible sport be widely practiced in at least 25 countries" better than many sports such as fencing, water polo, tobogganing and any number of others now included. You know what? They're right. So, why don't you and your friends clip out the petition here, sign it and send it to British Leyland at the address indicated.

THIS PETITION IS CIRCULATED IN THE INTEREST OF THE SPORT BY THE COMPETITION DEPARTMENT OF BRITISH LEYLAND MOTORS INC. SEND TO: AUTO OLYMPICS, 600 WILLOW TREE ROAD, LEONIA, N.J. 07605

We the undersigned, urge that the International Olympic Committee include motor sports events in the Olympic Games as soon as possible in the interest of true internationalism in sports.

We firmly believe they meet the Committee's criteria for recognition. They are practiced in more than 25 countries and we believe organized motor sports are pursued with as much enthusiasm as a number of sports already on the Olympic schedule, fencing, tobogganing and water polo, for instance.

We firmly believe they meet the Committee's criteria for recognition. They are practiced in more than 25 countries and we believe organized motor sports are pursued with as much enthusiasm as a number of sports already on the Olympic schedule, fencing, tobogganing and water polo, for instance.

Certainly there are few sports more international in terms of participants and following than motor sports.

Lest the Committee raise the objection that motor sports are tests of machines and not men, we want to point out that both cars and drivers are put to test. This in no less a way than Olympic bicycling tests both the rider and his bike or Olympic yachting tests the design of competing boats and the skill of their crews in equal qualities.

Nor is the fact that some motor sports, particularly racing, have been professionalized a valid objection. Amateurs outnumber professionals. The mere fact that there are professional events is irrelevant. Basketball, soccer and boxing, all Olympic regulars, are heavily professionalized.

Specifically, we propose that the Committee study the possibility of including road racing, long distance rallying and hill climbs in the 1972 Games or at the very latest the 1978 Games.

These three events are suggested because they are the most widely practiced in the greatest number of countries. All three can be conducted under international rules respecting engine size, etc. Facilities for all three abound in Germany, the host country for the 1972 Olympiad.

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Readers of WORLD CAR GUIDE Magazine



**NEW YORK AUTO SHOW GAINS IN POPULARITY...** For the second consecutive year, the New York International Automobile Show has sold all of its available space. 1969 marked the first time any exhibition had been able to occupy all four floors of the giant Coliseum. This year, every inch of available space was sold five months before the opening date! While it may not yet match Geneva, Earl's Court or one or two of the other European giants, the New York show has arrived as an international showcase and its importance continues to grow.

**MORE PRESSURE FROM NIPPON...** With Toyota already rattling everybody's complacency, Datsun now makes yet another giant step in the U.S. market. Moving almost without fanfare from 56,000 units in 1968 to well over 90,000 in 1969, Nissan recently announced that they were closing a nine year period of reconnaissance with a bold plan for future expansion in the U.S. The goals are impressive, to say the least — 300,000 units annually, within five years! In discussing this development with Soichi Kawazoe, Nissan's executive VP, one gets the distinct impression that his company means precisely what it says. They have a solid service and distributive organization plus simple, reliable products which are both well accepted and highly regarded, and the price is right. To stay in the swing, Datsun has introduced the 240Z Sports, which was previewed last month in WCG. This new machine is crucial to Nissan's overall ambitions here since it represents a \$5,000 value for \$3,500, meets the expanding opportunities of the personal car field and will keep pulling new buyers to dealer showrooms. One more amazing statistic is that nearly one in every three of Datsun's sales last year was one of their marvelous little pick-up trucks. This is still another case of doing the right job of "hitting 'em where they ain't." There is an apparent need for this kind of machine and Datsun was the first builder on the spot with the goods. Kawazoe is always quick to demur in the face of any flattery. "I am only an engineer," he is quick to say, "not a business man." Indeed, he leaves the direction of Nissan's corporate development here to Yutaka Katayama, but watching him lead the company in the early days and help move it now, one is left with a profound sense of admiration for the front rank of Japanese business leaders who come over here and go marketing.

**WORLD CAR GUIDE**

**PENSKE JOINS ONTARIO BOARD** ... At the half-way mark in its colossal \$25,500,000 building project, Ontario Motor Speedway recently announced that Roger Penske had joined its board of directors after taking a position as a minority stockholder. Almost simultaneously, Michael B. Demetrios, former general manager of the Shipstads and Johnson Ice Follies, joined the Speedway as VP in charge of non-racing activities. The first move is perfectly clear in direction and motive, since Roger Penske is a bright guy, a proven winner and no doubt, was put in on the inside. That's only logical. But the signing of Demetrios is of considerably more basic interest. Once it became clear that Ontario would truly materialize, the burning question among insiders has been whether or not it could amortize its giant nut. From the numbers I see projected, it doesn't seem possible. One way out would be to use the facility for other activities. I don't know what exactly, but maybe rodeos, horse shows and well, whatever they can find. That's apparently where Demetrios comes in. Face it. They have a tough row to hoe, in spite of the impressive list of names who have come aboard. We'll see.

**RENAULT—RUMORS OF NEW CARS AND WHAT ALL...** My pals at Renault who know about these things are murmuring that Renault will introduce a new automatic transmission in its 16 sedan-wagon in the early part of 1970. This transmission is the first torque-converter type to be developed in France and is the result of considerable study by the Regie Renault. Unique features of the box are: 1), Disc clutches and brakes are used in place of bands to control the planetary gearsets which should increase the life of the unit by two or threefold; 2), It is a low-pressure system, with constant hydraulic pressure in the range of 45 psi, as opposed to the variable-pressure type where some pretty mean psi occurs; and 3), Shifting is controlled not by pressure build-up, but electronically, through a miniature alternator. The whole scheme looks so simple and fool proof that it could be a real winner. Those who have driven it say that it is as smooth as a maiden's cheek. The new 1970 Renault 10 has 1300 cc displacement, and an increase in horsepower from 48 to 56. Doesn't sound like too much, but the torque is up 23% and comes on at a lower rpm, which makes this little sedan behave like it has lots more ponies than the specs show.

(Continued on Page 53)

## HISTORICAL SCRAPBOOKS

### MOTOR SCRAPBOOK No. 1

Floyd Clymer began his series of scrapbooks as a sort of sentimental journey starting with the days when he was a dealer for Cadillac, Maxwell and Reo—at the age of eleven. Over 200 early makes of cars and motorcycles are pictured and detailed in this 160-page book and include such makes as Adams Farwell (with 5 revolving cylinders), American Underslung, Brush, Chalmers, Darracq, De Dion, Duryea, Reo, Duck (driven from the rear seat), Maytag, Metz, Everett, Haynes, Hup, Air-Cooled Knox, Orient Buckboard, Studebaker Electric, Wayne, Wanamaker, and many others—including steamers. Motorcycle section includes steam and foreign makes in addition to many early U.S.-made machines. Postpaid \$1.50

### MOTOR SCRAPBOOK No. 2

This is the second in the famous scrapbook series by Floyd Clymer and contains a portion of his autobiography. Among his earlier experiences, Clymer tells about a home-built 'cycleplane'; his first agency for an automobile company; and of the 100-mile and 1-hour records he established at Dodge City. Over 200 antique cars and motorcycles are illustrated and described in this volume. The list includes such cars as the 2-cylinder Fords, Buicks and Studebakers; the Aerocar, the Bergdoll, the Case, the Carter Twin-Engine, the Reeves 6-Wheel Car, the Julian Radial Rear Engine Car, the 12-cylinder Maxwell, the Horsey Horseless Carriage, the Imp, the Grout, and many more. Like the preceding volumes in this series, No. 2 has 224 pages. Postpaid \$1.50

### MOTOR SCRAPBOOK No. 3

In this number of the scrapbook series, author Floyd Clymer deals with another group of automobiles and motorcycles. He describes the first motorcycle races up Pike's Peak, and the famous Post road race for automobiles. Among the more-than-200 vehicles illustrated and described are: the Diana, the Stutz Bearcat, the Brewster, the Ariel, the Cord, the Detroit Electric, the Du Pont, the Herreshoff, the Isotta-Fraschini, the Locomobile, the Lozier, the Mercer, the Napier, the Octoauto, the Roosevelt, and many others. The belt-driven Indian, the American, Flanders, Reliance, Cleveland and many more forgotten or extant motorcycles of that era are also included. Postpaid \$1.50

### MOTOR SCRAPBOOK No. 4

This scrapbook, like the three preceding it, contains a wealth of information on more than 250 old cars and motorcycles which once travelled the highways and byways of the United States. Some of the makes illustrated and described include: Abbott, Alter, Amplex, Anderson, Auburn, Biddle, Birch, Bush, Case, Cord, Courier, De Tamble, Dixie, Dolson, Drexel, Doble, Stanley, Duryea, Eagle, Earl, Erskine, Flanders, Franklin, Hanson, Holmes, Kissel, Kline Knox, Lewis, Marquette, Mathewson, Moon, Owen, Pullman, Queen, Roamer, Simplex, Skelton, Welch, Wolfe, Yale, and many others. 224 pages and hundreds of illustrations. Postpaid \$1.50

### MOTOR SCRAPBOOK No. 5

250 old cars, motorcycles, and the way of life they served live again in the nostalgic pages of Floyd Clymer's No. 5 scrapbook. From the ABC to the Winton Six, his book is evocative of the era when automobile manufacturers could be numbered by the thousand, and Hayner Whiskey was \$3.20 for 4 quarts. Read about Mr. & Mrs. Chas. Glidden (who founded Glidden Tours), and their epic 3,536-mile drive in 1904, from Boston across the Canadian Rockies—in a 24 h.p. Napier. In 1907, chassis for the Rolls-Royce cost \$6,000-\$8,000 in New York, and in 1922 there was the Fox Air-Cooled Car... You will not be able to put this book down until the last page. Postpaid \$2.00

### MOTOR SCRAPBOOK No. 7

In 224 information-packed pages, Floyd Clymer presents a further chapter in the fascinating story of the automotive era. Included are more than 300 illustrations. He tells of various ventures in automobile manufacturing... of the response to the many advancements at the time... of the demise of the "assembled" car... of the thousands of accessories and special equipment made for the Ford Model T and others. Almost 400 different makes are mentioned or described, including such gems as the Alden Sampson Tourer, the Bendix Ideal Doctor's Car, and the Torbenson Gasoline Runabout. Postpaid \$2.00

### MOTOR SCRAPBOOK No. 8

The latest in the famous Floyd Clymer series of historical motor scrapbooks, this volume contains over 400 photos, charts, drawings and jokes about long-forgotten, odd and humorous makes of cars. Read about Pres. Eisenhower in an R & L Electric. See the freakish Pneumobile with its years-ahead pneumatic springing... the evolution of the streamline body... the 1909 Car Buyer's Guide... Barnum & Bailey's first car... 2-cycle cars... World War I trucks... cars built in the South. The 224-page book is dedicated to the Duryea Brothers, of Springfield, Mass. Postpaid \$2.00

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# Road Test

## 1970 VW TYPE III AUTOMATIC...

By Don MacDonald

photos by Lester Nehamkin

## Sedately Smooth

When you think that today's VW fastback costs \$2,339 at the pier in New York and close to \$3,000 when you toss in taxes, transportation, automatic transmission, radio and perhaps a sunroof, you're no longer dealing with what might be called an "economy import." This is an expensive car and should be compared with others of its ilk such as a Sunbeam Alpine, a Cortina GT, the Opel Rallye Kadett, Renault 16, SAAB 96 and Toyota Mark II. Also, there are quite a few domestic models stickered for this kind of money.

Wolfsburg's margin of superiority is not quite so wide in this league. As a package, the Type III is not superior at all so then you must start tallying up the components of the package that are most important to you. The car is at least as durable if not more so than any of the above. Quality control can be faulted only in minor details so its marks for this are probably higher than any but the Renault and SAAB. The Volks has more rear seat room than the Opel and SAAB but nowhere near as much as the Renault.

On the minus side, its gas mileage is neither better nor worse than the others. It lacks the full instrumentation that will be found on the Alpine, Cortina and SAAB. As to performance in terms of acceleration usable in normal traffic situations, the Type III is the most sluggish of the group by far.

Certainly the biggest plus in its favor is the current roster of more than 1,100 authorized service outlets plus maybe triple that number of independent specialists. You can't get very far from a source of parts even in Alaska, a comforting thought that tends to push any product deficiency off into a corner. Further, each of these authorized outlets are now equipped with electronic diagnostic apparatus which takes the guesswork and therefore much of the cost out of VW service.

**CAR AT A GLANCE:** Generous interior room... Soft, comfortable ride... Smooth automatic shift but the quadrant is ornery... Slower than the '70 beetle... A+ quality control and attention to detail... Troubled by crosswinds.



*Main styling change on '70 VW Type III's is perpendicular nose. The car corners well thanks to its front stabilizer but steering is just slightly on the heavy side.*

I suspect that very few Type III buyers spend much time comparing other import makes in the price class before choosing. Records show that a sizeable and surprising proportion of first-time fastback buyers are those who either own or have shopped for a Detroit pony car such as Mustang and believe it or not, GTO. This type of car is the one most often taken in as a trade on a fastback, the owner expressing disillusionment over high upkeep costs. Another large group of Type III buyers are understandably those who have owned beetles and want to move up, not so much in price but room, and of

course these people generally choose a squareback rather than a fastback.

A survey of dealers show that they rate the fully automatic transmission, electronic fuel injection and disc brakes as selling tools in that order. This is surprising too, as all but the electronic injection are generally available on other makes, domestic or imported. Actually, neither Volkswagen nor the dealers contacted seem to have a good profile of the Type III buyer except that they know he's young (25-35) and usually engaged in some white collar job or profession. Most squareback sales are influenced strongly by the distaff side



## VOLKSWAGEN TYPE III FASTBACK

Specifications From  
The Manufacturer

### ENGINE:

**Type:** Rear-mounted, overhead valve, horizontally opposed four, air-cooled

**Bore and stroke:** 3.36 x 2.72 ins.

**Displacement:** 96.66 cu. ins. (1584-cc)

**Horsepower:** 65 @ 4,600 rpm

**Torque:** 86.8 lbs. ft. @ 2,800 rpm

**Compression ratio:** 7.7 to 1

### TRANSMISSION (on test car):

**Type:** 3-speed automatic

**Gear ratios:** 1st-2.65, 2nd-1.59, 3rd-1.00, R-1.80

**Rear axle ratio:** 3.67

### SUSPENSION:

**Front:** Independent torsion bar with stabilizer

**Rear:** Fully independent torsion bar, semi-trailing

**STEERING:** Roller with dampener, curb-to-curb 36.5 ft.

**WHEELS AND TIRES:** Bolt-on steel disc with 6.00x15 bias ply tires

**BRAKES:** Hydraulic dual circuit with discs at front

### CAPACITIES:

**Fuel:** 10.6 U.S. gals

**Oil:** 5.3 U.S. pints

**Transmission (automatic):** Approx. 12 U.S. pints

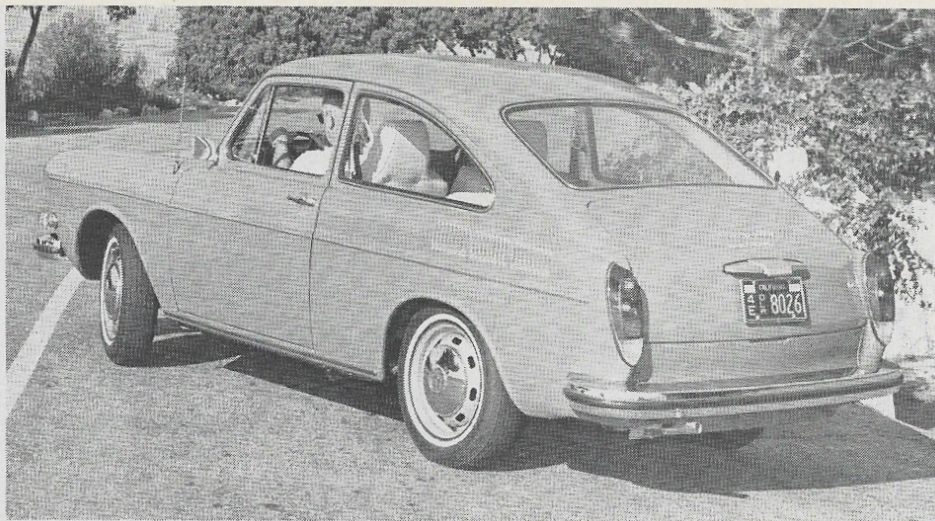
**BODY AND FRAME:** Steel body, platform chassis

### DIMENSIONS AND WEIGHTS:

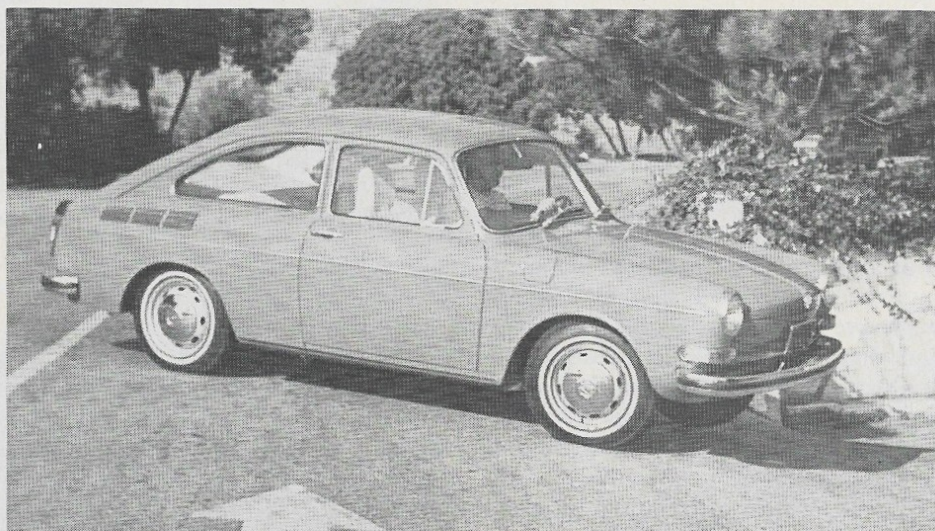
Wheelbase 94.5 ins., Overall length 170.8 ins., Width 63.2 ins., Height 57.9 ins., Weight 2,226 lbs.

of the household who seems to grow tired of pony cars faster than her husband.

Oddly enough, the idea that the Type III has more power is an important buying influence although actually, as our performance figures will show, the car is slower than a 1970 beetle. All of this seems like rather vague motivation towards the purchase of a car that would still stand No. 5



*There would seem to be more louvers in the rear fenders but we didn't actually count them. Our test car's exhaust pipe encountered a rather severely sloped drive.*



*We're cornering rather hard here on private property and it can be seen that the inside front wheel has very little if any traction. Yet there's not much lean.*

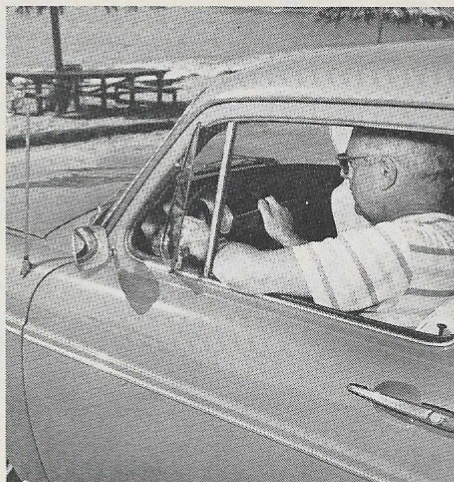
among imports in sales if it were divorced from the rest of the Volkswagen line.

Our test fastback was equipped with the optional automatic transmission and mechanically, it was as smooth as they come. Non-forced downshifts were gentle and so, too, were the upshifts at any degree of throttle opening. I had a feeling, though, that performance was deliberately sacrificed to achieve this goal and it reflects in our zero to 60 mph times which were all run in "3" or drive. The smoothness of the mechanism, however, does not rub off on the shift lever with its unlighted quadrant. It's certainly necessary to provide some form of detent to prevent over-running through neutral into reverse, but you don't have to make a Chinese puzzle out of it. Three degrees of lift on the lever are required to get into Park, and at night I suggest that the neophyte owner



*This is a better view of the new shape to the luggage lid. It does wonders to the Type III's appearance and is immediately recognizable on the road.*





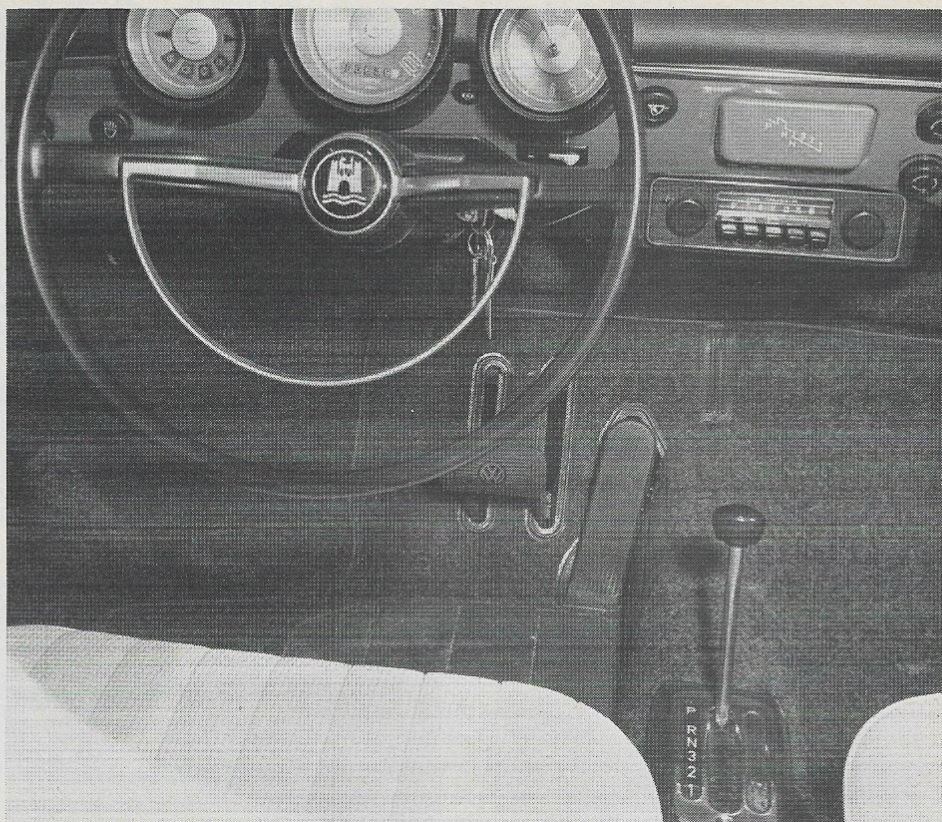
*Those who might think I was nitpicking when complaining about the positioning of the vent window post can see the problem here. You end up with creases in your arm.*

keep a flashlight handy to see where he's at.

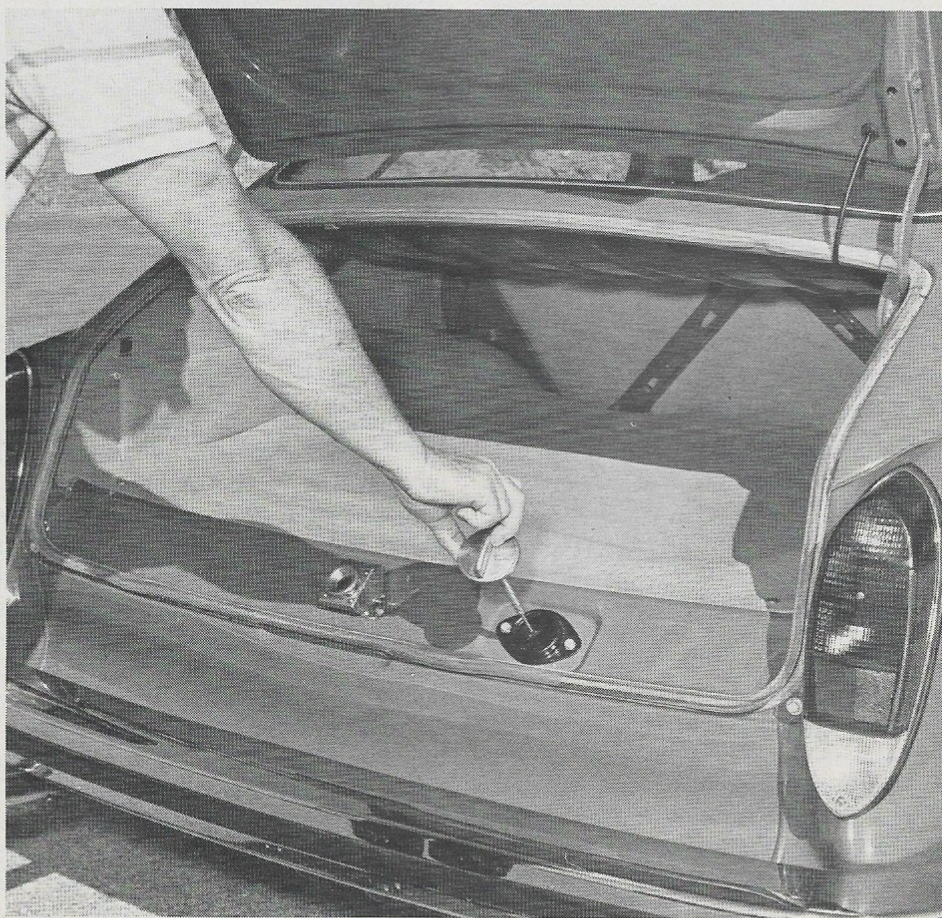
The brake pedal on the automatic models is large enough to facilitate left foot application. In fact, it is mounted on two pedestals which is kind of an expensive way to make the floor pan and mat interchangeable between the automatic and the stickshift. But what is more important, the brakes are good. Use of front discs without power assist is rather rare even on relatively small cars, but the pressure required for even panic stops is not excessive at all.

In the process of setting up standard testing procedures for WCG which are both repeatable and not so complicated that they don't relate to normal driving (ergo some of our competitors' claimed usage of Tapely meters, fifth wheels and the like), I had occasion to try a succession of 10 maximum stops from 60 mph without locking the wheels. The first, or "base-line" stop was achieved in 132 feet which is very good indeed. The tenth stop required only 145 feet. Put another way, only 13 feet of "fade" was induced by this severe program whereas some American cars which shall remain nameless won't stop at all — well, hardly — on the tenth try.

Steering is understandably slightly heavier than the beetle and on a still day (more about this in a minute) it is perhaps overly sensitive. A driver new to a Type III will overcorrect during his first few sessions behind the wheel, but you soon get used to it. The mechanism seems to follow road irregularities and the thing to do is let it correct itself.



*Control and instrument layout is straightforward, practical and neat. Shift quadrant, however, is not lighted and should be to aid drivers new to the Type III.*



*Outside access to crankcase dipstick is a step in the right direction but unfortunately, the screw cap can be as obstinate as the lid of a pickle jar.*

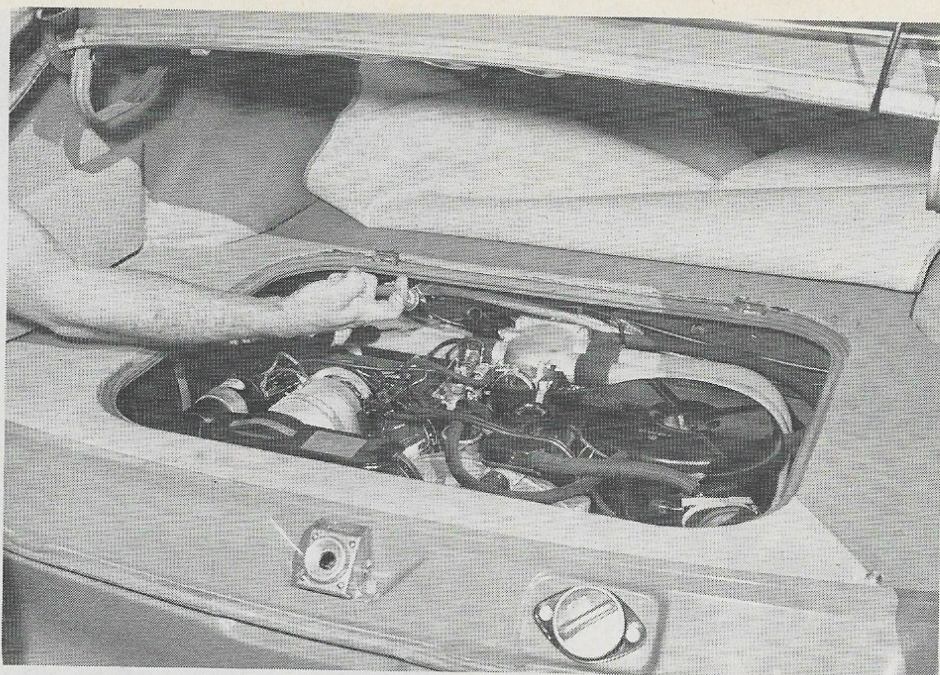


Gusty crosswinds — here comes that complaint again — are something else. If the beetle is bad in this situation, the Type III is worse. Here, you have to correct, particularly when a car is alongside you in the other lane, and you have to guard against overcorrecting. Admittedly, the gusts were strong enough (35-50 mph) that day for the fuzz to ban camper and trailer traffic but when you literally get pushed from one lane completely into another, it's tiring and sometimes frightening. At least the Type III doesn't share the beetle's other foible; namely, harmonic drumming in the headliner.

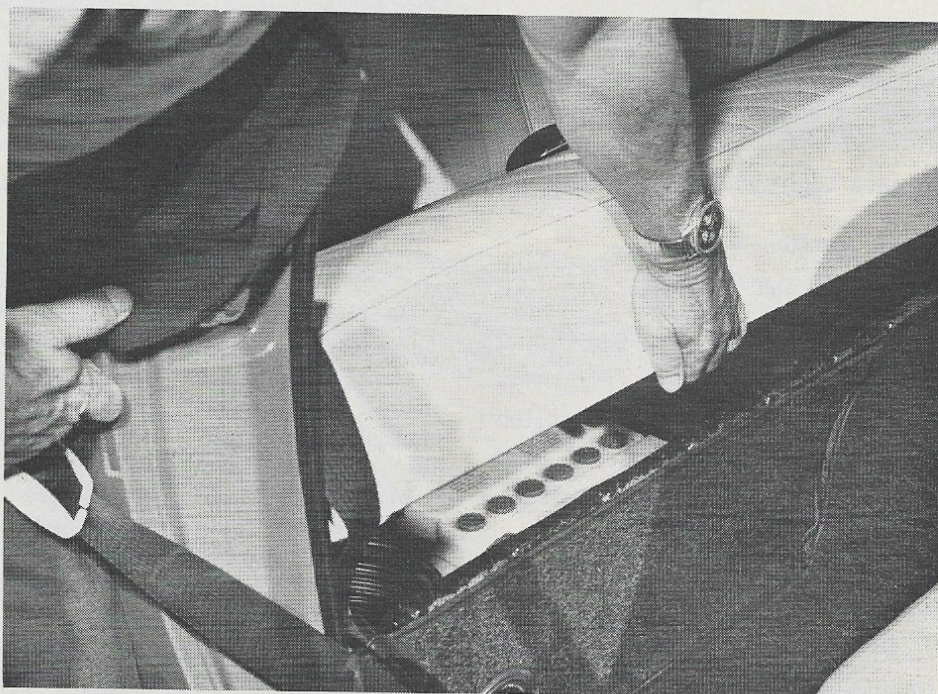
My other complaint is on behalf of service station attendants who have every right to charge time for checking the fluid level in the automatic transmission, much less the battery. Surely there must be a better location for the battery than under the rear seat with its wrapping of lap and shoulder straps. And also, by this time, Wolfsburg should have given greater leverage to the wing nuts that secure the engine cover. The battery inevitably winds up unchecked and the engine cover is left loose in its position by people who aren't being paid well enough to fuss with such annoyances. That dipstick arrangement is no prize, either. If the last attendant was a little ham-handed, the next one had better own a strap wrench, or maybe you could hold the car under a hot water faucet like a jar of pickles.

Standards of finish and attention to detail rate the usual A+ that must be handed to any Wolfsburg product. One would almost wish that the doors could be fitted a little less tightly, or else, a relief valve be incorporated because it is distinctly hard on the ear drums to have them slammed with the windows up while you're inside. And on the subject of these doors, they're a sure cure for the bad habit of driving with your arm on the sill. For one, the rubber weather guards are sharp and if that doesn't make you quit, the positioning of the vent-window post almost midway in the door will.

On our mileage check, which took place during the abominable wind conditions mentioned earlier, we racked up a respectable 23.3 mpg, a figure that would undoubtedly improve measurably in still air. Zero to 30 mph acceleration, as used to cross from a stop sign in heavy traffic, was 5.7 seconds; zero to 45 mph, as used with the blind entrances on older freeways, was 11.7 seconds and zero to 60 mph took an overly long 21.1 seconds. Vital 40 to 60



*This VW Type III is only 500 miles old and has had nothing but factory service but notice already the frayed edges where the engine cover clamps.*



*Okay, one man has the seat up so now who's available to check the battery. This arrangement has just got to be changed or else you're in for chronic battery problems.*

mph passing took 13.9 seconds and from 50 to 70 mph, 16.3 was consumed using only automatic downshift in both cases. Unlike the beetle, the fastback seemed happier at 65 mph than it did at 75 mph, although this is more a measure of noise than any stress on the engine at the higher speed.

Overall, the fastback with automatic is a solid car, somewhat lack-luster in performance when compared with other

imports at its price, but obviously more durable than they. With its adequate luggage room, it would rate high as a travel car except for its dislike of wind gusts. Seating room for four is more than adequate and it rides more softly than any car in its price class except the Renault 16, the latter being almost too soft for some tastes. The Type III is sound value for those whose main requirement is reliable transportation.



# Road Test

## TOYOTA COROLLA SPRINTER...

Spunky Lightweight

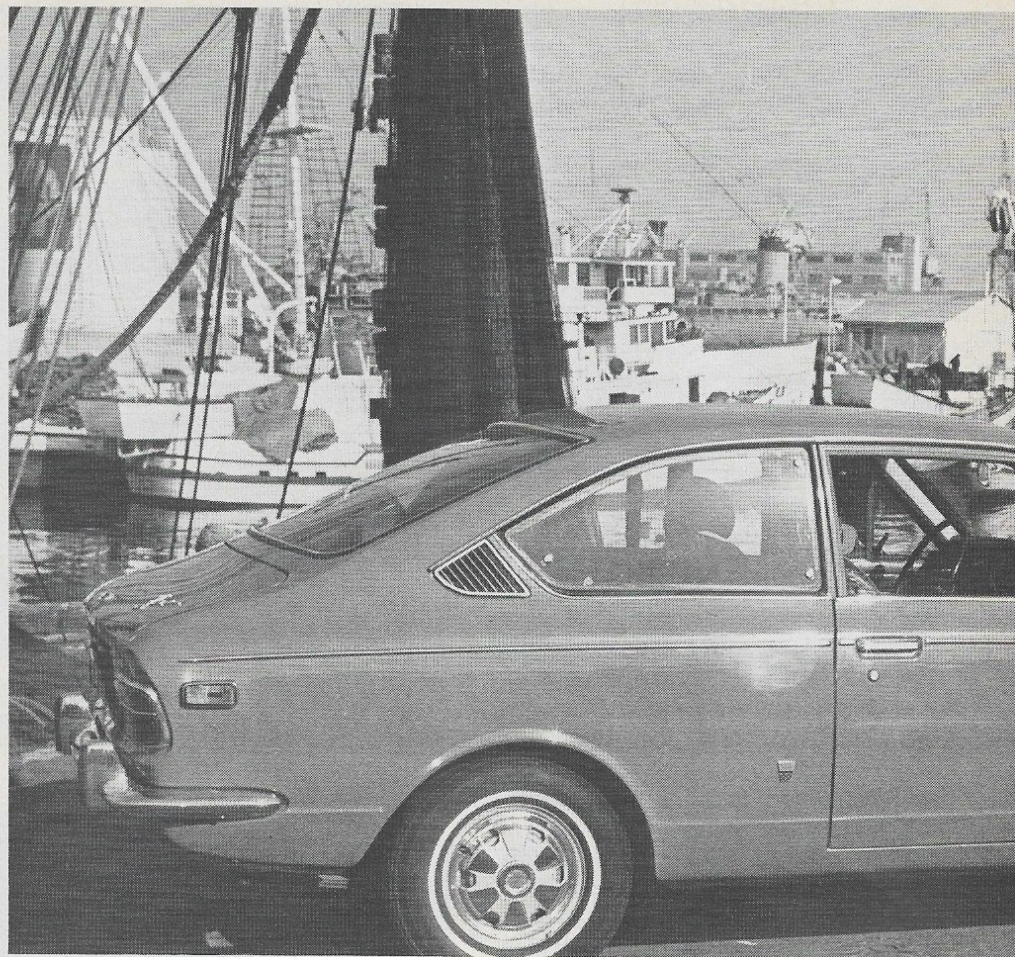
by Don MacDonald

photos by Lester Nehamkin

**CAR AT A GLANCE:** Exceptional 3rd gear performance... Firm ride and steady cornering... Limited front seat headroom... 31 mpg economy... Minor bungling of detail trim.

If you're five feet, eight inches or less tall and have about \$1,900 to spend on a new car, Toyota's Corolla Sprinter is worth looking into. Taller people, though, will find that the space provided between the front seat cushion and the headliner is insufficient for their needs.

This is unfortunate because in every other direction except maybe rear seat legroom, the sprightly Sprinter offers an excess of people clearance. Maybe there's a way of lowering the seat, or you could buy a Corolla wagon which is an inch taller and almost as spry. They all have the overhead valve four which produces 60 horsepower and 62 lbs. ft. of torque from just 66 cubic inches of displacement but the wagon



*Clean lined Sprinter is only 53 inches high but this is at that sacrifice of adequate front seat headroom for taller persons.*

weighs 1,700 pounds, 100 more than the Sprinter and two-door sedan.

Considering that this willing powerplant is about one-third the size of our smallest domestic six and there's been no hot-rodding in the sense of extra carburetors or stratospheric compression ratios, its performance is rather amazing. It also puts out where it counts which is at the high end in third and gives 31.3 miles to the gallon.

This feature showed up in our acceleration runs. Its zero to 30 mph figure of 5.5 seconds and zero to 45 of 10.7 aren't significantly different from the much heavier VW fastback tested elsewhere on these pages. But, once you have a chance to reach out in third as in zero to 60, the Corolla comes into its own. This figure was 17.3 seconds compared to 21.1 seconds for the Volks. At 10.4 seconds, the nimble Jap was four seconds in 40 to 60 mph passing and registered the same superiority in jumping from 50 to 70 mph. Again, we shifted down into third as high gear passing imposes a two second penalty.

Although I don't suggest that you make a regular practice of running up to

70 mph in third gear, the engine showed no sign of protest other than the racket any little four-banger would make when churned up to 6,500 rpms or so. Instrumentation, of course, is rather spartan and did not include a tachometer. Perhaps its happiness at almost any speed is due to the cam, though not overhead, being set in an unusually high position which in turn cuts down on the length of the pushrods and therefore valve train inertia.

Certainly another major contributor to performance is the crude sounding but effective four-speed gearbox. On first try you might accuse the long, slanted stick of being vague as to its whereabouts but this is countered by little if any precision being needed to seek out the proper gear. I call it crude only because downshifting, say into first as you coast up to a traffic light, sets the syncros to chirping like a mynah bird. The box is by no means something that ZF would put its name on but it works in its own foolproof way.

Corollas have only been around these parts for a couple of years at the most so there is no way of assessing their overall durability but especially after



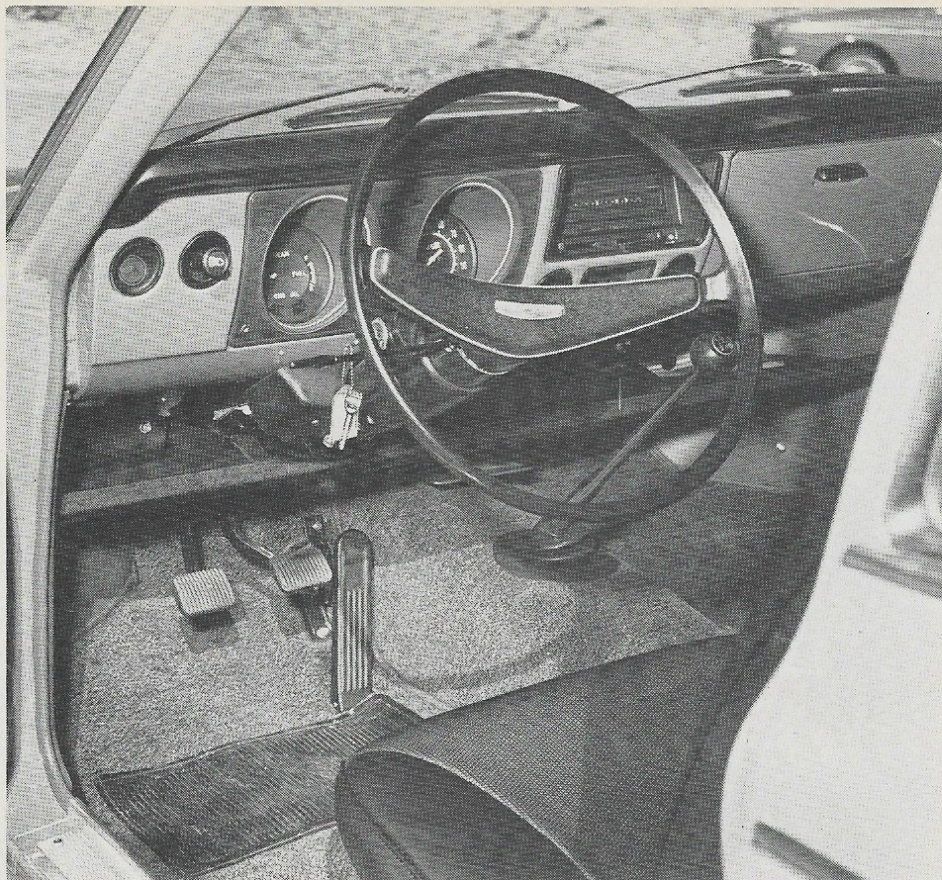


*Vision is excellent in all directions, unlike some fastbacks. There's room for five overnight cases plus incidentals in the trunk.*



*Though there's some lean during hard cornering, Corollas don't spook you into feeling uncomfortably off balance. Steering is light and precise.*

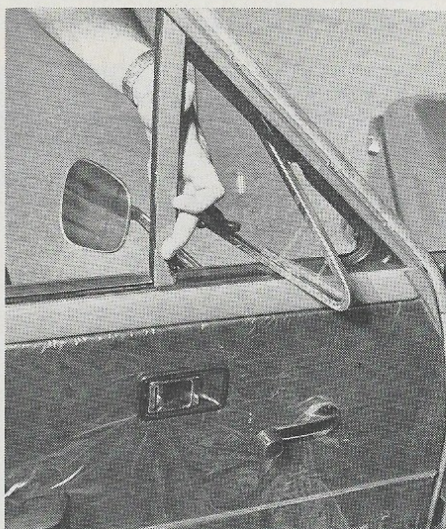




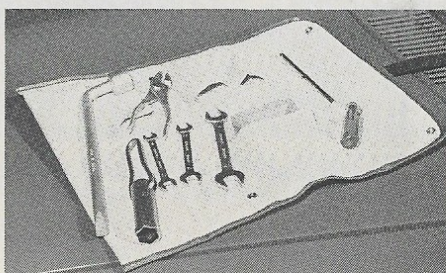
*Controls are simple but well laid out, particularly the positioning of the steering wheel and gear shift. Instrumentation is confined to speedo, gas and heat.*



*Jack stowage and sharp edges in the commodious trunk could wreck some havoc with fine luggage but the area is dust and wet proof.*



*The plastic covering the spot where the vent window fastens soon tears, exposing the original chromed post.*



*Handy-dandy metric tool kit comes free with every Toyota Corolla but there's no place to fasten it down in the trunk.*

moving from a Volkswagen into one, I can't help but get a feeling of slight insecurity — that maybe there was too much emphasis on structural lightness. Anyone who has flown much senses the same thing upon entering an aircraft even though you know that it's been built and tested to withstand empty-ump G's or whatever.

The feeling is enhanced by the fact that attention to detail in the Corolla is not of the finest. For example, that part of the vent window post upon which the window latches is covered with a sort of soft plastic which seems strange to specify for a non-lubricated surface that must stand rather severe local abrasion. Then the buzzer which warned of the key being left in the ignition was so stridently tinny in its sound that one was tempted to leave the door open for a while in the hope that the thing would cough up its larynx or otherwise expire without causing a short circuit.

As Dave Ash noted in his World News column this month, that whole business of the buzzer and locking steering column is ill-advised. Many systems are set up so that it's possible to lock the steering wheel while the car is in motion which doesn't exactly enhance control in an emergency like a stuck throttle. And there's no law that says you have to have a buzzer. Fiat, for example, uses a warning light which is just as effective and a lot easier on the nerves.

But those things aren't the manufacturers' fault so enough of that. Let's get to the Corolla Sprinter's other forte which is handling. I suppose you could put one over on its side while cornering but it would take a bit of doing, at least within legal speed limits. The steering wheel is big and well positioned although it takes a bit of cranking to get from lock to lock with its 18 to 1 overall ratio. It's evident in our photographs that hard cornering produces some lean but you don't feel this much inside the car, at least in the driving position. Though the Sprinter is over five inches taller than its tread, it doesn't spook you into a feeling of imbalance in the corners the way, say, the Volks does.

The ride is on the firm side and can get a bit choppy on certain pavements such as concrete slab that has settled irregularly. Though far superior to any American including pony cars with "sports" suspension, Toyota could work a bit more with their shocks. On our section of test dips which both the beetle and the fastback will take without secondary thrash, the Corolla



## TOYOTA COROLLA SPRINTER

Specifications From  
The Manufacturer

### ENGINE:

**Type:** Front-mounted, overhead valve, in-line four, water cooled  
**Bore and stroke:** 2.95 x 2.40 ins.  
**Displacement:** 65.8 cu. ins. (1,076-cc)  
**Horsepower:** 60 @ 6,000 rpm  
**Torque:** 62 lbs. ft. @ 3,800 rpm  
**Compression ratio:** 9.0 to 1

### TRANSMISSION:

**Type:** 4-speed manual, fully synchromesh  
**Gear ratios:** 1st-3.68, 2nd-2.05, 3rd-1.38, 4th-1.00, R-4.32  
**Rear axle ratio:** 4.22

### SUSPENSION::

**Front:** Coil springs, telescopic strut shock absorbers, lower wishbones and transverse leaf springs

**Rear:** Semi-elliptic leaf springs and telescopic shock absorbers

**STEERING:** Worm and sector, curb-to-curb 14.9 ft.

**WHEELS AND TIRES:** Bolt-on steel disc with 6.00x12 bias ply tires

**BRAKES:** 4-wheel drum, diameter 7.9 ins.

### CAPACITIES:

**Fuel:** 9.5 U.S. gals.

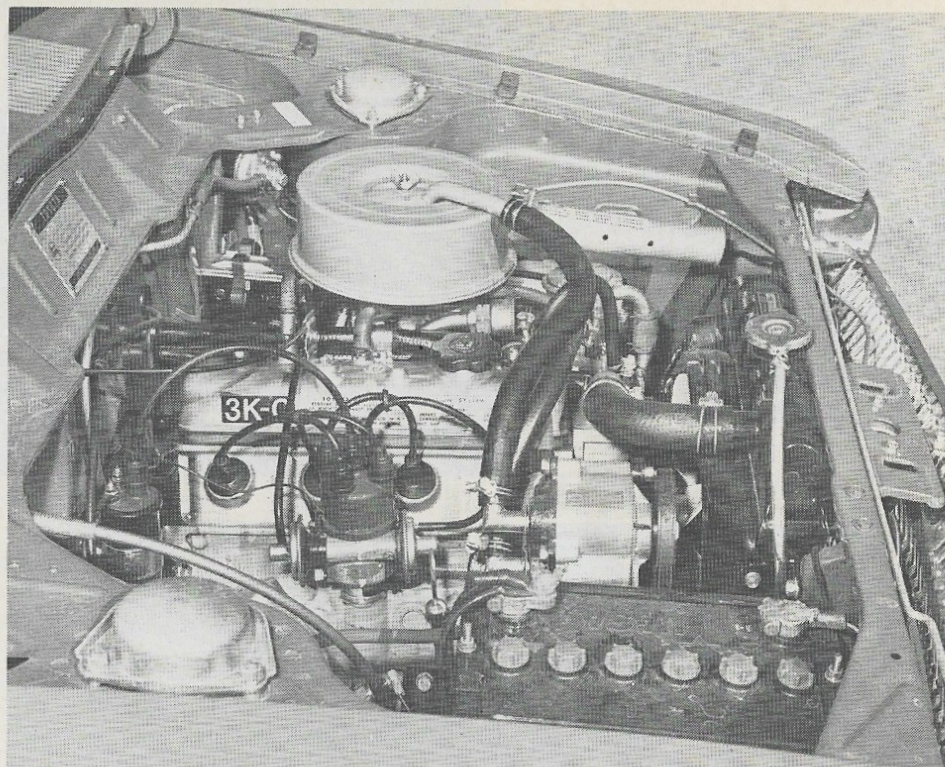
**Oil:** 2.9 U.S. qts.

**Transmission:** 1.8 U.S. qts.

**BODY AND FRAME:** Unitized

### DIMENSIONS AND WEIGHT:

Wheelbase 90.0 ins., Overall length 152.0 ins., Width 58.5 ins., Height 53.0 ins., Weight 1,600 lbs.



*Neatly finished engine sits in a spacious compartment, making routine maintenance exceptionally easy. Emission control is by air pump.*



*Oddly enough the raised and drilled plate escutcheons at the Corollas rear do not fit the standardized U.S. plate.*

serves up a slight "thank you Mam" at both front and rear. It doesn't, however, have any tendency to bottom and as I think we've mentioned before in our test write-ups, this set of dips taken at 40 mph causes severe bottoming with both heavy spring Camaros and Mustangs. Standard American sedans take to the air over them.

Standard features that you don't

expect at the Sprinter's low price include reclining seats, full carpeting and a nicely finished engine compartment that an owner inclined towards tinkering of a Saturday afternoon will find hard to resist. All of the Corolla's little innards are right there within easy reach, making a spark plug change or a point adjustment as easy as opening a flip-top can of Coke. The Toyota people even toss in a nice packet of metric tools including three open-end wrenches, a plug socket and a screwdriver that handles both Phillips and conventional heads.

Trunk space is quite adequate but

unfortunately, jacks and stuff are exposed along with sharp edges in a way that could damage luggage. The area will hold five overnight cases standing on their edges.

You'll have no problem getting used to the controls except perhaps the choke. The black handle for this moves horizontally like a heater control in a black cubby hole and there's a tendency to forget that it's on. If I owned a Corolla I'd paint this handle white so that its position would be immediately evident. Otherwise your wife will invariably return from the store complaining about a strong smell of gasoline.●

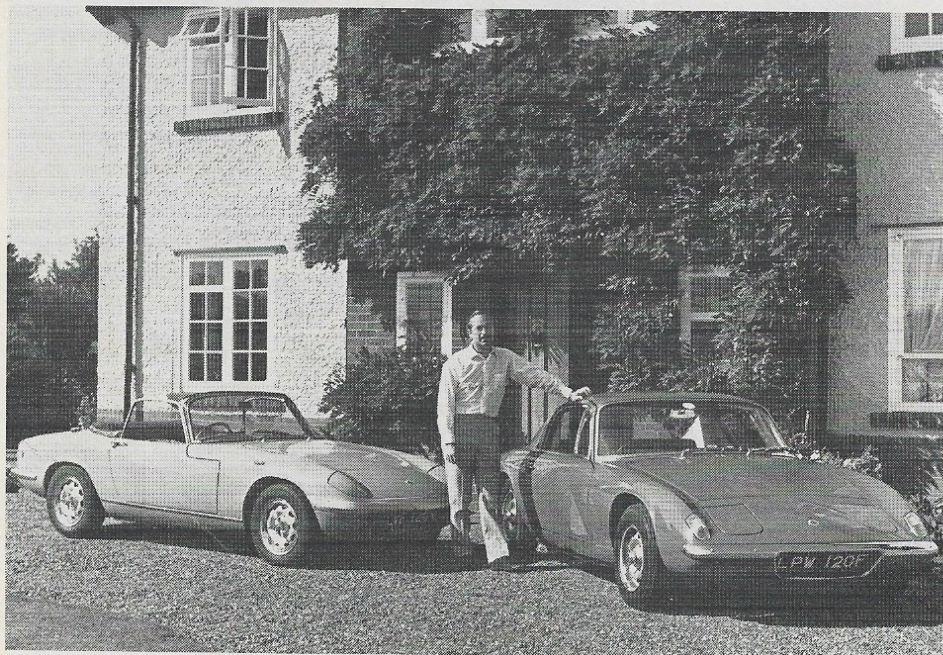


# Road Test

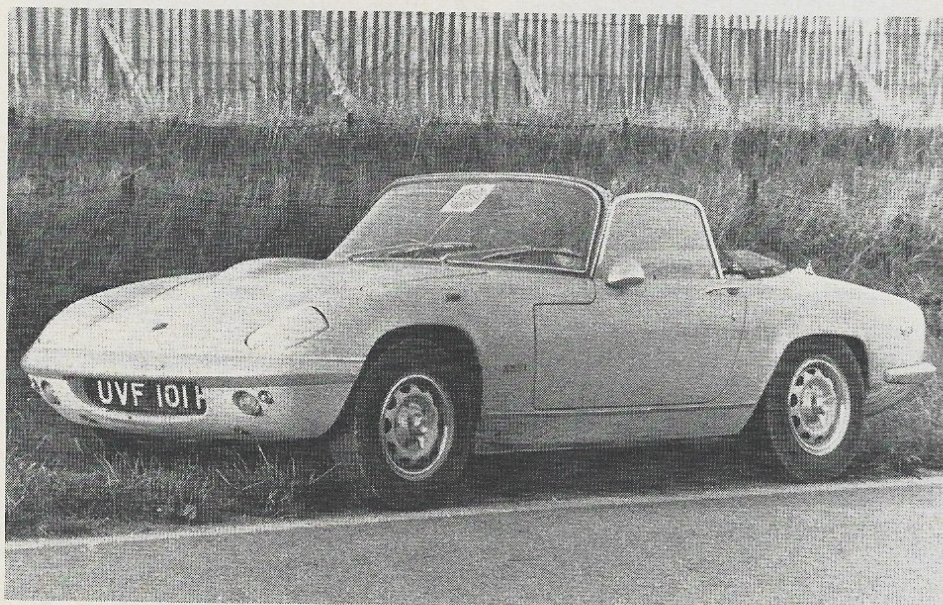
# LOTUS ELAN SE

by Joseph Lowrey

**CAR AT A GLANCE:** Everyday funabout for two plus luggage... Ford-based dohc four in cruciform chassis... Fiberglass convertible body... Race-bred handling... Easy riding... Good gas mileage.



Designer Colin Chapman stands with the Elan SE (left) and the heavier but better handling +2 that will be the subject of a later test.



Test car is to U.S. specs except for protruding enter-lock hubs. A switch to dual Zenith-Stromberg carburetion to meet emission requirements actually improved performance.

Any fool technician can pile complications onto a car, whereas getting results from a light and simple machine requires real engineering skill. This is why, from his very first days as an amateur car builder, Colin Chapman has specialized in giving you less car for your money than did his rivals!

Sure, the extra weight Lotus don't put into a car represents less steel for the company to buy and more profit they can plow back into expanding the plant for 1971. Good luck to them, if paying for the designer's brains rather than for unnecessary iron gives you more acceleration, more top speed, quicker steering response, better gas mileage and less stressed brakes.

Giving customers less car for their money has been proved very sound policy ever since Colin Chapman and some friends started building Lotus sports cars in their spare time about 20 years ago. Three Formula 1 world road racing Championships have been won, and a modern plant alongside its own airfield now has the capacity to build 5,000 Lotus cars per year. Those 5,000 cars are 5,000 reminders to major companies around the world that, however many electronic computers they may own, they know 0.62499999 (or five-eighths) of damn all about building sports jobs.

Seven years after its introduction the Elan is an old sort of Lotus to look at but in fact, the "Special Equipment" convertible I motored around England, Belgium, France and Germany in recently incorporates plenty of improvements upon early examples. The big plants have not caught up. The Elan still makes their products seem heavy, slow, cumbersome and sadly dull.

Lotus build this model (and their two newer cars) around a very simple and very deep X-shaped chassis frame. A Ford Cortina engine with dohc conversion occupies the front space between frame members and the rear space takes



## LOTUS ELAN "SPECIAL EQUIPMENT"

### Specifications from the Manufacturer

**Engine:** In-line water-cooled four with chain-driven dohc and five main bearings

Bore and stroke: 3.25 in. x 2.86 in. (82.6 mm. x 72.8 mm.)

Displacement: 95.2 cu. in. (1,558 c.c.)

Advertised horsepower: 115 at 6,250 rpm

Maximum torque: 108 lbs. ft. at 4,000 rpm

Compression ratio: 9.5 to 1

Carburetion: Two Zenith-Stromberg CD 1¾-inch

**Transmission:** Four-speed all-synchromesh with floor shift

Ratios 1.00, 1.40, 2.01 and 2.97

Final drive ratio 3.77 on test car, or 3.5 optional

**Steering:** Rack-and-pinion gear, 2.5 turns from lock-to-lock

Turning circle diameter 32 feet

**Suspension:** Front independent by coil springs, short and long transverse links

Rear independent by coil springs and telescopic struts

**Wheels:** Center-lock steel disc with 4.5-inch wide rims.

155-13 radial-ply tires (Dunlop SP Sport on test car)

**Brakes:** Girling discs on all wheels with vacuum servo. Disc diameters 9.5 inch front and 10.0 inch rear

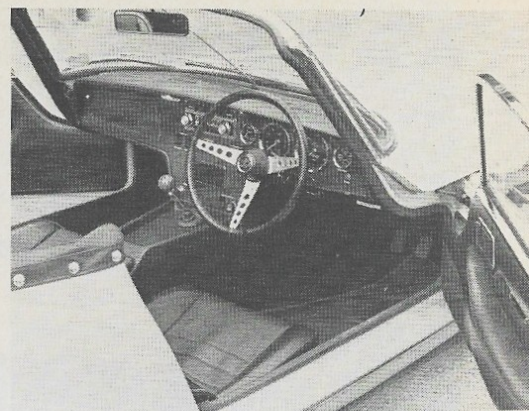
**Capacities:** Fuel — 11 gallons, Oil — (Engine) 4.1 quarts, (transmission 1 quart, (Rear axle) 1.1 quart

Cooling water — 7.7 quarts

**Dimensions:** Wheelbase 84 inches. Track 47 inches front and 48.4 inches rear.

Length 145.2 inches. Width 56 inches. Height with top up 46 inches

**Curb weight:** 1,550 pounds.



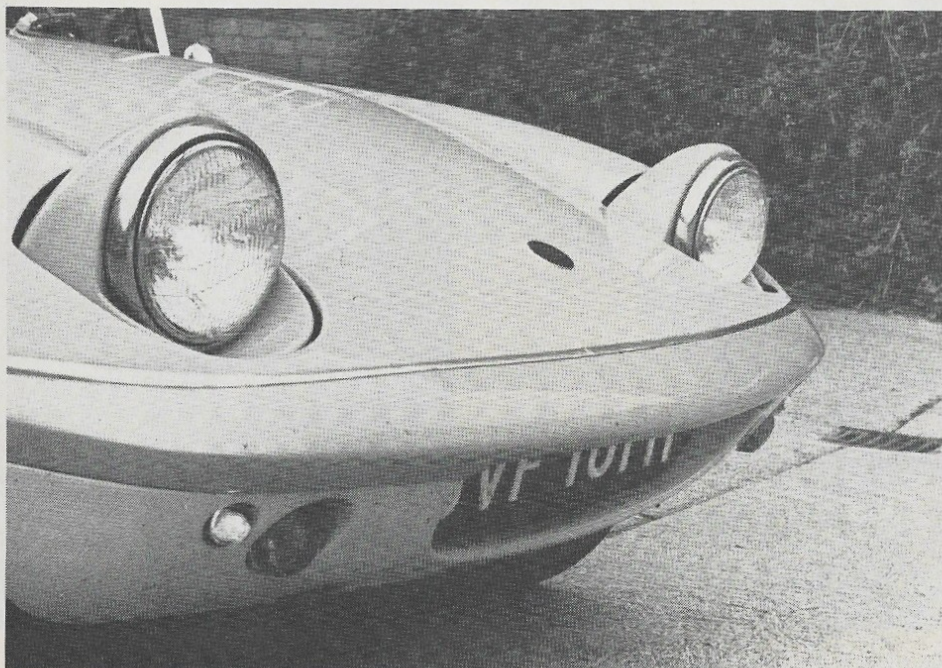
*Shifting ease suffers from applying a short throw to the Ford 4-speed gearbox.*

two seat backrests was just right for a car which you corner fast. My first old-fashioned idea of sitting forward with knees and arms bent was uncomfortable, as my 170 pounds were supported on too little of my backside. So I slid the seat back, and the fashionable race-bred driving position with straight arms and legs was far better. Two things continued to annoy me, and these are one armrest each on the door and above the drive line in a comfortably wide cockpit which were just awkwardly too high for my elbows.

When I saw the microscopic face-level fresh air vents on this latest Elan I laughed at them, which was a mistake. They do a useful job in the compact interior when the top is up. Keeping the top down on cool evenings, we found that the heater kept our feet warm very effectively. Press-button windows are a surprise for anyone who drove the stark Lotus models of 15 years ago, but... Chapman evidently discovered that he could build power window lifts himself that were about as cheap, light and compact as hand winding gear from regular component suppliers. Lotus are very independent. They even build their own door-operated courtesy switches for the interior light instead of buying the regular design.

This is the only car I know which has actually become better as a result of anti-smog regulations. When two Zenith-Stromberg CD carburetors first replaced a pair of 2-barrel Webers on cars for the U.S., middle-range torque improved but peak horsepower suffered. Development has restored that lost top-end power so CD carburetors now go onto all cars, much to the benefit of their docility in city traffic.

As I drove it the Lotus Elan SE was too low geared for best performance, although the 3.77 ratio in it was alright for countries with speed limits. The



*Headlights are cranked into position by hand from the driver's cockpit. Windows, though, are newly actuated by electrics of Chapman's own manufacture.*

a sprung differential, spare tire, gas tank and luggage trunk. At each side of the cruciform there is one seat which keeps your backside about eight inches above the road. This is a very sturdy foundation for a car, really free from shake on the fast but rough roads of

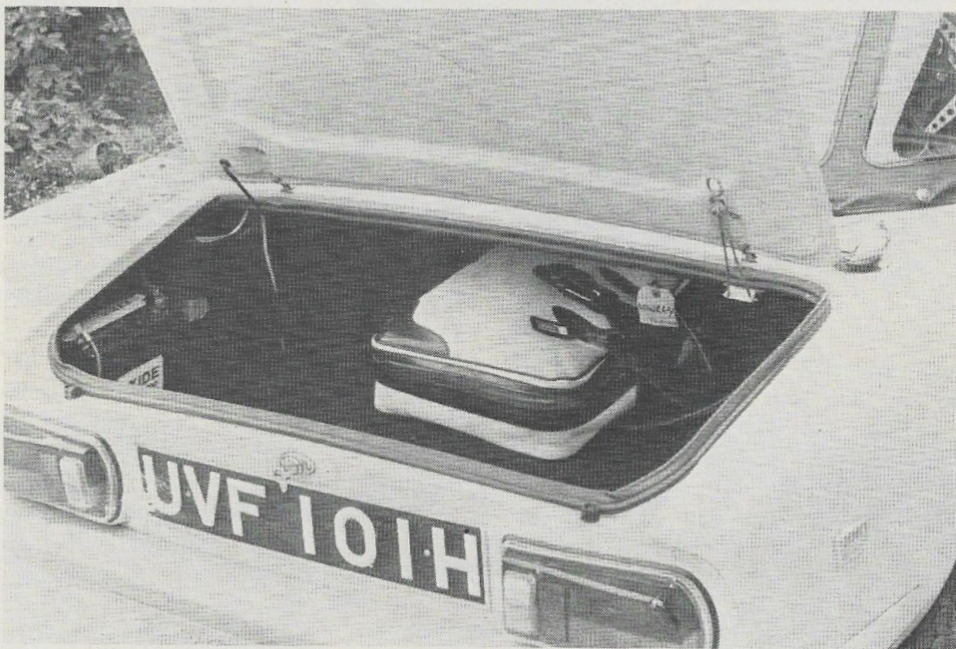
northern France. Molded fiberglass bodywork is to protect you from the weather, not to reinforce the chassis.

Myself half a century old, I could still get in and out of the Elan easily enough even if not with extreme dignity! Wrap-around shaping of the





*New Lotus plant at Hethel, Norwiche contains 160,000 sq. ft., is capable of 5,000 cars a year. Car test track is in foreground, Chapman's private airfield in the rear.*



*Luggage space both in the trunk and behind the seats is adequate for two on a long tour. Note the remote but accessible location of the battery.*



*Elan poses where it is quite at home — on the Grand Prix circuit of Reims. Dunlop "towers" are as common to European circuits as Goodyear's are here.*

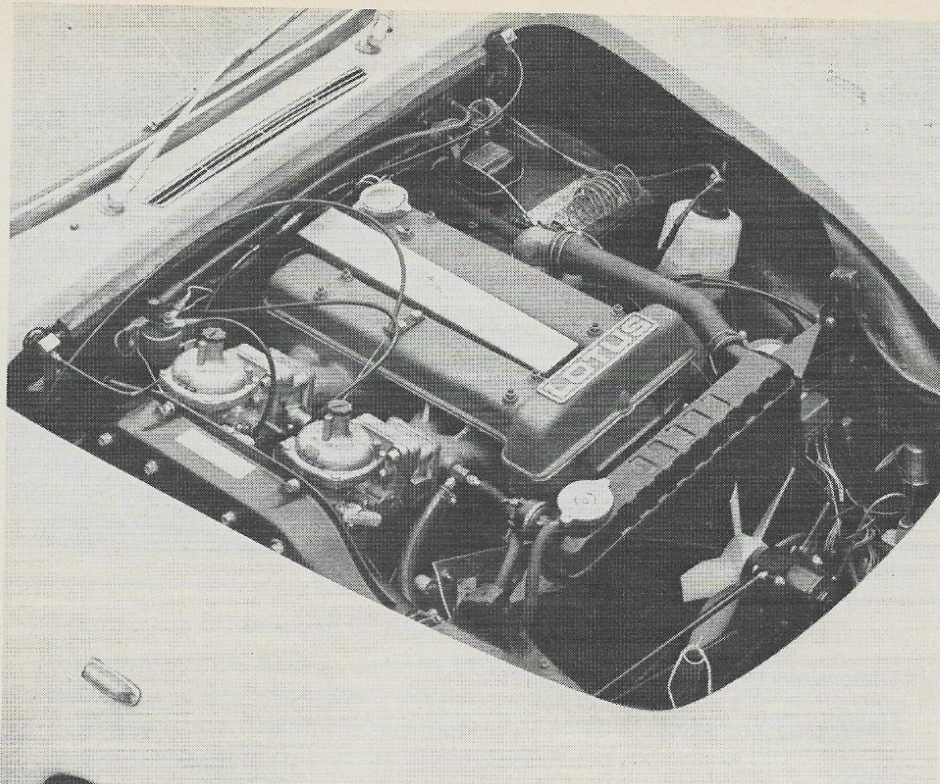
optional 3.5 axle would certainly make the car faster, as the top speed would go up to nearly 130 mph instead of nearly 125 mph with the ratio I had. In fact, with such good low-speed torque, I think a ratio as high as 3.0 would suit the Elan.

On the 3.77 axle, you get real acceleration if you stamp on the gas when running steadily at 100 mph. Sustained high speed along a German Autobahn on a hot day took the radiator temperature above the thermostat setting, so I'd have doubts about

noonday heat across the desert to Las Vegas. Despite the unnecessary revs on the 3.77 axle, we recorded 25 mpg for 1,000 miles of driving at speeds above what are legal in the U.S.

Shifting wasn't too smooth on the test car, and I suspect it's because a





*Dual carburetion requires a hump in the hood for clearance. Tiny radiator causes cooling problems under severe conditions, despite electrically driven fan.*



Ford transmission doesn't benefit from a shortened lever. Notably, the 1st to 2nd shift was awkward, so quite often I wound up to 35 mph in 1st before doing a "crooked shift" into 3rd. This dohc engine based on a Ford Cortina block is very flexible. It idles fast but

4th gear is really useful from 1,500 rpm upwards. Treating the reluctant transmission firmly and using about 7,000 rpm, a quarter mile took 16 seconds or sometimes a fraction less, with about 85 mph reached.

Colin Chapman has always believed

in soft springs controlled by very powerful dampers. His ideas seem to work out as his cars have real road holding. They're a bit jumpy at very slow speeds but surprisingly comfortable when hustling over bad surfaces. My test route, however, just happened to emphasize the one snag. We did many miles over traffic-free (and fuzz-free) but rough French roads with two big men and a load of luggage in the car and when you put that weight on soft springs, road clearance can become a noisy zero over big bumps. No damage resulted and back on England's crooked but less bumpy roads, the luggage-laden Elan was still a joy. Yes, it will take quite a lot of luggage, half in the trunk and half behind the seats.

I must write carefully about the Elan's handling, because the Elan +2 which handles even better is promised for a future WCG test. Friction damping on the rack-and-pinion steering mechanism causes a slight deadness of feel on smooth going, and for best cornering balance you must adjust tire pressures to suit the load in a lightweight car.

What is less than perfect, however, is nevertheless way ahead of anything from the mass producers. For a tight 90-degree turn in town, you may give the steering wheel half a turn, but for ordinary cornering you don't move the wheel appreciably. You just guide the car with finger and wrist pressure, accurately and effortlessly.

For a light car, 165-13 radial-ply tires are amply broad. Four-wheel independent springing has a proper balance between front and rear roll stiffnesses. Neither on fast starts nor in cornering is it at all easy to break the tire grip, even on a rainy day.

This Elan "Special Equipment" is one of four sorts of road-going Lotus's now in production. Something of a motor cycle on four wheels, the "Seven" is sold mainly as a build-it-yourself kit of parts. Carrying a Renault engine amidships, the Europa coupe is less practical for daily use than the Elan, having a high top speed but not enough horsepower to match Elan acceleration. Then there is the Elan +2 with hard or soft top which handles even better than the Elan, but it is a bigger and heavier car with no more power.

Kept ahead of rivals by development, the Elan (with hard or soft top also) remains the best buy as a two-seater for making everyday motoring on the highway fun. Maybe its shape has acquired a beetle-like familiarity by now, but the Elan is a highly desirable and reassuring bit of evidence that what's right is relatively timeless.





*SAAB 99 for 1970 is unchanged inside or out in the manually shifted version. Four-cylinder, front-drive engine is a Ricardo design built by British Leyland.*

## SAAB...

### Automatic And Injection For The 99, Interior changes In The 96

All new last year, the SAAB 99 has undergone few changes for the 1970 season except in gaining a partner at the top of SAAB's model line-up — the new fuel-injected 99 with three-speed automatic transmission and called the SAAB 99 Automatic.

Both the five-passenger front wheel drive sedans are identical in their body configuration and exterior color options, though the 99 Automatic is identified by the script on the bottom right corner of the trunk lid. Both are powered by the 104.27 cu. in. overhead cam in-line four cylinder engine designed by Ricardo Engineering in England and built by British Leyland, but there the similarity ends.

The 99 Automatic has a fuel injected engine with an electronic computer metering system coupled by an hydraulic torque converter to a Borg Warner three speed automatic transmission with floor shift, whereas the standard 99 is conventionally carbureted and has a manual four-on-the-floor shift. Identical performance both in top speed and acceleration has been maintained between the manual and automatic 99s through the use of fuel injection in the Automatic model. The 10% increase in horsepower and flatter torque curve obtained with the fuel injection has more than made up for the power losses inherent with an automatic transmission.

Roll cage construction, a major feature of SAAB automobiles since 1949, is carried through to the 99's. The car can withstand great external pressures including dropping a fully loaded car upside down from six feet onto concrete with an impact velocity of 25 feet per second with roof and pillars remaining intact.

The dual-diagonal brake system,



### SPECIFICATIONS — SAAB 99 SEDAN

#### Dimensions and weights

Overall length	14 ft. 3 in.
Overall width	5 ft. 6 in.
Height	approx. 4 ft. 9 in.
Wheelbase	8 ft. 1 in.
Track front	4 ft. 6.7 in.
rear	4 ft. 7.1 in.
Curb weight	2500 lbs.
Ground clearance	approx. 7 in.

#### Engine

Type: four-stroke, in-line chain-driven overhead cam

Number of cylinders: 4 in-line canted 45 degrees

Bore ..... 3.29 in.

Stroke ..... 3.07 in.

Piston displacement ..... 104.27 cu. in.

Compression ratio ..... 9.0 : 1

Max. output (Manual): 87 bhp SAE at 5500 rpm

Max. output (Automatic): 95 bhp SAE at 5500 rpm

Max. torque (Manual): 97.7 lb-ft SAE at 3000 rpm

Max. torque (Automatic): 97.7 lb-ft SAE at 3000 rpm

Fuel system (Manual): Constant vacuum carburetor Zenith Stromberg 175 CD

(Automatic): Bosch Electronic Fuel Injection

Lubrication: Pressure system with oil pump and oil filter. 3.7 quarts.

Service: No lubrication points. Engine oil replaced at 6000 miles.

Cooling system: Liquid cooling with expansion tank. Electrically driven, thermostat controlled fan.

#### Transmission (Manual)

Front wheel drive. Engine, transmission and differential in one unit. Free wheel.

Single dry plate, cushion center clutch located forward of engine.

Four forward gears, fully synchromesh floor mounted lever. Gearbox with self-contained lubrication.

Gear ratios: first 13.6 : 1

second 8.6 : 1

third 5.8 : 1

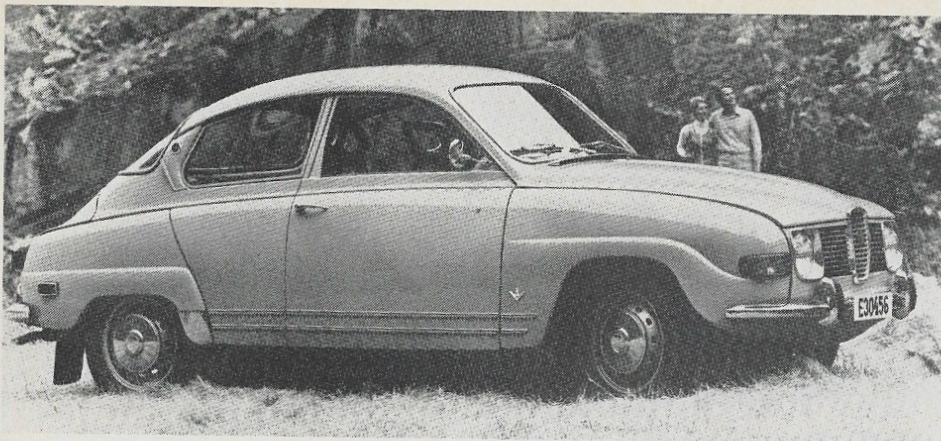
fourth 4.0 : 1

Reverse 13.6 : 1

Final drive ratio: 4.2 : 1

Permanently lubricated inner and outer drive joints; outer joint of Rzeppa constant velocity type





*Still powered by the V-4 supplied by German Ford, the familiar SAAB 96 has many interior changes in the interests of safety. Rear seat newly folds down to make a semi-wagon.*

### Transmission (Automatic)

Front wheel drive. Engine, transmission and differential in one unit.

Automatic transmission (Borg Warner) combined with final gear and engine into one unit. Transmission consists of a hydraulic torque converter with a planetary gear set with three forward speeds and one reverse.

Gear ratios: first 2.39 : 1  
second 1.45 : 1  
third 1.00 : 1  
reverse 2.09 : 1

Final drive ratio: 3.82 : 1

### Brakes

Power assisted disc brakes all-round

Dual diagonal hydraulic system divided into two circuits each acting on one front wheel and opposite rear wheel.

Hand brake works mechanically on drums located inside front wheel discs. Gives 50% total braking effect.

### Steering

Rack and pinion type

Safety column with double joints

Impact absorbing wheel with padded hub

Number of turns lock to lock ..... 3-1/3

Turning diameter ..... 33.5 ft.

### Suspension

Independent front wheel suspension

Swinging arm with coil spring and double acting telescopic shock absorbers

Light, rigid rear axle suspended in four mounted longitudinal arms and cross beam. Coil springs and double acting telescopic shock absorbers.

### Wheels and tires

Large wide base steel rims ..... 15 x 4½ JSL in.

Radial ply tires, tubeless ..... 155 SR x 15 in.

commended by the National Aeronautics & Space Administration (NASA) as one of the safest brake systems available, is also in the 99's. Stopping power is assured by power assisted disc brakes all round.

The fuel induction system in the new 99, called electronically metered fuel injection, is of Bosch manufacture and works on the principle that the fuel line

delivering fuel to the injection points is under a constant pressure of 28 psi. The opening of magnetic valves at each injection point are controlled by the computer which is a sophisticated system of electronics that governs each injector's fuel delivery according to information monitored from the engine.

The information gathered by the computer originates from the four

points critical to engine efficiency:

- \* *the distributor* reflecting engine speed and thus injection timing;
- \* *inlet manifold pressure* implying the degree of engine loading;
- \* *throttle position* so that fuel delivery is shut off during deceleration;
- \* *engine coolant and ambient air temperature*. Outside air temperature directly influences the quantity of fuel needed for efficient vaporization.

Because of this close electronic "scrutineering" by the computer, fuel delivery can be exactly governed according to the engine's requirements. Thus, not only is efficiency increased, but also horsepower and torque.

It is a common fact that automatic transmissions usually mean higher fuel consumption, but by clever engineering — including fuel injection — the engineers have succeeded in reducing the fuel disadvantage to the point where, except in heavy city traffic, fuel consumption is almost identical.

This has been achieved by overlapping the shift points. This means that maximum speeds attainable in first and second gears vary according to the degree of acceleration. Thus, if first gear runs from 0 - 40 mph, second from 30 - 65 mph, and top from 50 - 100 mph, the shift points under hard acceleration would be first to second at 40 mph and second to top at 65 mph. However, under moderate acceleration, the shift points would be approximately first to second at 30 mph and second to top at 50 mph. This system has an added advantage in that constantly recurring and undesirable shifting can be avoided while driving in dense city traffic.

Economy gains were also achieved by increasing the gear ratio on top gear. This has been changed from 17.7 mph per 1000 rpm on the manual transmission to 16.5 mph per 1000 rpm on the automatic. As a consequence of these steps, the fuel consumption at a constant speed above 60 mph is equal for the manual and automatic transmissions.

### SAAB 96 and 95 Wagon . . .

The most conspicuous changes in this series are to the interior of the car in both the 96 and 95 station wagon with new upholstery, new instrumentation and re-designed controls. The basis for these changes in instrumentation and controls was SAAB's continuing scrutiny of the safety aspects of automobiles.

A feature added to the 96 for 1970 was introduced in last year's 99. The





*Availability of automatic transmission with electronic Bosch fuel injection is the main SAAB 99 mechanical change for 1970. This engine has 97 horsepower, eight more than the manual shift.*



*In 1969 Chrysler Corp. claimed to have invented the station wagon spoiler but SAAB has actually had it as standard equipment since 1960.*

rear seat is hinged at the front end and by tilting it forward and the rear backrest forward and downward, the rear of the 96 can be turned into a semi-station wagon. With the seats folded down, there are 57 inches of flat storage space from the rear of the trunk to the front seats.

The 96's basic body configuration has remained virtually unchanged since its inception in 1949. With a giant investment in machinery for aircraft production possibly facing the scrap pile at the end of World War II and with large manpower resources and plants, SAAB needed new fields of production. They built an automobile. Designated the SAAB 92, it was designed and built almost exclusively by aircraft engineers who are zealots for aerodynamics and structural rigidity. Their design worked so well that 1970 will be its 21st year. The 96's aircraft heritage also explains why it is one of the slipperiest sedans in the world with a drag coefficient of 0.35 whereas most sedans are in the range of 0.40 to 0.50.

*(Continued on Page 55)*

## SPECIFICATIONS — SAAB V-4 SEDAN, 1970

### Dimensions and weights

Overall length	13 ft. 9 in.
Overall width	5 ft. 2.2 in.
Height, unladen	approx. 4 ft. 10 in.
Wheelbase	8 ft. 2.3 in.
Track, front and rear	4 ft.
Curb weight	1960 lbs.
Ground clearance, unladen	approx. 7 in.

### Engine

Type: four-stroke overhead valve engine, V-4

Number of cylinders: 4 (in Vee, 60°)

Bore ..... 3.54 in.

Stroke ..... 2.32 in.

Piston displacement ..... 91.4 cu. in.

Compression ratio ..... 9.0 : 1

Max. output: 73 bhp SAE at 5000 rpm

Max. torque: 87 lbs-ft SAE at 2700 rpm

Fuel system: Camshaft-driven fuel pump

Autolite downdraft carburetor

Pressure lubrication. Full-flow filter. Oil capacity: 3.5 quarts

Water-cooling system: Pump, fan and thermostat. Holds 7.5 quarts

### Transmission

Front wheel drive. Free wheel.

Single dry plate cushion center clutch

Hydraulic system between pedal and clutch

Four forward gears, all synchromesh

Gear ratios: first 17.0 : 1

second 10.2 : 1

third 6.3 : 1

fourth 4.1 : 1

reverse 15.5 : 1

Final drive ratio: 4.88 : 1

Permanently lubricated inner and outer drive joints, the outer joint of Rzeppa constant-velocity type.

### Brakes

Disc brakes front, drum brakes rear

Servo-assisted Lockheed hydraulic foot brake system is divided into two independent circuits, each acting on one front wheel and opposite rear wheel

Hand brake acts mechanically on rear wheels

### Steering

Rack and pinion type

Ratio, steering wheel to road wheel: 15.8 : 1

Impact absorbing wheel with padded hub

Number of turns, lock to lock: 2.7

Turning diameter: 34.8 ft.

### Suspension

Independent front wheel suspension

Tubular, rigid rear axle in U-form

Coil springs front and rear

Stabilizer bar at front

Double-acting telescopic hydraulic shock absorbers front and rear

### Wheels and tires

15 in. steel disc wheels

Wide base rims ..... 4 J x 15 in.

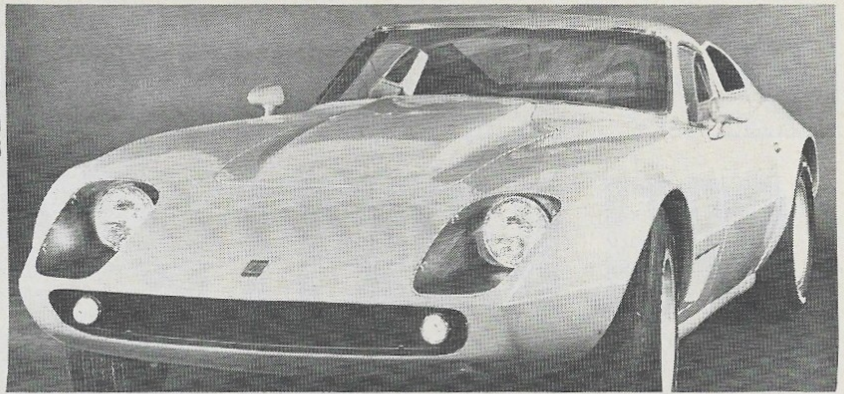
Tires ..... 5.60 x 15 in. tubeless

Radial ply tires ..... 155 x 15 in.





## FIBERFAB... The V-8 Jamaican



*Fiberfab's new front-engined Jamaican kit evolves into a hairy GT that has been engineered to handle as well as it looks.*

Early in 1968 Fiberfab, a large producer of fiberglass automobile assembly kits, introduced the Jamaican body as a completely new model to supplement the already popular Avenger and Valkyrie product lines. The original Jamaican was designed as a direct-replacement body for several popular front-engined sports cars such as the Austin Healy, Triumph and MG.

Following the Jamaican's introduction, Fiberfab's Engineering Staff was deluged with questions concerning the use of V-8 engines in the Jamaican body. Several "hybrids" were built and tested, but none seemed like an acceptable commercial answer, particularly since Fiberfab had to assume that many kits would be bought by persons with only average mechanical skills.

Based on the interest shown and performance of the hybrid V-8's, Fiberfab's engineers decided to build a "pure-bred" Jamaican V-8. At the outset, the project seemed a simple one — just build a frame to accept a V-8 engine and to fit under a Jamaican body. The Jamaican body, however, was designed for a relatively short wheelbase, narrow-track chassis. A "no-compromise" V-8 chassis would be too long and too wide for the existing body, so thus started the six-month development of a brand-new, wider, tougher-looking Jamaican V-8 body and a high-performance chassis to match. As for the styling, the picture speaks for itself.

The well engineered chassis features provisions for four-wheel, fully-independent suspension, four-wheel disc brakes, rack-and-pinion steering, V-8 power trains up to 400 horse-power and either standard or automatic transmissions. The ladder-frame is built from rectangular steel tubing welded in a rigid jig. All the engine, transmission, differential, steering and suspension mounting bracketry is provided as part of the chassis.

The builder must provide the following major items of hardware:

- Corvair ('65 or later) front suspension, complete — just as it unbolts from a Corvair.
- Chevrolet 283-327 cubic-inch V-8 engine, Chevy's Z-28 engine or the 350-hp L-79 engine.
- Four-speed transmission — Warner T-10 with aluminum case is recommended.
- Corvette Stingray ('63 or later) third member. No mounts or other associated hardware are required, just the third member.
- Corvair ('65 or later) rear suspension — radius arms, hubs, brakes, springs, etc.; Transaxle, axles and suspension links not required.

- Chevrolet passenger car gas tank — any tank about 38 x 15 x 10-inches will fit.
- BLMC (Austin Healey Sprite, MG Midget, etc.) rack and pinion steering unit.
- Mustang heavy-duty radiator or equivalent.
- Late VW steering column — unit with column-lock recommended.
- Maverick tail lights, Chevy II headlights, Yankee parking/turn lights.
- Karmann-Ghia roll-up side windows and mechanism.
- Corvette Stingray windshield and Porsche 911/912 rear glass.

### JAMAICAN V-8 SPECIFICATIONS

Overall length .....	164-ins.
Overall width .....	70-ins.
Hood height (cowl to road) .....	30-ins.
Cockpit height (roof to road) .....	44-ins.
Wheelbase .....	95-ins.
Track; front (6" rims) .....	56-ins.
Track; rear (6" rims) .....	56-ins.
Weight, curb (average) .....	2200 lbs.
Road clearance (F70/15 tires) .....	5-ins.

Chassis: Ladder frame construction, principally 5 x 2 x .083-inch rectangular steel tubing inert gas/arc welded in a precision jig.

Body: Fiberglass reinforced polyester plastic sprayed-up in open molds — primer gel-coat applied.

Finally, here's the Jamaican V-8 Body/Chassis Construction Kit price list:

Complete Kit .....	\$1595.00
chassis only .....	695.00
body only .....	1050.00
Upholstery Kit .....	195.00
Instrument Kit, complete set with senders, cables, etc. ....	175.00
Defogger Kit, complete .....	27.90
Heater Kit (defogger not req'd with heater) .....	55.42
Door Hinge/Latch/Weatherstrip Kit .....	95.00
Horn Kit .....	7.90
Windshield Wiper Kit .....	65.75
Wiring Harness Kit .....	75.00
Headlight Cover Kit .....	30.75
Lighting Kit .....	115.00
Switch Kit .....	28.29
Pedal/Master Cylinder Assembly .....	95.00

Further information may be obtained by writing Fiberfab at 2365 Lafayette, Santa Clara, Calif. 95050. •





# OPEL KADETT AND GT



*1970 Opel station wagon can be recognized by its optional wood-grain trim on sides and tailgate. Luggage rack is standard.*

Opel Kadetts offered in the U.S. for 1970 feature minor styling changes, more powerful engines, wider wheel rims to increase the effective track and the usual list of safety and emission control items required for the new year.

Inside you'll find an ignition lock that also secures the steering wheel and transmission and there's the now familiar GM buzzer to warn if you leave the key in place. Outside there are new taillamps and front and rear side marker lights. Station wagons now offer an optional wood-grain applique on the sides and tailgate and a roof rack is standard equipment, along with deluxe wheel rings and extra exterior moldings.

Models total six which is the same number as last year. These include a two-door sedan, deluxe wagon, sport sedan, "super deluxe" sport coupe, Rallye Kadett and the Opel GT.

The 1.1 R (for 1,100-cc) four-cylinder, overhead valve engine with an 8.2 compression ratio is standard in all models but the Rallye and GT. Horsepower for this has been increased to 63, up from 60 last year, but it still uses regular fuel through two single-barrel carburetors.

Standard engine for the Rallye Kadett and GT is the 67-horsepower, 1.1 SR with two single barrel carburetors and 9.2 to 1 compression ratio that operates on premium fuel. Both this and the 1.1 R have pushrod valves.

Optional in any body style but the two-door sedan is a 102-horsepower, overhead cam four of 1,900-cc displacement which figures to 115.8 cubic inches for those who want to relate its rather high output to American terms.



*GT with stylish French-made body is still in short supply. Retractable lights operate manually and the hood scoops are functional.*





*Kadett sport sedan is one of four two-door styles available, each with a different roofline. Vinyl top is an option on all but the plainest two-door.*

Any Opel equipped with this plant is a real goer, only the Datsun 510 being a competitive performer in this class.

Opel's three-speed automatic transmission, introduced in 1969, will continue as an option on all Kadett and GT models powered by the 1.9 liter US engine. Power brakes with front discs come at no extra charge with this and the 1.1 SR engines.

In addition to the wider wheels and a change in steering gear ratio for improved handling, other 1970 features include seat belt retractors, a new buckskin trim, new coat hooks, a simulated black leather steering wheel on Rallye and GT models and larger license plate lights. All interior trims have been restyled.

All cars are equipped with the new Opel emission control system, and cars sold in California will have an evapora-

## 1970 OPEL KADETT SPECIFICATIONS

	GT	Rallye	Deluxe Coupe	Sport Sedan	2-Door Sedan	Wagon
Standard engine	1.1 SR	1.1 SR	1.1 R	1.1 R	1.1 R	1.1 R
Horsepower	67	67	63	63	63	63
Rear axle ratio	4.11	4.11	4.11	4.11	4.11	4.11
Length, ins.	161.9	164.6	164.6	164.6	161.6	164.4
Width, ins.	62.2	61.9	61.9	61.9	61.9	61.9
Curb height, ins.	48.2	55.3	55.5	55.3	55.3	58.8
Wheelbase, ins.	95.7	95.1	95.1	95.1	95.1	95.1
Front tread, ins.	49.4	49.3	49.3	49.3	49.3	49.3
Rear tread, ins.	50.3	50.2	50.4	50.4	50.4	50.4
Front headroom, ins.	35.3	38.3	38.3	38.3	38.3	38.3
Rear headroom, ins.	---	36.3	36.3	37	37	36.5
Front legroom, ins.	45.7	38.7	38.7	38.7	38.3	38.3
Rear legroom, ins.	---	31.2	31.2	33.5	33.5	32.6
Usable luggage, cu. ft.	5.4	10.6	10.6	11.1	11.4	55.6
Optional Engine	1.9 US	1.9 US	1.9 US	1.9 US	N.A.	1.9 US
Axle Ratio	3.44	3.67	3.18	3.18		3.18
Optional Automatic Transmission					N.A.	
Axle Ratio	3.44	3.44	3.18	3.18		3.18

	HP	Torque	Compression Ratio	Displacement	Carburetor
1.1 R	63	59 @ 4200	8.2 to 1	65.8	2-1BBL
1.1 SR	67	62 @ 5000	9.2 to 1	65.8	2-1BBL
1.9 US	102	115 @ 3000	9 to 1	115.8	2 BBL

### TRANSMISSIONS

#### Standard

4-Speed Manual, Synchronized in all forward gears. Console mounted.

1.1 R and	1st—3.867	2nd—2.215	3rd—1.432	4th—1.000	Reverse—3.900
1.1 SR					
1.9 US	1st—3.428	2nd—2.156	3rd—1.366	4th—1.000	Reverse—3.317

#### Optional

Automatic Transmission. Available on all models except two-door sedan. Full 3-speed automatic. Console mounted.

Low—2.40	Intermediate—1.48	Drive—1.0	Reverse—1.92
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tive control system conforming to the requirements of that state.

The two-seat Opel GT, which is still in very short supply in the U.S., has been hardly changed. The body for this is built in France and then the car is assembled in Germany from whence it is exported. One of the delays in bringing the model over here in quantity was a prolonged strike at the French body supplier.

It has a wheelbase of 95.7 inches and an overall height of only 48.2 inches. The 1.1 liter SR is standard power but the 102-horsepower 1.9 liter US engine with or without automatic is optional.

Standard transmission on all models is a fully synchronized manual shift

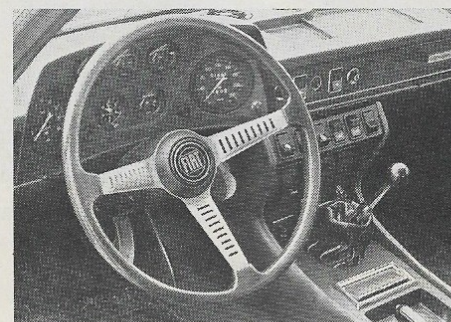
with a rather short throw. The GT retains its manually retractable headlamps, thus running against current GM policy which decrees fixed, open lighting. However, it should be noted that the so-called "1970" Corvette due to bow this February retains its retractable lighting system contrary to most predictions, so it could be that GM is backing off on this restrictive ruling. It was made, of course, in anticipation of possible government bans on this type of lighting.

About the only changes in the GT consist of the black, simulated leather steering wheel, the addition of a storage tray on the console and anti-lift windshield wiper arms.





*Rear view shows the clean, functional lines to advantage. Vents at the rear window serve the flow-through ventilating system.*



*Dished instrument panel with flanking tach and speedo is unique to the coupe. The Spider puts the two essential items in the middle.*

*Second generation Dino coupe (by Bertone) features a matt grille, replacing the chromed strips used formerly. Lack of side markers indicates no export plans.*

## FIAT DINO... Ferrari-Bred V-6 Power

There's no substitute for cubic centimeters. Just ask Fiat. The four-wheel colossus of Italy, if not all Europe, has taken the predestined path to power for its sporty line, boosting V-6 Dino engine capacities a healthy 20% and adding all of 170-cc (a whole three cubes) to their 124 Sport mills.

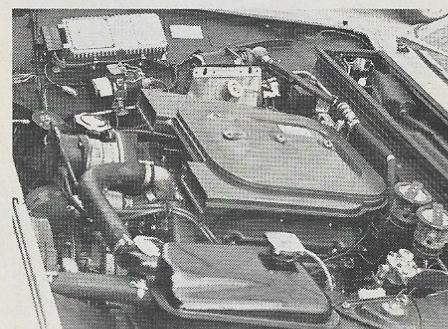
The new Dino, still a six grand automobile in coupe form, is one generation more desirable with its 2.4 liter V-6. Extra cubes combine with an iron block to reduce buzz and give more plain pulling muscle.

They increased both bore and stroke to 92.5 x 60mm, but kept four overhead cams, alloy heads, hemispherical chambers, three dual carbs and electronic ignition. Horsepower has

risen from 186 to 210 SAE at the old peak of 7,200 rpm while 159 lbs. ft. of torque come a thousand rpm lower than in the past at 4,600. That's the biggest benefit of all.

This Dino also has a five-speed box, not by Fiat, but a new one from ZF. Here reverse and 1st share the left slot, leaving 2nd through 5th in the H-pattern with light loading to the 2nd-3rd side. You must hold the lever to the right going from 4th to 5th or you make horrible noises in 3rd.

The ex-Ferrari racing mill red lines at 8,000 but its 7,200 yellow line is all most drivers will need or want. After that, thrash becomes too obvious. It will show 135 mph at 7,200 in top or 120 in 4th while a true 100 mph cruise comes up at 5,000 in 5th. This is a very quiet



*The Ferrari-based V-6 now has an iron block and horsepower has been boosted to 210 SAE. Torque peak has been sensibly lowered from 6,000 to 4,600 rpm.*

travel car if you can find speed limit enlightenment. Wind noise such as is found in most Fiats is the chief aural annoyance.

The Dino still doesn't really want to pull below 2,500 rpm but a new, light clutch and short gear lever motion make shifting fun. They lightened clutch force by some 12 lbs. by dropping hydraulic action. Brakes are just heavy enough,

*(Continued on Page 55)*



# HOLDEN TORANA...

## A Stormer from Down-Under

### NEW CARS FOR 1970



*Six-cylinder Torana GTR can easily be boosted to 250 horsepower, making it a candidate for racing in the Capri GT class.*



*Toranas were styled by an American, Joe Schemansky, on loan from the parent GM studios in Detroit.*



*Four-cylinder Toranas have their own grille and are mounted on a shorter, 96-inch wheelbase. Two- and four-door sedans come in both series.*

General Motors does not often make mistakes, particularly not big mistakes, and in Australia early last November it caught the opposition going the other way. It produced, with a flourish, a 100-inch wheelbase range based on the four-banger British Vauxhall Viva, but

using six-cylinder engines from the big Holden range and the coupe-snoot styling of the Mustang kick.

GM-H in Australia has been lolloping along with about 37 per cent of the overall market, most of that Holden in six-cylinder and V-8 form, right up to

the 300-hp, 111-inch wheelbase, 350-inch V-8 GTS Monaro bomb that cuts a quarter in mid-14's and runs to just under 130 mph. Its small car was first the square and dull Viva Mark One, then the Viva Mark Two, modified the better to stand Australian ruggedness and given the aboriginal name of Torana. This means wingless bird or birdless wing, depending on whether you ask Ford or Holden personnel. But it still had the 1200-cc four-pot and despite a 70-bhp engine option, it still had all the performance of a cat on wet linoleum. They even brought out a Brabham-Torana version, which fell with a thickening sud, and Brabham twelve months later accepted a Ford dealership in Sydney, which shows you what he thought of *that*.

Anyway, right when Ford was killing

*(Continued on Page 55)*



## NEW CARS FOR 1970



*BMW 2002 Automatic is a spirited performer off-road and on. It's easily capable of 100-mph cruising at 17 miles to the gallon.*

The BMW 2002 Automatic tale can very nearly be compressed into a heroic couplet: all the outstanding pep and handling of the finest small BMW *plus* a 3-speed automatic box for those ever more inevitable traffic jams.

I've lauded the basic BMW often enough here to skip over its essentials and get down to what's new, which is Munich's addition of two-pedal action in their smallest sedan. Still, it wouldn't hurt to note that the finest cornering known to sedan drivers and a punchy 2-liter engine putting out 100 hp still work wonders in a 1-ton 2+2. A 105-mph top and 115 lbs.-ft. of torque for instant passing have just got to swing!

Sadly enough this kind of sports car engineering in the small family class costs cash. You wouldn't really settle for a basic 2002, nice though it may be, because the extras list carries heated rear window, reclining seats, full carpets and trunk trim and, of course, the automatic box which adds 10% to the price by itself. Even in Germany the "as delivered" bite is roughly 20% over base price. Maybe that's too much — unless you really love to drive.

And if you love to drive why buy an Automatic BMW 2002? The reasons are

# BMW 2002 AUTOMATIC

Text and photos by Sloniger

**One of the world's finest small sedans gets a ZF automatic with a penalty in performance more imaginary than real.**

mostly because their ZF box doesn't steal enough performance to bother any but track addicts, it has low-cog holds for mountain work and will please the wife on her way to market. For that matter he-men will be caught smiling around town, too.

In theory an Automatic 2002 should be about 3-mph slower than its manual

cousin and accelerate to 80 at about the same rate as their smaller 1.6 liter two-door with manual box. Above 80, the bigger engine more than balances the automatic.

In practice this WCG test machine was obviously at the top end of production tolerances, being actually faster than any manual 1-carb 2002 I've driven. They admit you can get from 96 to 104 horsepower and this red bomb must have been broken in right as well. Zero to 60 in 13 seconds and 110 nph tend to pop the eyes.

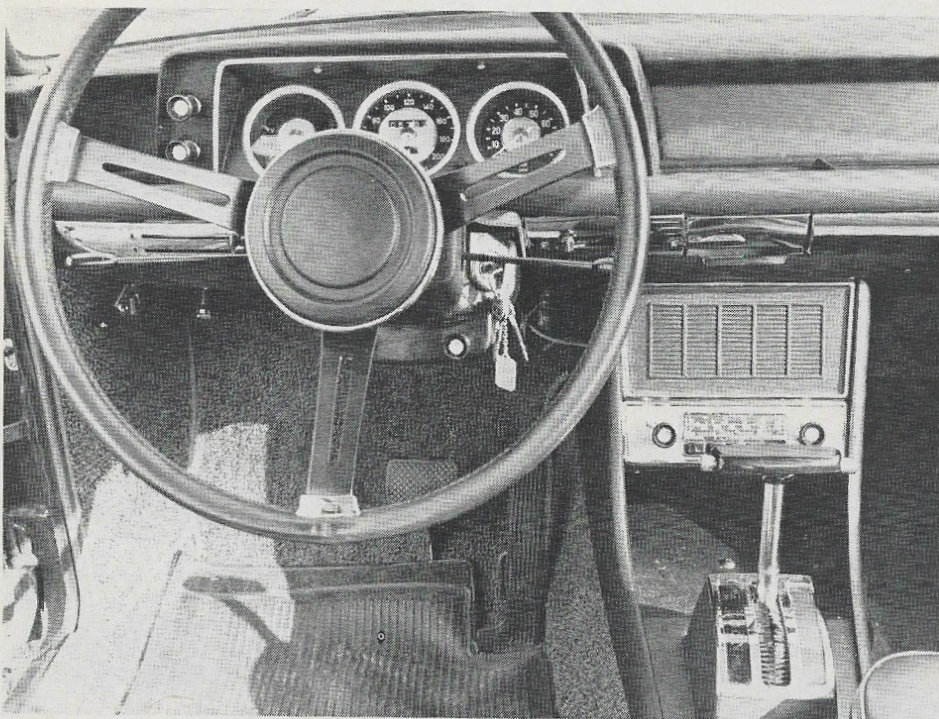
By way of comparison the 2002 A is slightly slower from zero to 60 than say a Renault R16 TS or Fiat 124 Coupe, but it's faster than the 1.7-liter Capri. It also costs about 10% more than the larger 2.3-liter V-6 Capri.

Just as amazing as the poke was overall consumption over 1,850 miles run flat out every second that traffic allowed. We still got 17.5 mpg. Mind you, any manual BMW driver in speed-limitless Europe is tempted, nay certain, to use full singing revs in every gear, right up to the 6,400 red line. The automatic, though, shifts up at 5,000 if you leave it in D and won't overreach 6,000 in top no matter how long the straight.





*This boxy shape is familiar to Americans but the shiftless feature will make it a little easier to explain the purchase to their wives.*



*Relatively small brake pedal precludes left foot usage and the T-handle shift lever is vaguely stopped and lettered.*



*Somebody ought to explain to the Germans that automatic transmissions are taken pretty much for granted in other parts of the world.*

Left to itself the 3-speed box shifts at 35 and 65 mph, while pulling the T-handle down a notch or two allows you to pull full revs any time. That last technique is hardly worth its slight margin.

At one point we covered two-thirds of France on those 2-lane roads with no big-city bypasses and averaged 70 mph with nary a tire squeal. Very few sport cars will do likewise and I never took the lever out of D position.

The chief reason for that was trouble in finding a notch with their tunnel-top selector. The detents are soft so you can easily overshoot and even if you wanted to look down each time, actual gear positions don't match the letters alongside anyway.

Another drawback is a very high creep factor, though the tach insisted the car wasn't idling over 800 rpm or so. It takes a lot of brake to hold it at red lights unless you shove the lever out of D, and the brake pedal is much too small and off to the right for left-foot action.

There is a fairly long pause between forward and reverse or vice versa when you're maneuvering in tight places, and there's a certain wait on cold mornings before it will take up the drive smoothly. Fortunately the car warms very quickly. The jerk on brutal kickdown is noticeable but not a bother unless you are going slowly enough for the box to drop two cogs at once, which is a real head snapper. Normal upshifts, even on strong throttle, come softly and normal downshifts in city traffic pass unnoticed.

In any case, no 2-door BMW is really comfortable for more than two adults on long hauls. The back seat is a city standby at best.

The car itself, with options noted, is highway comfortable and fitted with many small thoughts like shelf strips to keep your smokes from sliding, plenty of pockets and bins and big round dials, plus a leather-covered wheel. It is also cursed with frameless windows like all this series and they whistle like a traffic cops' convention. Besides, they need 5.5 turns to raise or lower, a teutonic design syndrome dating back to armored Grosser Mercedes.

But balancing likes and dislikes, I've always considered the 2002 an ultimate driver's sedan if you cover a lot of miles on mixed roads and can exploit both its balance and speed potential. Now, with the automatic, the wife likes it even better than I, which could make quite a parlay in the sales of a marque normally tagged for men only.





## 16th TOKYO MOTOR SHOW

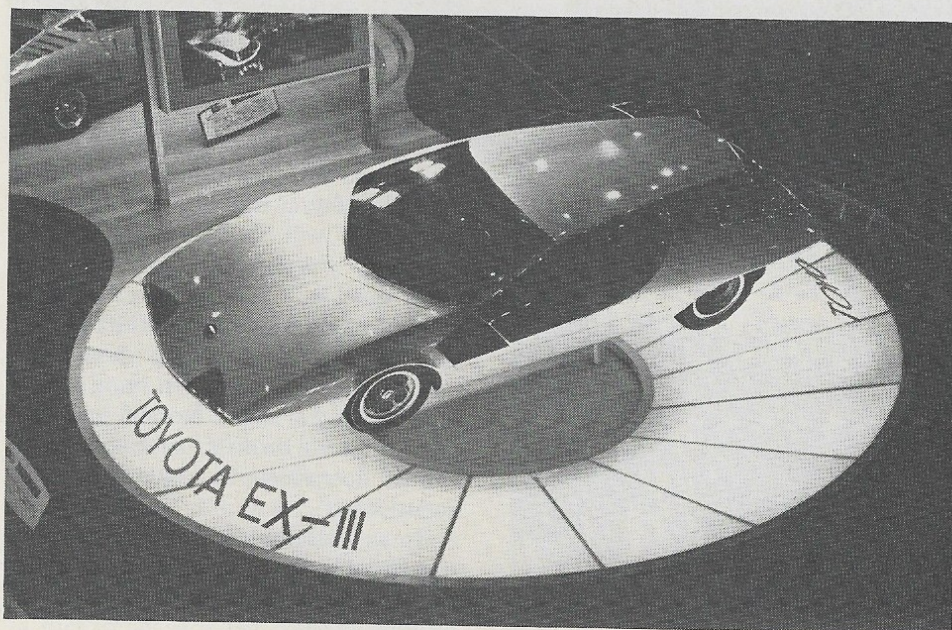
Notes & Photos by  
Eizo Ikeda

The 1.5 million people who visited the 16th Tokyo Motor Show must have went away wondering whether it was 1970 or 1980. Futuristic dream cars from almost every manufacturer almost outnumbered the products actually for sale. Among the latter, it was quite evident that the Japanese, temporarily at least, are reserving quite a few very desirable goodies for their home market.

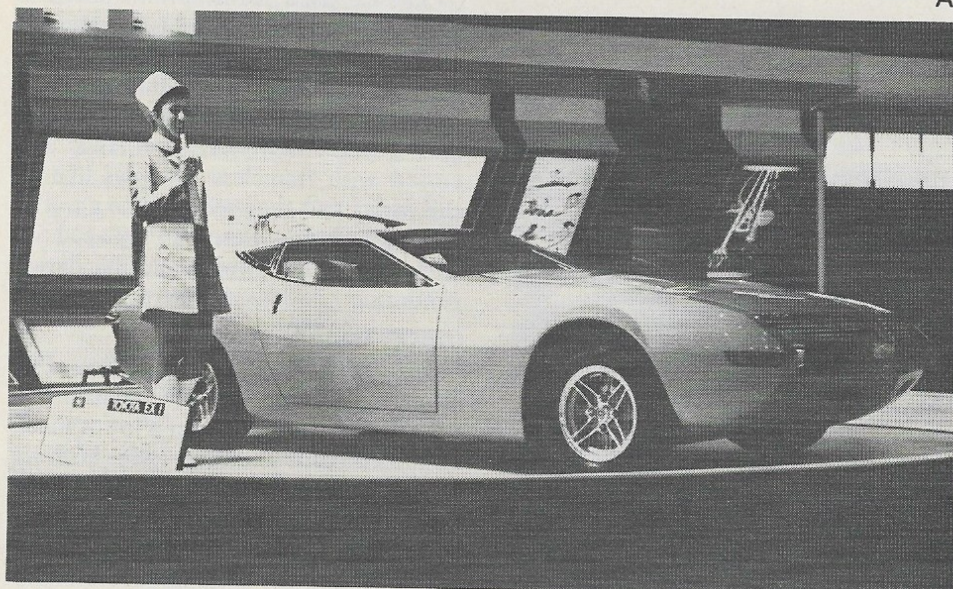
It was also quite evident that Japanese designers no longer depend upon the Italians for their inspirations, credited or otherwise. Each design had an international flavor that would make it seem at home anywhere in the world. Also, the futuristic ones seemed more ultimately practical than the current Italian and English crop. Certainly they avoided the present American practice

of chopping the top off a production coupe, altering the skin, adding hot rod paraphernalia at random and calling it "Super Charger" or "Beep-Beep I."

The Japanese industry would seem to be coming of age, which is perhaps why there are signals that import restrictions will be drastically eased in the foreseeable future. This is good.



A.



B.



C.



D.

A. Toyota's full-size fiberglass experimental study, the EX-III shows interesting treatment of delta shapes. It looks like a wagon in this view but from the side, the rear quarters reach to the roof line.

B. The EX-I is another Toyota exercise that is closer to today. Driveable, it is powered by the 2000 GT engine. Handling of the grillwork is particularly inspired.

C. Corona Mark II 1900 GS unfortunately is restricted to the Japanese home market. Power is from a twin cam 1,858-cc four which produces 163 SAE horsepower and drives through a five-speed box. Vic Elford will drive it in the Monte Carlo.





E.



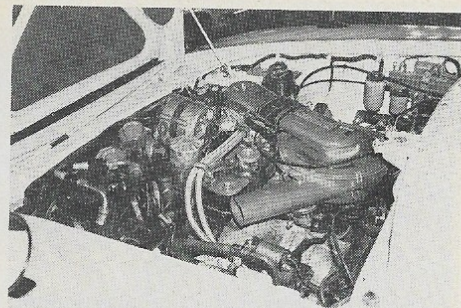
F.



G.



H.



I.



J.

D. In Japan the Datsun 240Z (WGC Jan. '70) is called the Nissan Fairlady Z and comes with a choice of two four-cylinder engines, the biggest being a twin-cam 186-horsepower unit.

E. Another view of the Fairlady Z, this one the Z-432 version with the hot four, shows the lines that should win it anyone's car of the year award for 1970.

F. Home-market variant of the familiar Datsun/2 is called the 1600 and differs in having a grille housing twin parking lights. Those trumpet-like fender mirrors are required by Japanese law.

G. Honda's new 1300 X coupe may be seen in the U.S. if the company's car importing arm ever gets geared for action. It's based on the 1300 front drive but the greenhouse and front end are new and much less boxy.

H. Toyo Kogyo's Mazda Wankel coupe, called the Luce, will certainly be sold in Canada and possibly the U.S. in the near future. The twin-bank rotary is the equivalent of about 2,600-cc and produces 147 SAE horsepower.

I. Engine compartment of the Luce rotary coupe does not show the front-wheel drive, a new feature. With all this mechanism up front, power steering had to be added.

J. Isuzu's (Bellet) exercise in the future consisted of this MX 1600, powered by the production twin cam four of 140 horsepower. It's a two-seater with the engine amidships.





Notes & Photos by  
Sloniger

## 51st SALONE INTERNAZIONALE

Right this way, ladies and gentlemen. Step right up, boys and girls. Marvel at the most enlightening, chin-dropping, eye-popping and unsurpassed display of snappy shapes and kinky corners to

titillate the motor world. This is *it* — the unforgettable 51st Turin Frolics.

It's also known, of course, as the Salone Internazionale Automobile but never mind that mundane bit. We came

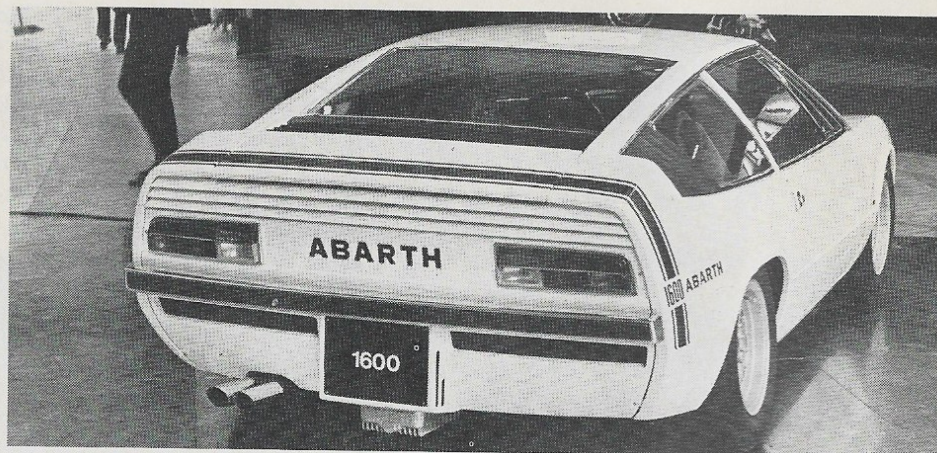
to see wild cars, the further out the better, and nearly a score of panel bashers foregathered to salve our whims. Some of them were even people we've met before.



A.



D.



B.



C.

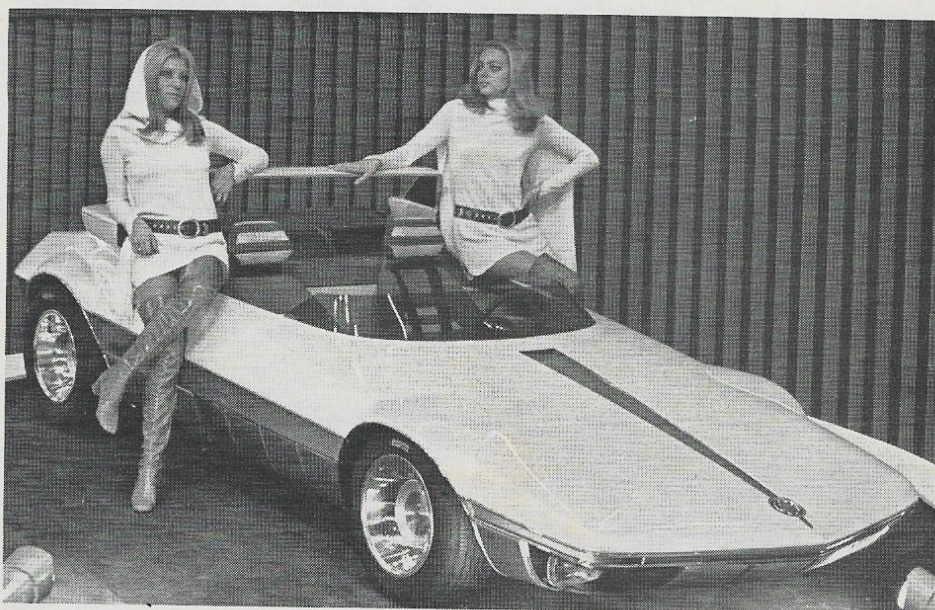
A. The golden boy of Italian form right now is Giugiaro (Miura), currently heading his own consortium called Italdesign. He calls his latest Alfa an Iguana which about describes it, then posed its plumpness alongside a bird best described as 22-22-22.

B. Giugiaro next deals with an Abarth, the 1600-cc model derived from the Fiat 1000. He seems currently to be obsessed with rear louvers and round wedges and also seems not to care what happens to protruding sumps.

C. Zagato showed a Junior Z based on the 1300-cc Alfa that is destined for limited production. It combined an overtone of wedge with a little of the lithe old Zagato-Alfa meanness.

D. Bertone calls this Fiat 128 a "coupe" but he built it in wagon form and not all that badly if you want interior space and a back door. Would you believe that a plug-in shopping cart rounds off the tail?

E.





# AUTOMOBILE

E. Bertone created this nautical Autobianchi by moving the normal A 112's mechanism to the rear. Headlights are mounted on the roll bar just behind the models. Sole instrumentation is a compass.

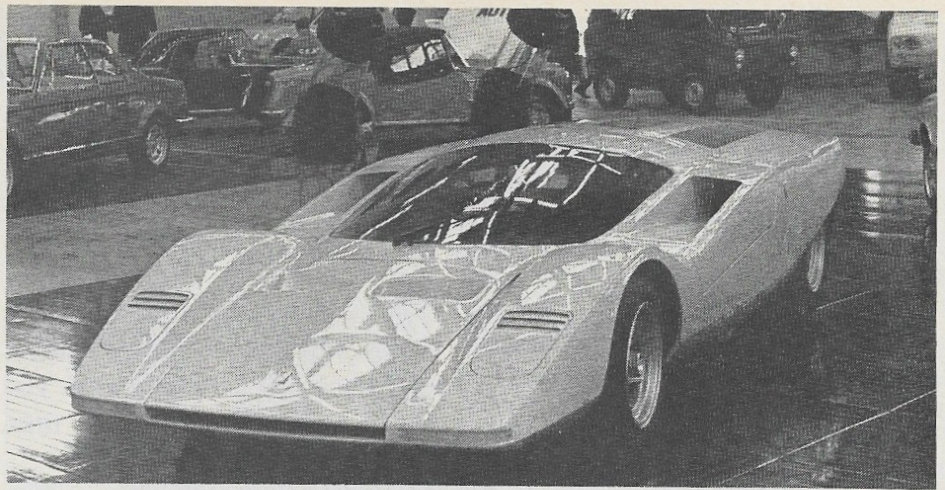
F. Pininfarina chose to doll up the coming Ferrari 512 production sports car (see World News) of which 50 will be built to go Porsche 917 hunting. How does 550 hp from 5 liters grab you?

G. Ghia apparently hadn't heard that Fiat has just bought Lancia for one lira a share and all the bad debts and came up with this rather Mangusta-like shape complete with the usual retractable wing.

H. Fissore, whose main forte is ambulance conversions, can also do nice, orthodox things to the Chrysler-powered Montverdi. The framework in the foreground is Fissore's Mongho to be propelled by a 650-cc Fiat at 85 mph.

I. Dave Gitten (an American living in England) did this Ikenga with flashing lights instead of dials, proximity warning lights and a rather unique solution to angled glass-revolving wipers.

J. Autobianchi's normal A 112 is a 900-cc super compact, 127-inches long with front drive that serves as usual as a trial balloon for Fiat. The 51-horsepower engine is transverse and the car has front discs with an anti-lock valve.



F.



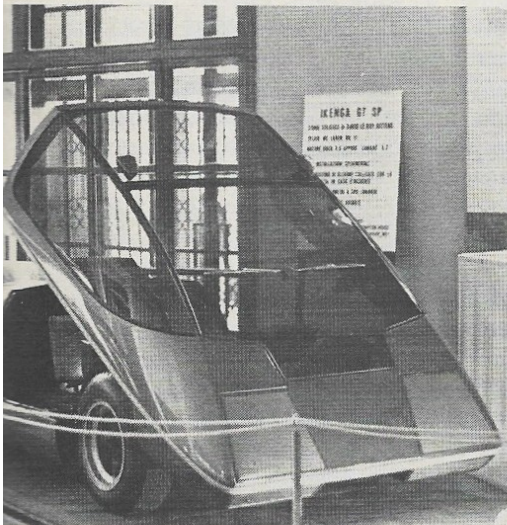
G.



H.



J.



I.



# A CONSUMER'S GUIDE TO TIRE BUYING

by Don MacDonald

The average car owner understandably dreads the day when he must venture forth into that oasis of blather and promise known as a tire store. There sit row upon row of black rubber doughnuts, all at first glance looking identical except for the price tag. It's like climbing to a third story loft in the garment district to buy the wife her first mink. Wild mink, ranch mink, pastel mink, beaverette — they each could be dyed rabbit for all you know.

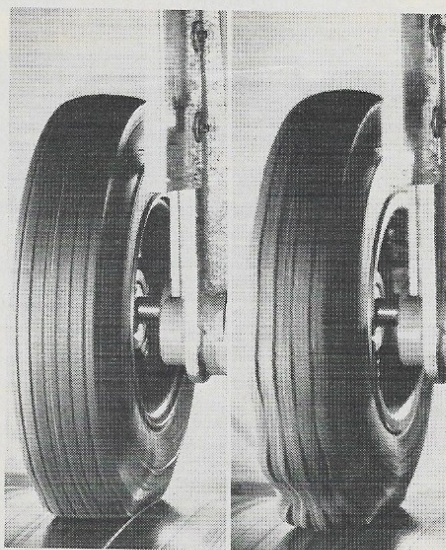
It's the same with tires. Price seems to have no relation to terminology as one company's "Premium Super Speedway" might be half the price of another's "Anyweather Extra DeLuxe." Two plies sometimes cost more than four and nylon can cost either more or less than rayon. There are "wide ovals," "low profiles," "tiger paws" and "rhino hides." Your old tires are 8.50 x 14's but the chart says that G77 x 14's fit now. And besides the varying numbers of plies and their composition, you are offered "belted plies," "biased plies" and "radial plies."

## Quality Level

To sort fact from all of this jargon you must first zero in on one of the more nebulous of tire terms known as "quality level." To explain it I must resort to a definition that of late is going out of fashion. A tire described as "100-level" means one of a quality equivalent to those *currently* being installed on new cars which is not necessarily the quality of the tires installed on your car when it was new. Despite what it might be called, this tire is not a premium or even a deluxe product. Its construction conforms to what the automaker has decided is needed to provide an *adequate* measure of safety, comfort and durability under *average* driving conditions. When you consider that Detroit alone buys roughly 45,000,000 tires a year, you can understand why even 10 cents extra per tire worth of safety, comfort and durability is subject to cold scrutiny.

*The author is indebted to the Automobile Club of Southern California for permission to adapt this article from one previously written by him for the Club's copyrighted publication, WESTWAYS.*

Today's proliferation of tire sizes, shapes and types confuses buyer and seller alike. Here's what you should know before buying tires.



*Both of these tires are spinning at very high speed on a test wheel. The left tire is the new belted polyester construction, the other a conventional bias ply. This frightening traction wave is what builds up destructive heat.*

If a 100-level tire of a given size lists for \$30, then an 80-level costs \$6.00 less, a 120-level \$6.00 more and so on. However, despite the neat way that the term "quality level" relates to price, it is being abandoned because it is misleading. Even a 60-level tire is a *quality* tire in the sense that it is adequately safe and durable for certain undemanding driving conditions such as a car used solely for suburban shopping chores or commuting back and forth to work each day on city streets. A 120-level tire, on the other hand, might have a less than adequate margin of safety for a salesman who carries heavy loads for long distances at high speeds. Then there are all kinds of in-between situations like the family car that might be subjected to both of the above-mentioned extremes at various times during the course of a year, the farmer who must travel a lot on unpaved roads, a highway patrolman whose main concern is safety at very high speeds and

the taxi driver who is interested in maximum durability.

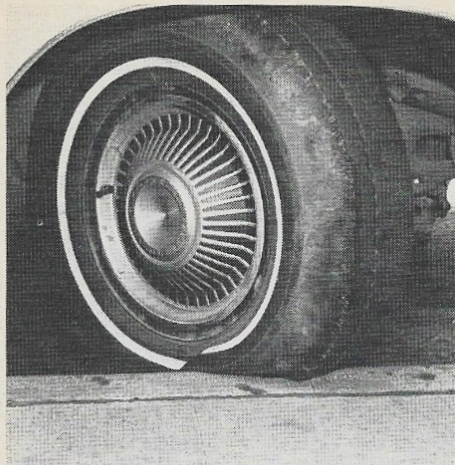
So when you go price shopping for tires, shop not for the cheapest ones but for the cheapest within the quality level dictated by your intended usage. This is no time to cheat as your welfare and that of your family is at stake. If you look at it this way, when you and the family pile into the car life insurance, savings, equities, career — you name it — could all be rather meaningless unless those tires bring you back alive.

Despite the fact that at last count there were 245 different domestic brands of tires being marketed in this country, they were all made by one of 19 primary manufacturers who are members of a trade association that has done a fine job of policing its own shop long before the government got into the act. Thus, you don't have to worry about the brand name on the tire at least as far as quality is concerned. Service and warranty are something else again. I should mention here, too, that a number of brands are being imported but even though they are not association members, I know of none that are inferior. It should also be mentioned that the Europeans have had a lot more experience with the complexities of radial construction. After all, it was an Englishman named Dunlop who invented the pneumatic tire and a Frenchman named Michelin who made it practical.

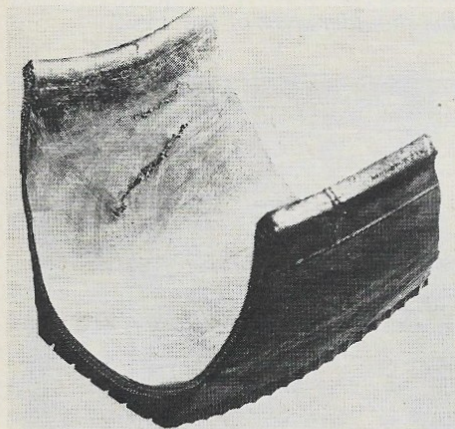
## Which Fabric Is Best?

One of the more confusing aspects of tire technology as it affects the consumer involves the plies or cords. The number of plies is always marked on the tire and generally speaking, the more plies or layers of cords there are, the better fitted the tire is for increasingly heavy-duty service. However, what really counts is the strength of each layer and you have no way of guessing this except from the price. Cord material is not a true indicator of tire quality. Cotton cord fabrics disappeared after the Hitler war in favor of the then "miracle" synthetic, rayon. Later nylon reigned as the premium fabric and theoretically it is much stronger. Some tire makers, though, began trading on nylon's image and





*Properly inflated tire will flex and probably survive this severe curb impact without damage. Too little inflation would pinch it against the rim, too much would rupture the cords.*

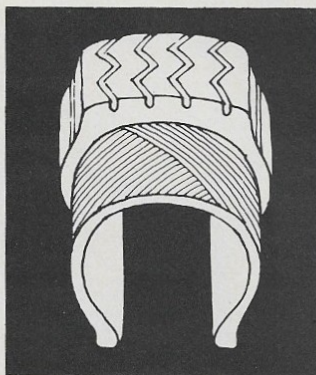


*This is the reason why patches applied to the outside of a tubeless tire should never be used except in an emergency. Tire must be removed to detect irreparable damage.*

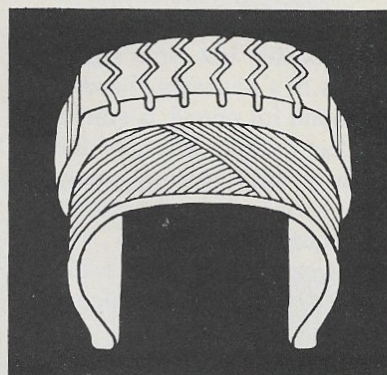
produced nylon tires with a cord thickness or *deniere* so thin that the structure actually was far weaker than the average 100-level rayon tire. The 80-level or so price exposed these inferior tires but the magic of the nylon name was such that for a while, the public thought it was getting a bargain.

Now to add to the confusion a couple of new fabrics, polyester and fiberglass, have entered the fray so let's look at the important characteristics of each of the four contenders — those characteristics that affect your safety, comfort and pocketbook. Rayon, constantly undergoing improvement, is still an excellent cord material for average service. It's flexible enough to allow the tire to ride softly and quietly and it has sufficient strength at average speeds but

## BASIC CONSTRUCTION



**Conventional bias ply**

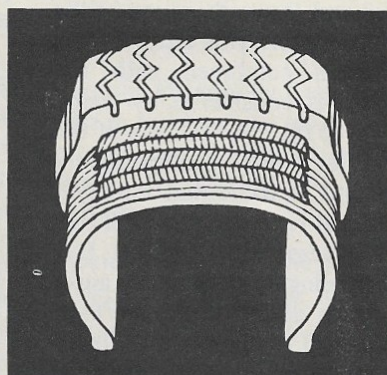


**"70 Series" bias ply**

- Two or four body plies criss-cross at angle of 30 to 38 degrees.
- Cord material may be rayon, nylon, polyester or other material.

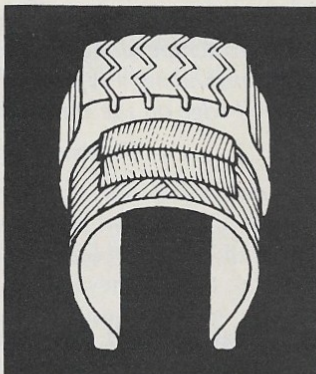


**Standard radial ply  
("80 Series")**

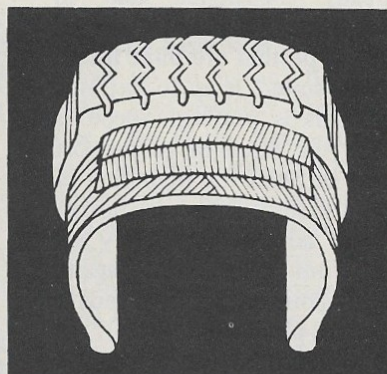


**"70 Series"  
radial ply**

- Body plies (rayon or nylon) run straight from bead to bead. So do not cross.
- Belts of fabric, glass or steel, having from two to six plies, run circumferentially around tire.



**Standard belted/bias  
ply ("78 Series")**



**"70 Series" and "60 Series"  
belted/bias ply**

- Body construction in two or four-ply with cord angle similar to conventional bias ply.
- Body material is rayon, nylon or polyester.
- Belt layer is composed of two relatively non-extensible fiberglass or textile plies.

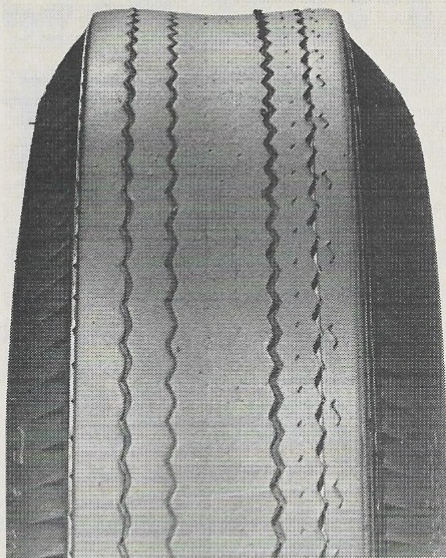


because it flexes, it builds up heat which impairs its strength at very high speeds or under heavy loads. Pound for pound, nylon is much stronger than rayon. It resists flex relative to rayon and therefore runs cooler but you pay a penalty in terms of a noticeably harsher ride. Rayon, pound for pound, is quite a bit cheaper than nylon, which is the main reason why until recently rayon tires have been specified by automakers for original equipment. Rayon will absorb and be weakened by water when exposed through a cut in the rubber whereas nylon will not.

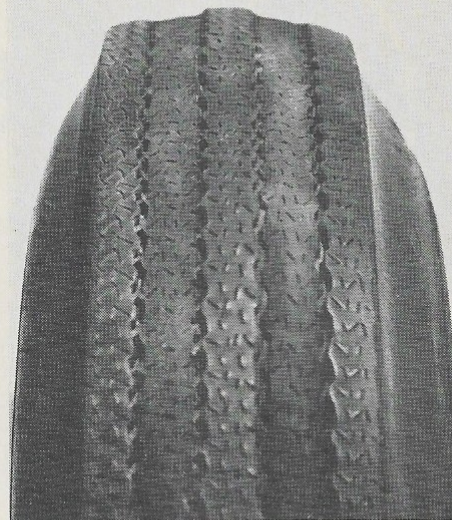
A fiberglass tire as such is somewhat of a misnomer. Since this synthetic is very resistant to flex, it is used only as an additional layer or belt underneath the tread, and being an add-on, these tires cost more than their un-belted counterparts. The actual sidewall construction of a so-called fiberglass tire is conventional and is usually rayon or the newcomer, polyester. This latter fabric, especially when combined with the fiberglass belt, is considered by many authorities to be the construction of the future. Polyester is priced competitively with rayon and is somewhat stronger, has superior heat resistance and will flex or ride with at least equal comfort. It is receiving increasing acceptance by automakers although admittedly there have been some initial problems with tread separation on belted versions. Up until the point where maximum safety is required, such as on a police or race car, polyester will do *almost* the job of nylon without many of the latter's disadvantages.

#### How Many Plies?

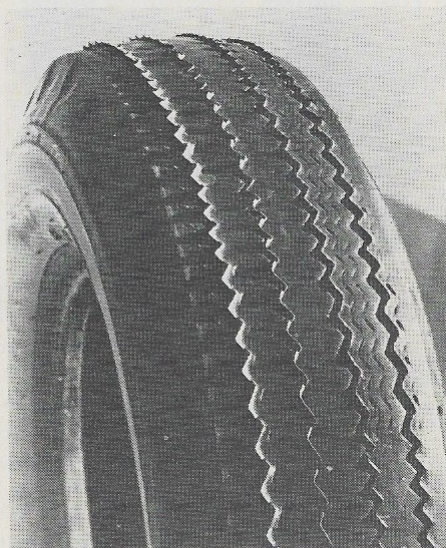
I've already mentioned that in general, the more plies or layers of fabric of any type that are built into a tire, the more suited it is to extreme heavy duty. This is not high speed as much as it is the strength to support heavy loading or resist the pounding of back-country roads. Thus a farmer would be well advised to specify six rather than four plies. Here again, though, confusion enters. Nowadays you will see "2-ply (rated 4-ply)" or "4-ply (rated 6-ply)" stamped on the sidewalls of many major brands. This relates to a new type of construction where just as much if not more rayon or whatever is formed into two plies instead of four. The advantages are mainly a softer ride and less heat build-up but the public is convinced that it is being cheated. You often hear someone say: "The minute I got rid of those 2-ply tires my troubles were



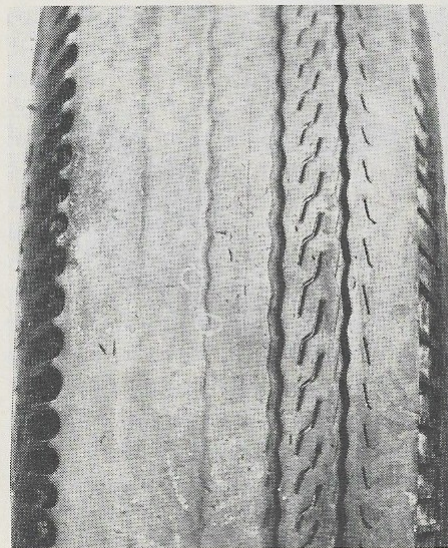
*Abnormal wear pattern of this tire indicates overinflation, causing premature wear in the shoulder areas of the tread.*



*This tire has been driven in an underinflated condition, causing premature wear in the shoulder areas of the tread.*



*Excessive toe-in or toe-out caused this tire to scrape along the road surface, producing a typical feathered edge on the tread ribs.*



*This tire was used on a car whose front wheel was out of vertical alignment. This causes poor traction as well as excessive wear.*

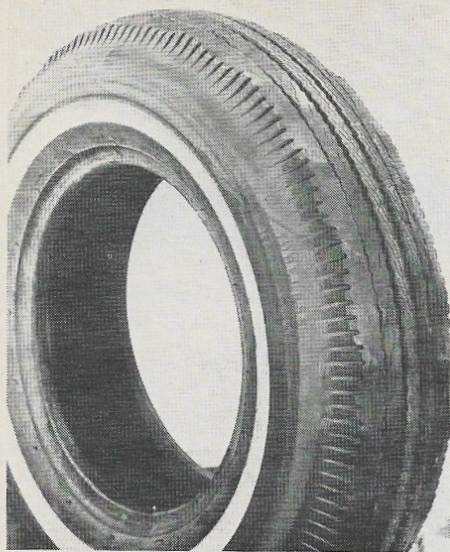
over." That just isn't true because given the same cord material, it is the thickness of the cords and not the number of plies that governs strength.

#### Tire Treads

The laws of physics tell us that four bald tires will stop a car on a dry pavement just as fast as will four new tires, however pretty the tread pattern, assuming the rubber compound, car and pavement conditions are the same. The

pretty tread, however, might make it possible to stop short of the space occupied by the other fellow in the rain. So when buying new tires a consideration should be getting a set whose tread patterns reflect the latest in technology. If you are putting tires on a two-year-old car, the tread pattern of the old tires are probably what are being sold as 80-level tires today. The 100-level tire reflects the advances of the intervening two years. The 120- or above level tire





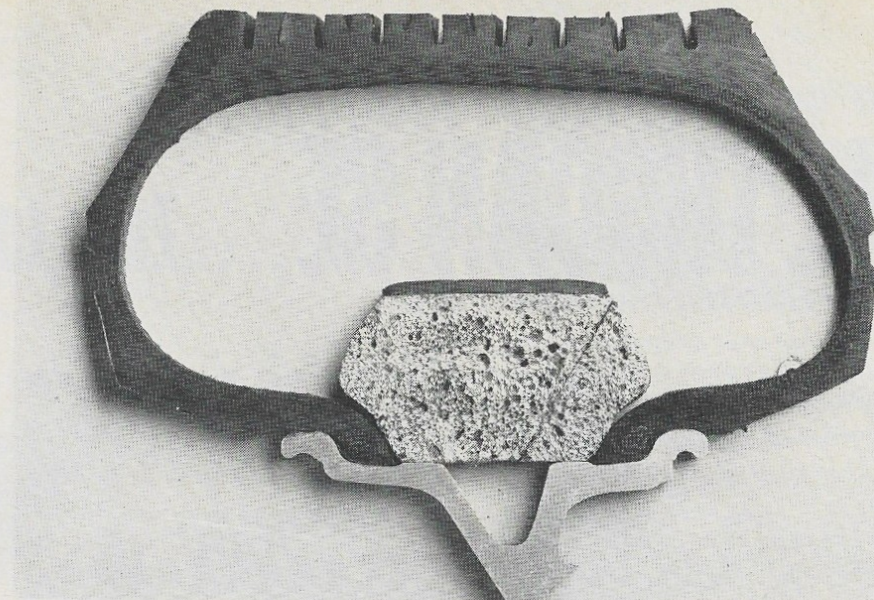
*Severe cupping can be caused by shimmy or unbalanced wheels. A tire like this can never be properly balanced again.*

reflects advances that automakers are not yet willing to pay for as original equipment.

#### **Bad-Weather Tires**

Snow treads are fine for those who live in that weather belt, but they won't help one bit except in deep snow or muddy slush. Their traction ability on glare ice or packed snow is about the equivalent of the bald tires I cited earlier. This is true, too, of new tires with conventional treads. The reason for modern tread designs helping in the rain is that the patterns are arranged to literally wipe dry that portion of the road upon which the tire momentarily rests at speed. This helps to prevent a dangerous phenomenon known as "aquaplaning" where you actually float on top of the wet surface with about as much control as you would have in a rudderless boat.

Studded tires of any tread pattern have a very useful, even life saving purpose. The studs will withstand quite a bit of driving on dry roads (it must be remembered that the roads are dry 90 percent of the time even in wintertime Maine), and studs are the only thing aside from chains that will help on glare ice. Studs on the driving tires will ensure that you get up an icy hill; studs on all four tires are necessary to ensure that you can stop *coming down* that hill. Studs must be installed when the tire is new and only when the tire is factory moulded with holes to accept the studs. The depth of these holes is critical or the studs will come loose. Thus you



*A cross-section of Firestone's new "LXX" tire, now being test marketed on the West Coast, shows the inner liner allowing you to drive slowly on a flat to the nearest service station.*

can't put them into a used tire as tread wear combined with dirt upsets this critical dimension, and for the same reason you can't go down to the corner gas station and have your present tires "drilled" to accept studs, even though some advertise this service.

As it stands now U.S. tire makers with one exception mould only their snow treads to accept studs. In Europe it is common to buy four studded tires complete with balanced wheels for an easy changeover come winter. This millenium, hopefully, will soon arrive on these shores because snow tires are extremely troublesome on the non-driving wheels. They are almost impossible to balance up there and steer poorly on dry roads. The one exception I mentioned is Goodyear's Pathfinder which is sort of a compromise tread that will steer and balance.

#### **What About Radials?**

Mostly due to the major, long term marketing efforts by Michelin, Semperit and Pirelli, radial-ply tires have been accepted and even sought after by knowledgeable motorists in America. The Michelin variety uses steel cords which, of course, are even tougher than nylon and these are also sold under the Sears label. The penalty is a harsher, noisier ride but radial tires of any make will corner like a Siamese cat and produce very measurable increases in durability and gasoline economy. You don't have to be a sports car owner to benefit; they work well on any car but they must be installed in sets of four as they won't mix with the conventional

bias ply. Potentially dangerous irregularities in handling can result. Also, ideally, a new car should be engineered for radials to smooth out the inherent harshness.

#### **Picking A Tire For The Job**

To summarize, an 80-level tire of either rayon or nylon construction is quite adequate for the family's second car assuming that the usage of this car is restricted to the housewife's suburban errands. The car that is used for daily freeway commuting and the annual family vacation should be equipped with at least 100-level rayon or polyester tires. If you consistently drive at maximum allowable speeds, carry heavy loads or drive long distances on a frequent basis it is highly advisable to move up to nylon, fiberglass belt or radial tires. Neither the tire companies nor I are in the business of moralizing over whether you should or shouldn't consistently exceed the speed limit but if you do, there is a specific type of tire built for police duty with a special nylon cord construction and relatively thin tread that resists heat build-up at high speeds. The sports or 70-series tires variously trade-named to indicate extra width that are optional on cars such as Mustang and Camaro conform in most basic respects to police standards but you'll pay a rather severe penalty in tread life. It is very important not to confuse the most expensive tire (some run as much as 200-level) with a high-speed tire. In general the thick tread, characteristic of any company's

*(Continued on Page 56)*

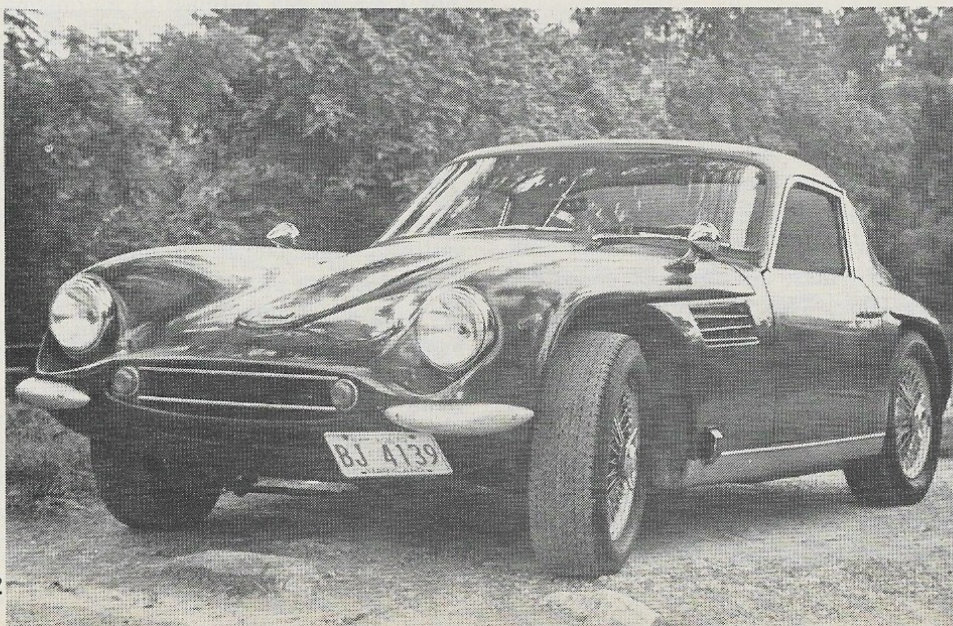


# THE TUSCAN SE ... Zero to 60 in 4 Seconds

Text and Photos by John E. Grammer



*Tuscan road clearance is minimal, making unpaved roads a hazard to negotiate. Entire front end lifts of access to the engine compartment.*



No ordinary car is this Tuscan SE owned by Terry Feelemyer of Baltimore, Maryland. Combining an outstanding performance record with a bit of owner ingenuity and the unusual match of a 1968 body with the 1967 powerplant, his Tuscan ranks as one of the more unique cars on the road today.

Owning such a car has really been an experience, as Terry will testify. Since there are less than 20 Tuscan in this country, the car invariably draws a crowd when parked and before the

*Small, improperly placed bumpers leave the fiberglass hood vulnerable to careless parkers. There is, though, adequate clearance for the "Indy" tires.*

FEBRUARY/1970



## '68 TUSCAN SE

### SPECIFICATIONS FROM MANUFACTURER

#### ENGINE:

Ford high-performance V-8  
 Bore and stroke: 4" x 2.87"  
 Displacement: 289 cubic inches (4727 cc)  
 Horsepower: 306 DIN hp at 5800 rpm  
 Compression ratio: 11:1  
 Carburetion: 1 Ford downdraft 4 barrel

#### TRANSMISSION:

4 speed synchromesh Ford gear box. Gear ratios: 1st 2.36; 2nd 1.78; 3rd 1.41; 4th 1.00; reverse 2.38  
 Salisbury 3.07:1 limited-slip differential

#### SUSPENSION:

Front: Independent, unequal-length wishbones with double-acting telescopic shock absorbers and coil springs  
 Rear: Independent, unequal-length wishbones with double-acting telescopic shock absorbers and coil springs. Two either side

#### STEERING:

Rack and pinion, 3½ turns lock-to-lock. Turning radius 27 feet wall-to-wall

#### TIRES:

185x15 — SP41 HR. 5K x 15 wire wheels

#### BRAKES:

With servo unit. Front: Caliper type, self adjusting disc brakes, disc diameter 10 in. Rear: Drum type, 9 x 2 ins., one leading, one trailing.

#### FUEL CAPACITY:

15 Imp. Gallons

#### OIL CAPACITY:

6 quarts

#### BODY AND FRAME:

High finish reinforced polyester body, bonded integrally with multi-tubular chassis and floor assembly

#### TRUNK CAPACITY:

On floor behind seats, 10 cubic feet

#### DIMENSIONS:

90-in. wheelbase. Front track 52½-ins., rear track 53½-ins.

#### CURB WEIGHT:

2128 pounds

#### MAXIMUM SPEED IN GEARS:

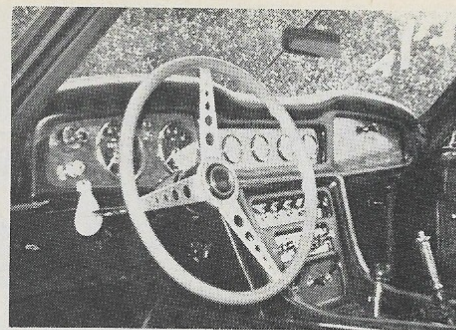
1st — 70mph at 7000 rpm  
 2nd — 98mph at 7000 rpm  
 3rd — 125mph at 7000 rpm  
 4th — 175mph at 6400 rpm

#### ACCELERATION:

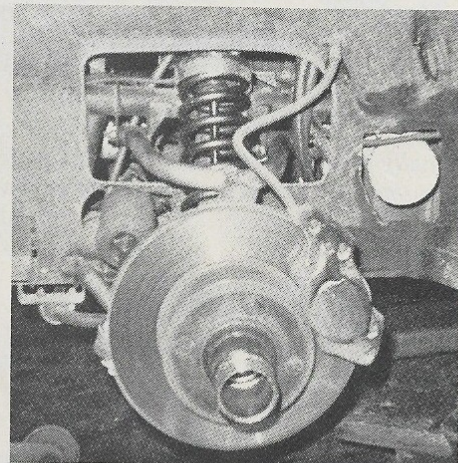
0 — 50 in 3 secs.: 0 — 70 in 6 secs.

#### FUEL CONSUMPTION:

18 — 24 mpg



*Neat and complete panelled dash is one of the finer features of the car. Cockpit ventilation, however, was left to be solved by the owner.*



*Front disc brakes are servo assisted. T.V.R. engineers claim the Tuscan can accelerate to 100 mph and come to a complete stop within 18.5 seconds!*

standard to compete with luxury-sport Americans such as the Corvette. There is enough room for two plus a small amount of luggage. Deep pile carpeting covers the floor and luggage space located behind the seats.

Many of those who gather around the car remark on the clean, yet sporty design of the dash. Evidently styled with the driver in mind, the dash puts a large speedo and tach in easy view thru the 3-spoke steering wheel. A row of gauges and toggle switches adorn the verticle plane of the walnut center console. The 4-speed shifter and hand brake are on the floor at the console.

By the time the perusal is over, Terry is making his way back to the car. But now there are more questions — mostly about the engine. Even with the engine running, there's no telling what's under the hood, so Terry is prodded into popping the cover and describing the 306-hp engine.

Those who have seen the Tuscan

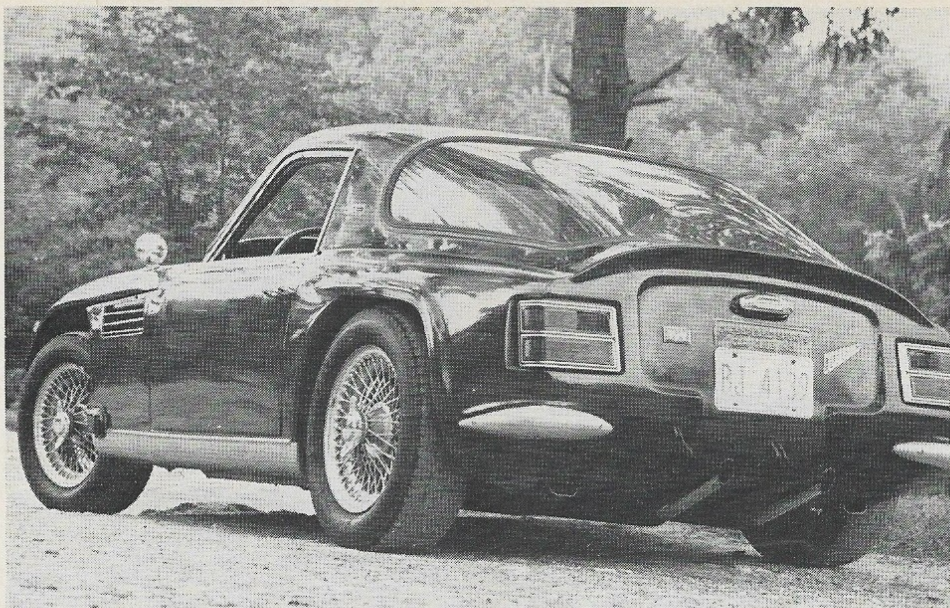
owner can get away, he is always confronted with one question: What IS this thing?

Terry explains that the car is made in England by T.V.R. Engineering, the same company that produced fiberglass bodies for the first model of the now defunct Griffith. The completed body is shipped to New York where the Ford engine is added and final adjustments are made. The importer, T.V.R. Cars of America, also brings in the Vixen model

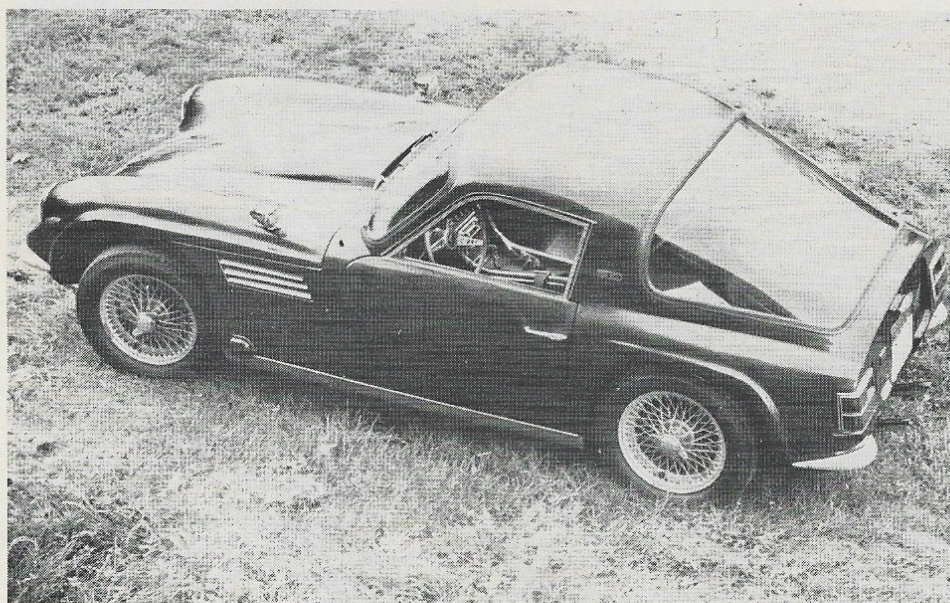
powered by a Cortina GT engine. A currently active sales outlet for both models is Lotus/Manhattan, Ltd., 633 W. 144th St., New York City 10031.

Satisfied for the moment, the on-lookers wander about the car eyeing each feature and the owner goes about his business, leaving the Tuscan to speak for itself. The fiberglass body was obviously designed with aerodynamics in mind. The interior reveals an abundance of padding and trim of a





*Equally small rear bumpers leave taillights and deck to the mercy of others. Manufacturer claims a top speed of around 160 mph.*



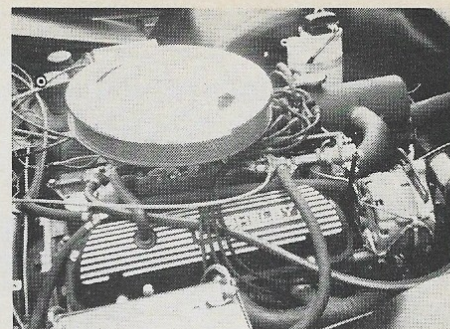
*The Tuscan only can be described as short and tubby but the shape is aerodynamically sound. Spare and luggage go on carpeted deck under plexiglass rear window.*

perform agree that the car has many inherent competition characteristics. Skepticism changed to exclamations like "Oh ma gawd!" and "Ooo mutha!" when the car appeared at a local drag strip for a sports car outing. Stealing the show from even the drag prepared machines, the Tuscan streaked through the traps at 100 plus mph in only 13.34 seconds! When timed on a short run, the completely stock Tuscan made the zero to 60 scene in just a little over four seconds!

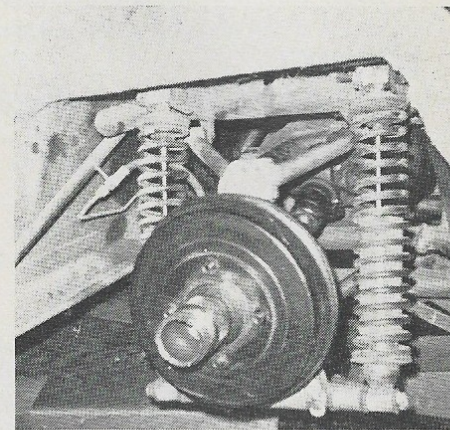
But Terry's major use of the car is in road race and slalom events, and it is here that the accelerative powers of the car take second place to its superb

handling properties. The fully independent suspension is comprised of an integral spring-shock and unequal wishbone arrangement. Twin shocks and springs are mounted to either side of the 3.07:1 Salisbury (a la XK-E and Cobra), limited slip differential. Near equal weight distribution, an anti-sway bar in front, Koni shocks all around, and "Indy" type racing tires round out the handling package.

The Tuscan has proven itself on the strip, the open road course and in tight slalom events and its general riding characteristics are exceptional and comfortable by sports car standards. It has, however, fallen short on other counts.



*Though now out of production, the Shelby-ized 289-CID V-8 was one of Ford's more inspired high-performance designs. Tweaking to a horsepower or more per cubic inch leaves it still relatively docile.*



*Rear suspension is completely independent with two integral spring shocks at each wheel and unequal wishbones. Underslung carriers, however, do not aid already minimal road clearance.*

After removing some padding from under the driver's seat to get at least a minimum of headroom (Terry still has to cock his head while driving), a problem with engine and cockpit heat received attention.

A badly undersized radiator and poorly modulated fan allowed an excessive amount of heat to generate in the engine. To solve this, Terry installed a manual override on the otherwise thermostatically actuated fan, thus allowing more cooling time at the driver's discretion. Overcoming the inadequate size of the radiator meant that more effective cooling area would be needed. The addition of several feet of finned tubing, similar to the material used in underwindow heating units, now allows water coming from the engine to be cooled by air passing through the fins. Then the water moves to the radiator for further cooling.

*(Continued on Page 58)*





# REPAINTING SMALL AREAS

by David N. Wenner

**Skillful retouching is the first line of defense against rust. With patience, YOU can do a better job than you can buy in a body shop.**

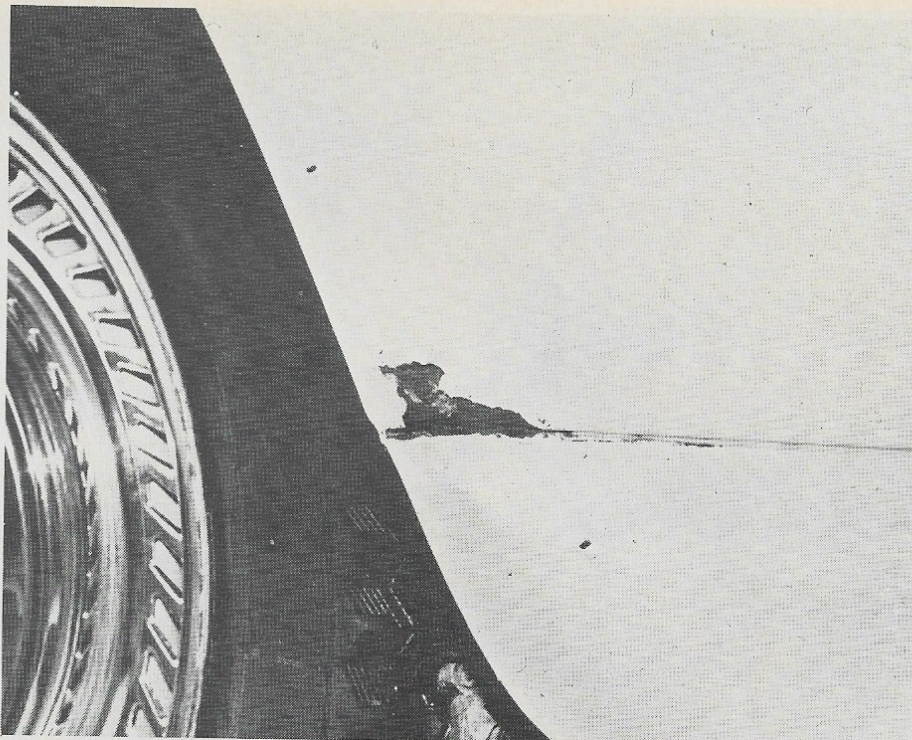
Most automobile bodies are made from steel, and steel rusts. It's as simple as that. Rust is almost impossible to stop once it's gotten a start, and the only thing that stands between the raw elements and all that vulnerable sheet metal is a thin coat of paint.

Since nobody enjoys driving a car that sports more nicks and chips than a home-plate umpire's chest protector, the majority of car owners keep after minor bug and flying stone damage with a small bottle of touch-up paint and a brush. But when a larger area of paint gets chipped, scraped or rusted off, "fingernail polish" repairs are not acceptable.

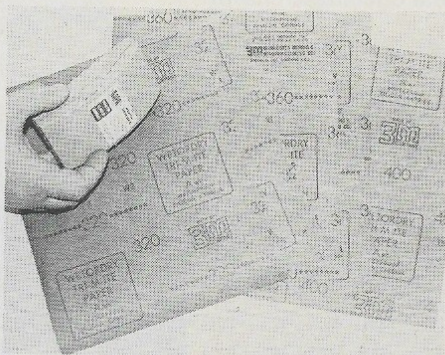
Unfortunately, the touch-up jobs done by the average body shop are so slapdash that the repainted areas often start rusting through in as little as six months. Unless you happen to be on extra-good terms with a body man who's bright enough to know that there's more to the repair racket than turning a fast buck, you'll have to tackle your touch-ups at home if you want them done right.

## Tools For The Task

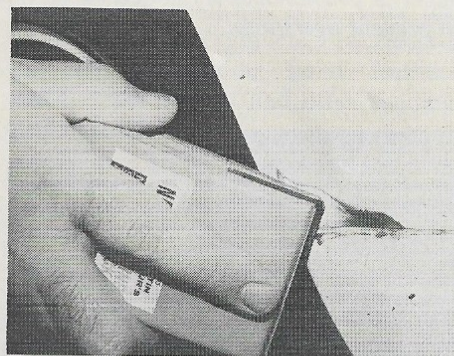
The only hardware you'll need for regular touch-up work is a selection of medium-fine, fine and extra-fine wet or dry abrasive papers and possibly a rubber sanding block. These can be



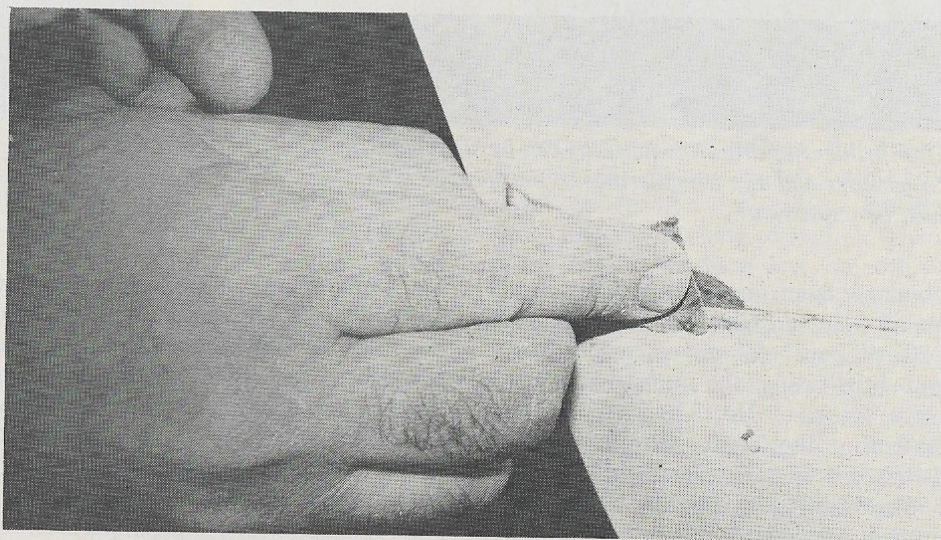
*Flying stone on a back-road rally chipped the paint, and the exposed steel immediately started to rust. Left alone, it would soon rust through.*



*Only real tools you need for touch-up work are fine grades of wet-or-dry sandpaper and possibly a rubber sanding block.*

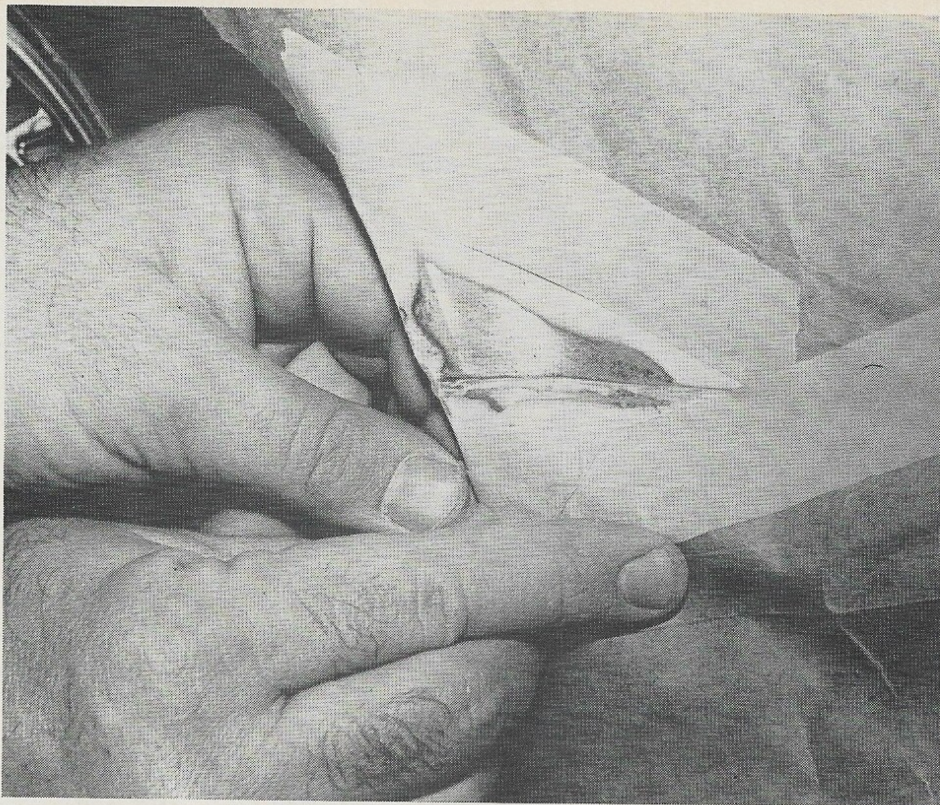


*First operation is to sand away all rust and unsound paint until bright metal shows. Be careful not to sand through in pock-marked spots.*



*Small areas can be sanded with paper on fingertip. Boundary of damaged area should be featheredged, revealing concentric bands of paint and primer.*

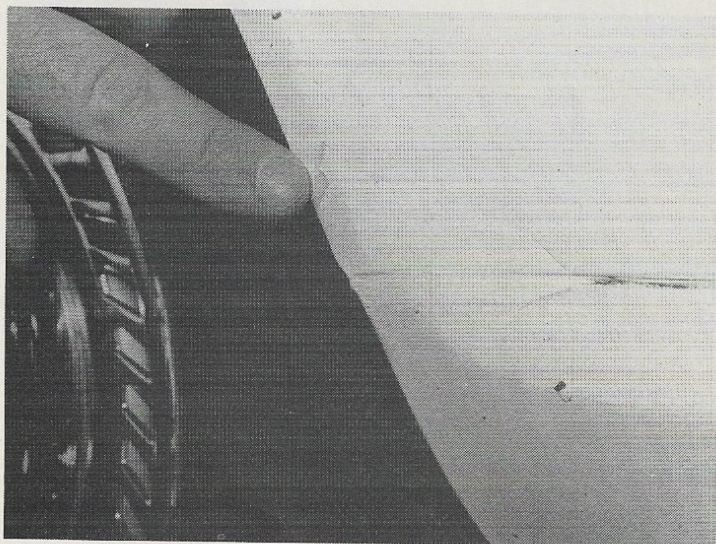




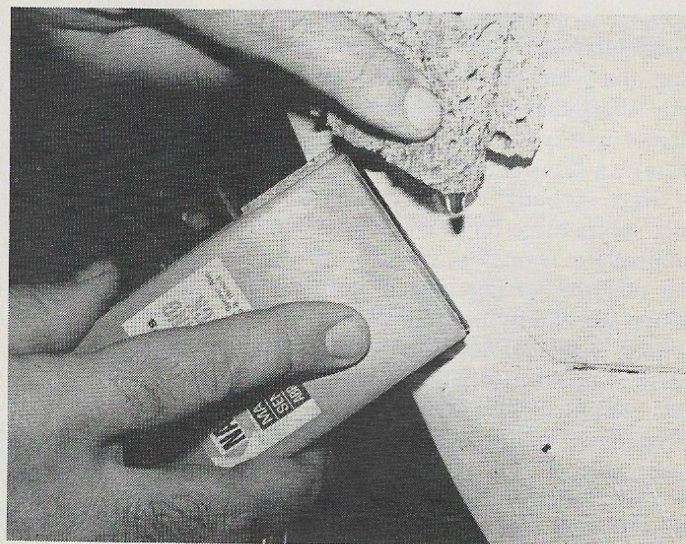
*Place masking tape strips just inside sanded area before applying primer. Brown paper or old newspapers should be taped around opening as shown to prevent overspray.*



*Spray cans of auto primer and touch-up paint are needed to touch-up larger areas. Save your "fingernail polish" brushwork for tiny chips.*



*After primer has dried the masking can be stripped off. Rough edge and any irregularities in the sprayed coat must be sanded out.*



*Wet sanding is used to smooth primer coat. A wet sponge held above the work area and slowly squeezed out is fine. Use little pressure, lots of motion.*

obtained from any auto supply store. You'll want a couple of sheets of No. 220-grit paper for removing loose rust and brightening the metal, a couple more sheets of No. 320-grit paper for feathering the paint surrounding the damaged area and a sheet each of No. 360 and No. 400-grit papers to bring the primed surface to mirror smoothness before applying the color coat.

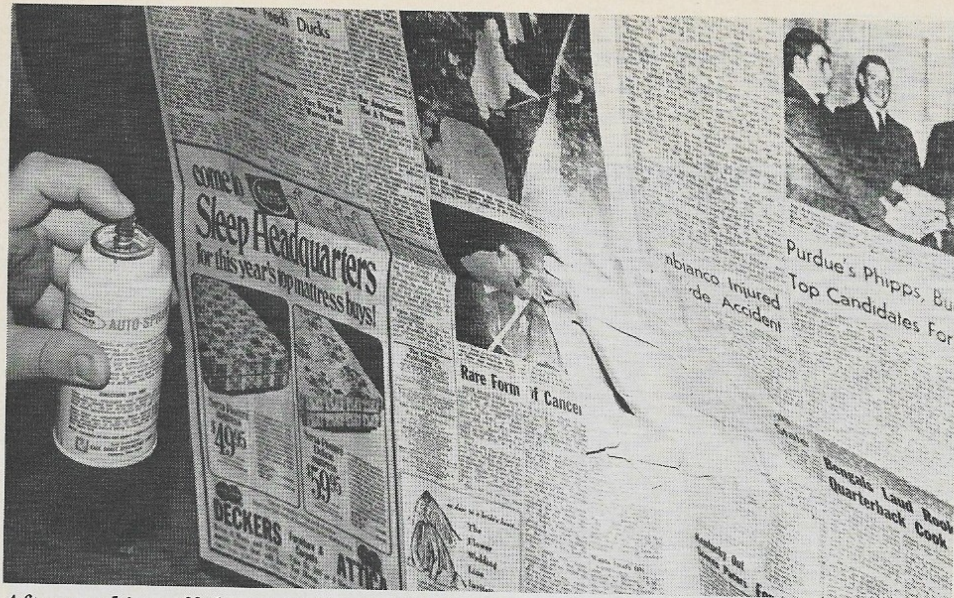
The primer you use is very import-

ant. If the damaged spot has been badly rusted, or if the metal seems to be porous and allowing moisture to come through from the underside, Rust-Oleum brand primer is to be highly recommended. It not only adheres to rust-pitted metal, but resists further rust formation as well. However, if the metal is clean and sound, regular primers are perfectly acceptable.

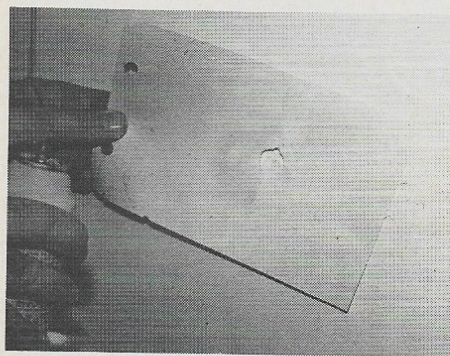
Normally, dark-gray "hot rod" pri-

mer does not work well for touch-up purposes, especially under light-colored finishes. You should usually choose a color that matches the primer originally used on the car. White primer, however, is often best for use under transparent white lacquers despite the fact that light gray may have been the factory choice. It will not cause a darkening around the edges of the repainted area as a gray primer might.

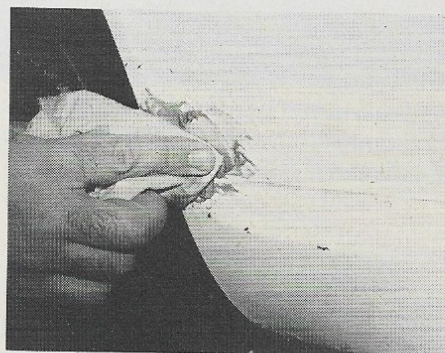




*After masking off the general area, the color coat is sprayed. Start spray against paper and move it smoothly across patch. Keep nozzle 12 inches from work.*



*For smaller areas, a paper sheet with a hole through it can be used in place of masking. This makes correcting many small spots quicker.*



*After color coat has dried the finish will probably have to be rubbed out with rubbing compound to obtain a good luster. Rub lightly in circles.*

The finish should be sprayed on. Spray cans are perfectly adequate for small areas such as those confronting the average home mechanic. If your dealer does not have spray cans of touch-up paint for your foreign car, try the Conrad-Blum Company, 23 Old Mamaroneck Road, White Plains, New York, 10605. Give the year, make and model, paint number or name, and expect slow delivery.

The new finish may have to be rubbed out and polished. This is always true of lacquers, but most enamels give a satisfactory luster without rubbing. Don't use lacquer rubbing compound on enamel, only special fine enamel-finish abrasive compound.

### Preparation

Without proper preparation your repainted spot will not blend into the original finish, nor will the repair remain permanent. This is where "quickie" commercial touch-up jobs frequently fall down. Most areas that require sprayed touch-ups — those ranging in size from the diameter of a dime to about a foot — will have some rusted metal in them. If the damaged area is much larger than this, serious thought should be given to repainting the entire panel.

Paint, and most primers, will not adhere to wax or rusted metal, at least for very long. The first step is therefore to remove the wax with a strong

detergent and sand all rusted areas down to bare, bright metal. Work outward into the painted areas surrounding the spot until your sanding reveals only sound primer and uncorroded metal under the finish. Sand away the rust with No. 220-grit paper.

Feather-edging the paint around the damaged spot is best done with dry paper. Wet sanding, which we'll discuss later, makes it too easy for a residual film of water or a fine layer of rust to remain, spoiling the primer application. Use No. 320-grit paper, and feather-edge as large an area as possible around the bare metal. You should be able to see distinct lines of color and primer layers completely around the bare spot — the wider the bands the better. A rubber sanding block is fine for larger spots, but a bit of paper on the end of your finger is best for touching up small areas.

Sanding should always be done in one direction. *Never* sand with a circular motion. If there is a seam or deep groove to be sanded, use No. 00 steel wool. This will conform better to such recesses than sandpaper will. After the rusted metal is completely smoothed and the surrounding paint feather-edged, wipe all dust and other sanding residue from the area.

### Masking

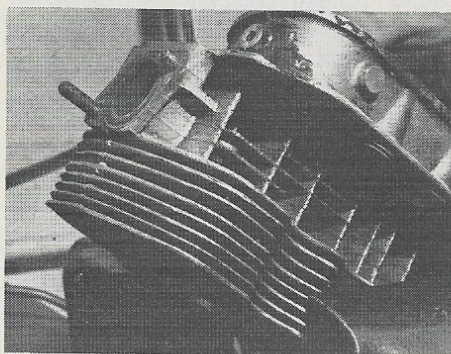
"Mask areas not to be sprayed," it says on the can, and you'd better believe it! Lacquers will usually "dust off" surrounding areas, but enamels tend to stick tenaciously. Start by placing masking tape around the spot you're going to prime. Have the edge of the tape just overlapping the sanded area of the color coat surrounding the feathered paint edges. Next, tape old newspapers around the opening to protect the rest of the car from overspray.

### Priming

Spray the primer in three thin coats. Depress the spray button with the nozzle aimed off to one side so that the spray hits the masking paper first. Then move across the bare area smoothly, keeping the button depressed *fully* and the spray nozzle at a distance of 12 to 15 inches away from the work. Allow about five minutes for the first thin coat to dry before applying a second. Wait five minutes longer and give it a third coat. The primer must then be left to dry for at least half an hour before removing the masking and sanding.

*(Continued on Page 58)*





*A broken stud on a Volkswagen cylinder head. Prior to the availability of "Heli-Coil" metric-size inserts the entire head would have had to be replaced.*

## How To Install Metric "Heli-Coils"

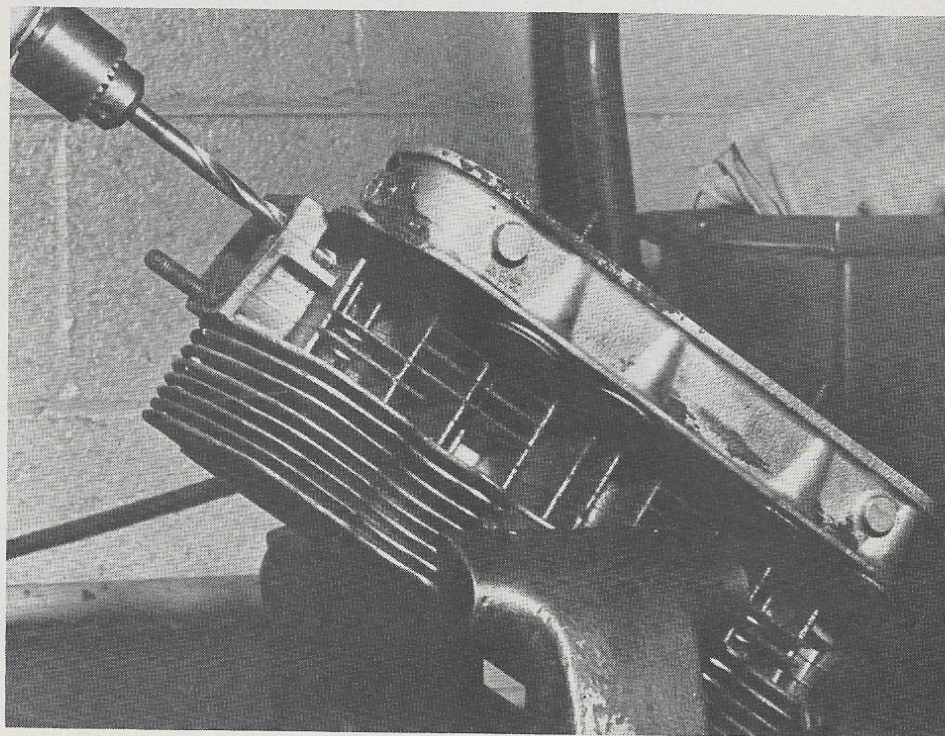
Stripped or otherwise damaged tapped threads on automobiles using the metric system are no longer cause for major concern to American auto mechanics. Now, with the use of metric-size stainless steel "Heli-Coil" Inserts, owners of Volkswagens, Opels, Renaults, Peugots, Toyotas and other foreign-made autos can make quick and economical repairs. Prior to this development, foreign car owners had little choice but to purchase new parts when confronted with damaged threads.

Metric-size inserts manufactured by Heli-Coil Corporation are available in Master Thread Repair Kits. Each kit contains 12 metric inserts, a tap and an installation tool. Thread sizes range from M6 to M14 x 1.5.

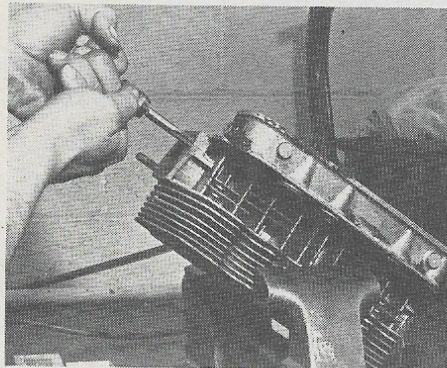
Thread repair with the use of "Heli-Coil" Master Thread Repair Kit materials is a simple, three-step process:

1. The damaged thread is drilled out.
2. The hole is tapped (threaded) with the aid of a tap wrench.
3. The insert is screwed into the hole.

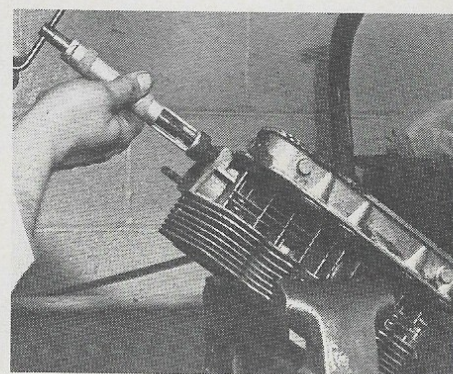
For further information about "Heli-Coil" metric inserts contact Insert Products Division, Heli-Coil Corporation, Shelter Rock Lane, Danbury, Connecticut 06801.



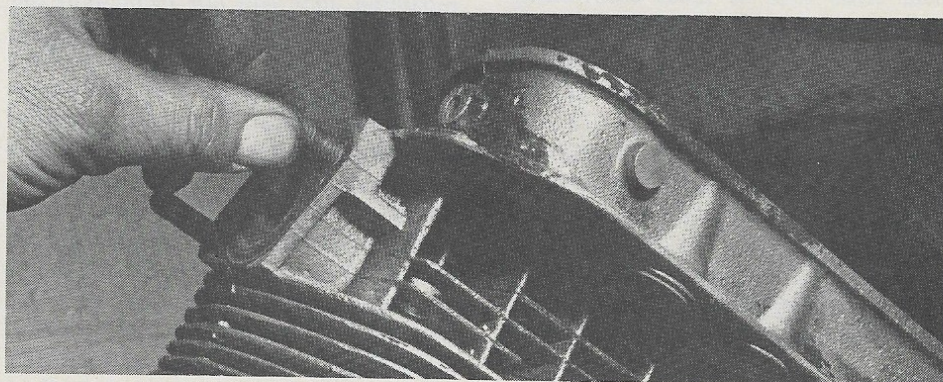
*The broken stud and thread are drilled out to the size recommended on the "Heli-Coil" Master Thread Repair Kit instruction card. Most European-manufactured cylinder heads are made of aluminum, and are easy to drill.*



*Here, the drilled hole is hand-tapped for an M6 insert. The threading tool is included in the kit.*



*The stainless steel "Heli-Coil" Insert is installed. The threads are stronger now than they had been in the original equipment.*



*The hole has been restored to its original metric size. The new stud is started in the armored hole and seated to the proper height with a stud driver or double nut arrangement.*



# TECH



# CLINIC

Questions of widest reader interest will be answered in this column monthly. These answers are prepared by our technical staff with the help of consultants who have many years of experience servicing the car involved. WCG, of course, can accept no responsibility for accuracy or applicability to a given situation although every effort is made to constructively help readers who have mechanical problems with their cars. Due to the heavy volume of queries, none can be answered personally so therefore do not include postage with your submissions. To be considered for inclusion in this column, send your question to: Tech Clinic, World Car Guide, 4207 Palos Verdes Drive South, Palos Verdes Peninsula, Ca. 90274. Please limit queries to a single problem and be as specific as possible.

## Volkswagen

**QUESTION:** I own a '65 Squareback, chassis No. 365-088-185, engine No. 0-788-009, model 1500S. Will you suggest an available shop manual for this car? Neither Floyd Clymer's nor the manual published by Delius, Klasing & Co. cover this car.

*Bruce M. Chetty  
Reno, Nevada*

**ANSWER:** The 1500S is that maverick hot-rod Volks that was never officially imported to the U.S. by Volkswagen of America. It was sold, though, in Canada so we suggest you query Mr. Frank Segee, Director of Public Relations, VW Canada, Ltd., 1920 Eglinton Ave. East, Scarborough, Ontario. We assume VW Canada follows VoA's policy of making a modified (do-it-yourself) shop manual available to owners for a nominal

charge. You cannot buy the dealer's shop manual, however, because instructions in it revolve around the use of special tools.

**QUESTION:** Do the '66 engines in busses run hotter than the earlier ones as these have 19 fins on each cylinder barrel compared with 15 before? Also, does the '66 engine take SAE 30W oil above freezing as is recommended for earlier models?

*Stanley Wayman  
Dabury, Conn.*

**ANSWER:** Let's twist our answer around the other way because the extra fins were added due to a cooling problem under extreme heat conditions. Thus the newer models with 19 fins run cooler. As to oil recommendations, SAE 30 designated for "Service MS" is advised for temperatures above freezing. Though not mentioned in the owner's manual, many dealers use 10W-30 MS during periods when the temperature dips close to freezing at night but becomes quite warm during the day. The "MS" designation, which will be marked on the can, is very important as it guarantees that the oil has a detergent content that will keep the engine clean during stop and go driving, between changes.

**QUESTION:** I own a '57 Volks bug and have had and still get good, economical transportation from it. As a loyal owner, though, I'm thinking about a new one to replace it but I've been informed by owners that VW dealers are now charging three times more for repair work. I realize everything has

gone up, but as dealers expand into new buildings, elaborate offices, etc., do customers get hooked for repair work way out of proportion, even for a minor tune-up? I feel now I will get my servicing done by private mechanics or garages who specialize in VW even though I would rather take my car to an authorized dealer.

*Al Londema  
Salt Lake City, Utah*

**ANSWER:** A minor tune-up at an authorized dealership now costs about \$7.50 excluding parts, versus about \$5.00 in 1960. That increase doesn't seem to be excessive in view of general rising costs for everything. You should remember that the seemingly fancy new facilities being put up by not only VW dealers but others as well are not just for show. They are designed to handle increasing volumes of business on an efficient basis. Today there are 3,000,000 VW's on the road, compared to less than 500,000 in 1960. In 1957 when you bought yours, VW dealers had to worry about only 150,000 cars.

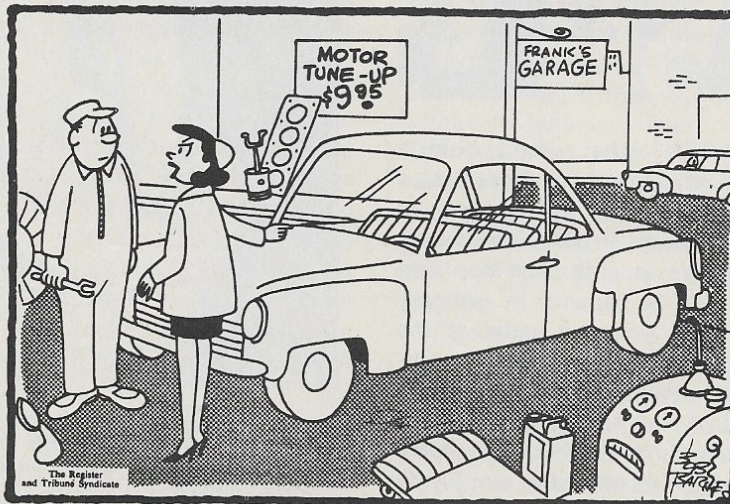
**QUESTION:** When I bought my '69 VW station wagon I'd planned on air-conditioning but my dealer stalled on obtaining a unit, telling me that they were undergoing modification or redesign. This is the last I've heard and now after one year, maybe you can tell me what has happened?

*Maj. G. L. Gould  
Hampton, Va.*

**ANSWER:** As we noted last month VoA bought Delanair, a U.S. maker of  
(Continued on Page 61)

## THE BETTER HALF

By Bob Barnes

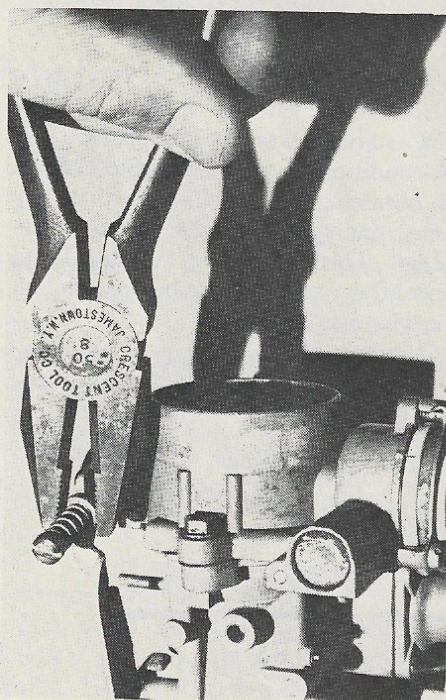


"Is there any sort of shock treatment you can give a car to de-lemon it?"

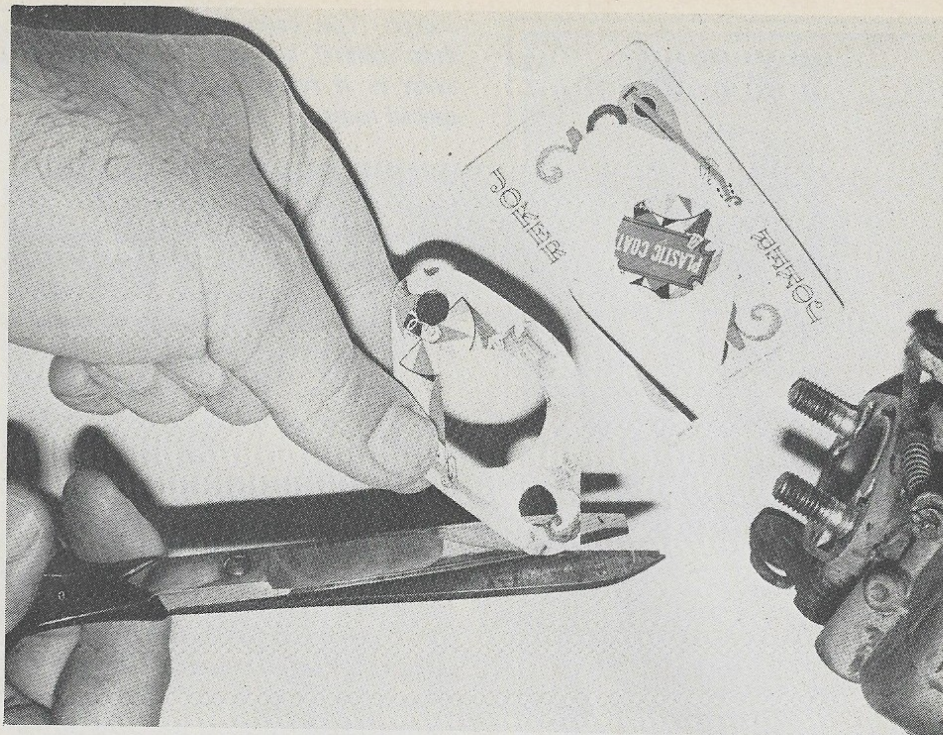




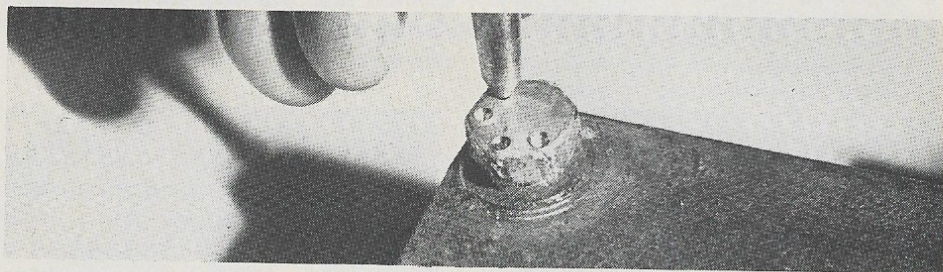
**LET DAVE DO IT**  
**LET DAVE DO IT**  
**LET DAVE DO IT**



**VOLKSWAGENS** that won't hold a steady idle adjustment for more than a few days are about as common as dandelion blossoms in May. It's probably because the long throttle-stop arm takes more of a banging in ordinary operation than on most carbs. If the screw on your Volks keeps working out, making the engine run slow and stall, try this: Back the adjustment off until the screw is almost out, then squeeze the sides of the throttle-stop arm firmly with a pair of pliers. Readjust. Result: Screw fits tighter, adjustments hold longer.



**GASKETS THAT LAST ALMOST FOREVER** can be made from old plastic-coated playing cards. Not only do they stand tremendous pressures, but they're about as grease resistant as a New York model on a crash diet. This means that they can take repeated installation and removal without coming apart or losing their sealing capacity. The only bad thing about them is that when a mechanic finds one in your engine he usually thinks that you're some kind of joker.



**BOLTS** that have become too rounded-off for your wrench to grip can be restored temporarily by striking each corner of the hex with a center punch. This can be a handier thing to know than your lawyer's phone number if you own a foreign car. Too often, service stations that do not have metric tools create problems like this by trying American sizes, adjustable spanners and pliers. Before you can replace the fastener, you've got to get it out, and that's when a center punch can save the day.



**FOREIGN CARS** often call for filling the crankcase with an uneven number of U.S. quarts. As a result, you're always stuck with a half-full can after an oil change. You can keep dirt from getting into the oil and prevent spillage by snapping a plastic lid from a one-pound can of coffee over the partially-used quart until it is needed. It's great for carrying already-opened cans in the trunk too!

—Dave Wenner

**FEBRUARY/1970**

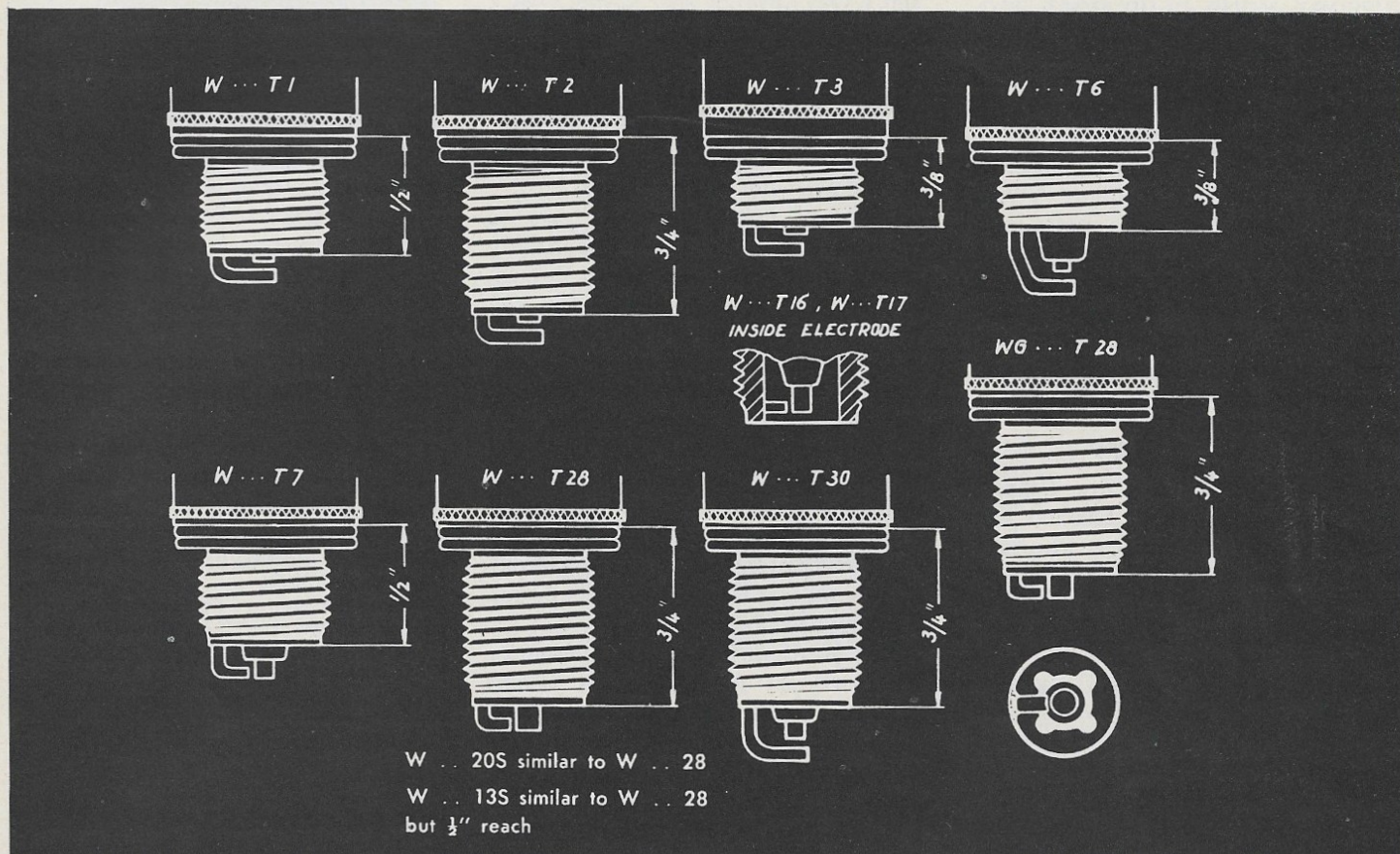


# HI-PERFORMANCE CORNER



by Tony Hill

## A SPARK PLUG PRIMER...PART 11



Last month we discussed the heat range value of spark plugs so this month, we'll get into their design characteristics. A look at the illustration will give you an idea of the various types available.

It must be kept in mind that plug insulator and electrode designs vary with the type of application, either from a better combustion standpoint or to solve clearance problems that can exist in some racing engines. These include domed pistons, oversized valves and combustion chamber designs, any of which can cause problems for the spark plug or, conversely, the plug can cause problems for the moving parts.

To illustrate the point, take the Champion L-60R spark plug, one of the types of plugs used by Dean Lowry in his full race VW engines. This is known as a "pure" racing plug with what

Champion calls a "retracted gap" which is the same design as the Bosch inside electrode T-16, T-17 series as shown in the diagram, although I should note here that we are talking design only. The thing to remember here is that if you pulled out a set of Champion L-60R's and wished to install a set of Bosch plugs of the same heat range value as the Champions, you will find on the cross reference chart that it calls for a set of Bosch W225T1, which as explained last month, is a normal design plug of the "cold" type for use in regular VW's. If you used these, you'd be in trouble.

The similarity in the aforementioned plugs is in the heat range only, and not in the configuration of the electrode and insulator design. For all practical purposes the L-60R is a "hot" type of racing plug, whereas the W225T1 Bosch

plug is a "cold" regular type. These mean the heat range qualities are the same, but the design is not.

To give another example, if you had a set of Champion L-57R plugs, which is one step colder than the L-60R, and wished to switch to Bosch, then you'd find that a set of Bosch W240T16 is what is called for. These types of Bosch plugs are of the "racing" design with the ground electrode positioned up in the shell of the plug as shown in the diagram.

One of the more popular design of plugs that is being used in high performance VW engines is the side electrode design or, as Champion calls them, "projected nose" plugs. This type of plug is shown in the diagram as the T-7 series. The side electrode design has many good features that lend to high

(Continued on Page 58)





Compiled by Carole Kepes

The VWCA, P.O. Box 963, Plainfield, N.J., 07061 is a non-profit organization dedicated to helping the VW owner enjoy his car to the fullest. For more information send 25 cents for postage and handling to the above address. Annual dues \$7.00 plus \$5.00 initiation fee first year. Dues include subscription to this magazine, WORLD CAR GUIDE.

## SUPPORT YOUR CLUB HOST PROGRAM

Ted Ubbelohde needs you! Be a Club Host and get some satisfaction out of helping others.

The Club Host Plan was conceived with the idea of helping VWCA members enjoy their VW's more, especially when travelling, by offering such services as securing advance reservations and appointments, obtaining tickets, providing lodging and offering suggestions as to routes to take, and even to the escorting of fellow members on a tour of the city.

VWCA now has over 70 club hosts throughout the United States, Canada, New Zealand, Ethiopia, England and Austria, serving its members who take to the open road. Why don't you become one of this group? Write Ted at Box 395, Davenport, Iowa 52805.

## ALL-NIGHT LEADFOOT RALLY

"I never said it was the best all-night rally in the world, just the biggest." The seventh annual Leadfoot all-nighter has been so described by its chairman, Leonard Karig of the Metropolitan New York Volkswagen Club.

Well, the rally kept up its tradition of size, registering an astounding 344 cars, compared with a mere 247 its previous run. It also hit a new high in quality, as many of the most experienced rallyists in the east tossed an assortment of encomiums at Karig.

Karig staged a 350-mile romp starting in Yonkers, New York and running through New York and part of Massachusetts. Walter Eisenstark and Dick Klein, in a Mustang, took first equipped with 36 points through eight timed and four self-scoring controls. The unequipped class was won by Michael Potheau and Bill Todd in a BMW with 277 points. The seat-of-pants class was won by Bruce Lawton and Bob Brennan in a Pontiac with 511. (What happened to all the VWCA members?)

Although the rally was basically straightforward, it did include a few

things for the less-than-attentive. One instruction told entrants to change speed at a winged corn cob. Prior to coming to the corn cob, entrants saw a winged carrot, winged bunch of cherries, winged apple, winged hotdog, winged peak and winged orange.

Another instruction told cars to execute a right at third opportunity after a circle with a line drawn through it. Inasmuch as this type of sign had been used as an off-course market throughout the rally, it left many entrants befuddled. The sign in this case was the Diners Club symbol in a gas station, and those that failed to find it (it was lighted) entered an off-course control.

Speeds were brisk, but the rally format permitted cars to stop in front of the checkpoint, so the entrants for the most part had no problems.

The Leadfoot was the fourth event in the Northeast All-Night Rally Championship Series with the final event being held on November 29. Nearly 900 cars ran the five events, competing for nearly \$5,000 in trophies and merchandise donated by the following companies: British Leyland Motors, Sun Oil Co., Purolator Inc., Bulova Watch Co., Kensington Products (Koni shock absorbers), KLG Spark Plugs, Union Carbide Consumer Products Co., Gumout, Trackstar Products, Semperit Tires, Lucas Electrical Services and the International House of Pancakes.

## DATES TO REMEMBER

**Jan. 24** - Trustees Meeting, Columbus, Ohio.

**Feb. 15** - "Winter Car-nival 70", Badger Beetles VW Club, Milwaukee, Wisconsin. Rally & Ice Gymkhana.

**April 25** - Trustees Meeting, Columbus, Ohio.

**June 19-21** - National Convention, Atlantic City, N.J.

## HAVE YOU ANY QUESTIONS?

If you have any questions concerning VWCA activities in the following areas,

write directly to the committee chairman listed:

**MEMBERSHIP** - VWCA Membership office, 10100 Gregory Ct., St. Louis, Mo. 63128.

**ACTIVITIES** - Bill Morris, 12447 Sharon Rd., Oakley, Michigan 48649.

**CLUB HOST** - Ted Ubbelohde, P.O. Box 395, Davenport, Iowa 52805.

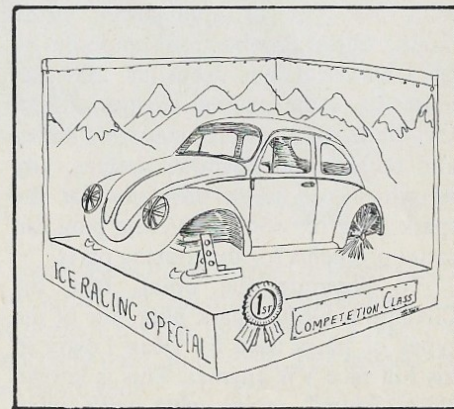
**CLUB TOUR** - H. Walter Kuntze, 5518 McLaran Ave., St. Louis, Mo. 63136.

**RECRUITING** - Maria Grayson, Rt. No. 1, Box 174, Dittmer, Mo. 63023.

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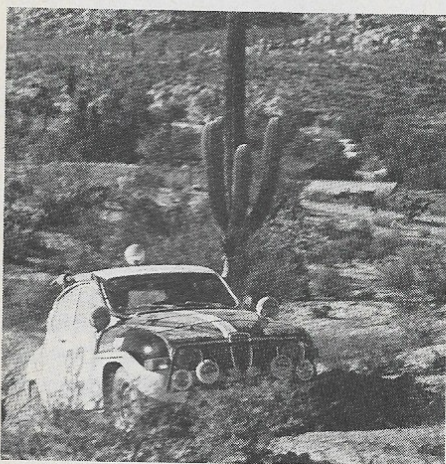
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# WORLD NEWS

(Continued from Page 11)



Baja-winning SAAB

## BAJA 1000 ENCORE FOR SAAB...

This year's brutal open off-road race ended up as another demonstration of the remarkable durability of SAAB's well proven front-wheel-drive concept. Ingvar Lindquist, a SAAB dealer from Culver City, California, with Sven Sundquist serving as his navigator, set a new record for two-wheel-drive sedans with a time of 25 hours and 50 minutes, lowering his previous time from last year by 4 hours and 39 minutes. Jim Garner might have won it as he led the class if the early going in his much modified Cutlass, but was forced to limp the last legs of the rally with falling oil pressure. His faltering pace let Lindquist by into the lead. Eric



Jim Garner's Baja 4-4-2

Carlsson, legendary European rally champ put another SAAB 96 into third spot in the class. A Ford Bronco won overall, and that of course is one of the headaches in evaluating a competition of this sort. Twixt the bikes, buggies, pick-ups, four-wheel drivers, sedans and what all, it's darn right confusing. But face it, the course is mean, exciting and as challenging as any ever opened-up to a field of motor vehicles, and for this very reason will continue to grow in popularity.

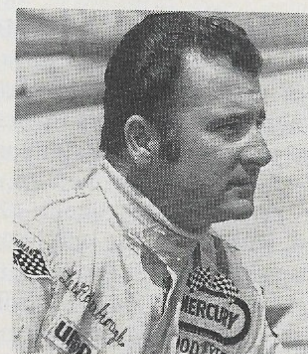
**BREAKTHROUGH IN TRAFFIC SAFETY STATISTICS...** The National Safety Council has added a new three-day workshop intended to assist in the development of standardized methods of compiling a comprehensive system of traffic and accident records which can be implemented without electronic devices. One factor which has consistently hampered progress in traffic planning and safety work at all levels is the absence of pools of accurate, standardized and reliable data. While it's a darn shame that we can't find a way to get the big insurance companies to help with making their enormous banks of information available for such a study, the NSC's new workshops may get to the same place by the long way 'round. In any case, it's unrealistic to expect much that's objective from the insurance companies. If the highways become safer, they might have to lower their rates!



Hornet equipped for Dual-Mode operation

**DUAL-MODE TRANSIT IN MILWAUKEE...** A proposal for a demonstration project of a dual-mode transportation system in metropolitan Milwaukee has been put forward to the County's Board of Supervisors by Congressman Henry Reuss. "The dual-mode transit system is a network of guideways along existing freeways on which vehicles can be guided automatically and at controlled speeds to and from several different points," Reuss explained. "The same vehicles can be operated manually off the guideways for travel on conventional arteries." American Motors and Allis Chalmers have agreed to cooperate in the development of the program which would utilize existing roadways and vehicles currently in production. These would be equipped with electric motors and retractable sidearms to operate on guideways. Conventional internal combustion engines would continue to provide the major source of power for more conventional use off the guideways. Power and guidance would come from a

"third-rail" fence along the guideway. The system would be developed by Professor Dwight Baumann of the Massachusetts Institute of Technology. Reuss claims that the system would cost \$10-15,000,000 and take some three or four years to put into operation. Well, heaven knows it's not a new idea and I seriously question whether it's the right way to go, but it's probably inevitable that one or more such dual-mode systems will come into use during the 'seventies.



LeeRoy Yarborough

## FORD NAMES LEEROY YARBOROUGH...

John Naughton, Ford Division's GM, named LeeRoy Yarborough as "Man of the Year in Autosports." Making the presentation in Detroit at Ford's annual Motorsports Banquet Naughton said, "LeeRoy is a credit to auto racing both on and off the track." He is the fifth man to be so honored by Ford. His predecessors are Jim Hurtubise, A.J. Foyt, Mario Andretti and Cale Yarborough. LeeRoy has been the insiders choice to surface as a superstar for three seasons. He won two superspeedway events in 1968 and just missed in several others. His '69 performance in both Mercury Cyclones and Ford Talledagas was "something else." He scored a last-lap victory in the Daytona 500 in February, won the Rebel 400 at Darlington and the World 600 at Charlotte. Then he went back and took the Firecracker 500 at Daytona on July 4th. When he won the Dixie 500 at Atlanta, he became the first driver to win more than four superspeedway victories in one year. LeeRoy went on to win the Southern 500 at Darlington and the American 500 at Rockingham. It was this last that gave him his "Grand Slam" — a win at each of Dixie's five major speedways. He is only the third man to turn this trick and the only one to do so in a single season. It was a terrific performance for the handsome 31-year-old from Columbia, S.C., and worthy of the big silver trophy and new Ford car that he



# WORLD NEWS

(Continued from Page 53)

won. But think about this: Jackie Stewart won the World Championship with a Ford engine, and Mario Andretti won the Indy 500 and most of his USAC Champ races with Ford power on his way to that championship. How would you like to be the guy who had to pick from the three of them?

**80 MILLION POUNDS OF RUBBER IN 1970...** Experts at Firestone predict that use of rubber products on motor vehicles will continue to increase. Based on projections of 8.5 million cars for the coming year, an increase of 10 pounds per unit or about 5% is expected. Part of the rise will be in the ever increasing demand for and fitment of bigger tires, but the '70's will see wider use of rubber in bumper inserts, interior fittings (door handles and the like) and in suspension systems where springs, shocks and body mounts are increasingly isolated by rubber shims and bushings.

**NEW RADIAL FROM B.F. GOODRICH...** B.F. Goodrich, a leader among U.S. companies in radial tire development, has announced a new "radial-belted" passenger tire for which 55% more tread area strength is estimated. Gene Bego, Goodrich Marketing VP reported that road tests show wet road traction improved by 20%, snow traction by 7% and measurably greater resistance to skid on ice. Frankly, none of this comes as a surprise to us at WCG. I recall very vividly using conventional radials in ice and snow as far back as 14 years ago and was flabbergasted by their superiority. This tire revolution now going on is pure balm for any enthusiast's soul.

**NEW TRAFFIC SIMULATOR FROM GENERAL MOTORS...** General Motors has recently unveiled a new traffic simulator for driver training. The device is classified as a second-generation machine, able to produce important new information on the behavior of drivers and their cars under varying traffic and road conditions. Development tests were conducted under the direction of Dr. Frank J. Bulik, the medical director of GM's Tech Center at Warren, Michigan. GM spokesmen believe the unit to be the only "moving base" driving simulator in operation, subjecting its "driver" to the same

forces he experiences at the controls of a real automobile — much as the Link instrument flight trainer does. I applaud this because I think really good simulators will be very helpful in training better, more complete drivers. But at the risk of offending GM, will they for crying out loud put this machine and their discoveries to work in a practical way so that these important developments can find their way quickly into applications that will benefit student drivers. So often GM will go through this kind of exercise as though the only people of interest are the press and not the public. So what will you do with this work now gentlemen, use it or file it? Do you intend to build 30,000 at a price that can be paid by the nation's high schools?



Sam Posey

**TRANS-AM FOR '70...** There's not a shred of doubt about it whatsoever. In 1970, the Sports Car Club of America's Trans-American Championship series for pony cars is going to be the real battle ground for youth market sales. And the scramble for position that has just been completed is an eye-opener. After bouncing around between Dodge and AMC, Roger Penske settled on the Kenosha makers, making good his promise to leave Chevrolet. Dodge has chosen Autodynamics Corp. of Marblehead (Mass.) with the talented combination of Ray Caldwell and Sam Posey to campaign their Challengers. Word is that Jerry Titus may slip over from his role with Firebird to direct the Camaro challenge. Dan Gurney will build up the chassis for both his own Barracudas and the Autodynamics Challengers — but that's where the cooperation will end. The whole pot is boiling furiously and it should be a marvelous season.

**NEW OVERDRIVE FROM WARNER GEAR...** I've just finished an extensive road test of an experimental overdrive for a conventional automatic gearbox



Warner Gear's overdrive for automatics

developed by the Warner Gear Division of Borg-Warner Corporation. The unit reminds me somewhat of the late model boxes produced by Laycock de Normanville for stick-shift transmissions, which is to say that it is smooth and flexible. My own tests confirmed Warner's claim to a 10% improvement in gas mileage. The test gearbox was fitted to an AMX, and the rig was so keen that I really hated to give it up.

## A SOLUTION FOR SCRAP TIRES...

The U.S. Department of the Interior may be on the trail of a solution for what to do with scrap tires. Like other hard waste we produce, scrap tires present a mounting, nay awesome problem. What to do with them? Land fill sites are disappearing, and burning is impossible in the light of mounting pollution. So what then? The Department reports that its Bureau of Mines (Pittsburgh) Coal Research Center, working in cooperation with Firestone's Central Research Laboratories, have developed a means to dispose of used tires that may well be commercially feasible. Through a process called "destructive distillation," large quantities of oil, gas, tar and the like can be reclaimed and then recycled back into industrial manufacturing processes. The distillation is accomplished by heating the scrap in a reactor like that normally used to test the coking properties of coal. Shredded tires are fed into the closed reactor and as they are heated, they break down into various chemicals. The rest of the explanation is pretty technical, but this is a happy piece of news. We are now moved once again, to be reminded of the TV commercial where the gruff foreman chides his airline baggage crew in an effort to outperform a rival work force in Chicago. "OK you guys," he roars, "Who we gonna beat?" "CHICAGO," they bellow. "OK," he shouts back at them, "DO IT!" So don't talk any more, fellows. DO IT! ●



\* American Motors is cooperating with the University of California, San Diego, in a steam car research project which will utilize a motorcycle engine in a 1970 Javelin. It sounds confusing, but the motorcycle pistons will be powered with steam, not a gasoline mixture. On another AMC front, one Barney Navarro has installed a 199-cubic-inch Hornet engine for which he claims 640 horsepower in the championship chassis that Roger Ward drove to a 1964 Indy victory. The car failed to qualify at its first outing in the Rex Mays 300 which was won by Mario Andretti in Andy Granatelli's STP Hawk-Ford.

\* SCCA, prodded by Volkswagen of America, will establish a Super Vee class for the current 1600-cc engine. VoA's motive is to get today's engine in action because parts for the 1200-cc are becoming scarce. VoA, though, pledges its continued monetary support for the original Formula Vee.

\* Breakaway signs, now mandatory on all new Federal-aid highways, have already saved many lives so the technique will be expanded to include the bridge-type signs used on freeways. Even though one post is broken away on impact, the remaining posts will support the structure.

\* The National Auto and Truck Wreckers Association reports that for the first time ever, its members have succeeded in disposing of more vehicles than were junked. The nation's 15,600 yards took in 9,033,000 vehicles but kept only 7,018,000 for spare parts purposes.

\* Toyota has opened a \$900,000 parts depot and training center in Portland, Oregon, bringing the total of such installations to five.

\* SAAB have begun car assembly operations in Finland with an initial target of 15,000 cars a year. Some of these will find their way to the U.S. and other export markets.

\* Volkswagen sales this last Fall have been running 14.1% ahead of the previous all-time record set in 1968, showing that the firm has completely recovered from the shortages caused by the prolonged dock strike and also, that customers are not resisting the 2% price hike.

## SAAB (Continued from Page 26)

Consisting of black, integral foam, the new panel contains recessed instrumentation for the speedometer, fuel and temperature dials, with fuel and temperature housed in one unit. Earlier pull switches for headlights and ventilation fan have been replaced with flip-over "piano key" switches to reduce interior protrusions to a minimum. The steering wheel has been provided with a new shock absorbent pad covering the spokes built into which at each end are press buttons for the horn. Actually, the horn can be blown by pressing anywhere on the wheel padding as well as by the buttons at each side.

By pressing the lever located on the right side of the wheel forwards, the driver can squirt water onto the screen before starting the windshield wipers. By starting the wipers on an already wet

screen, this feature will reduce smearing and unnecessary wear on the wiper blades.

Other safety features include a red reflector on the inside end of the driver's door for extra visibility at night while opening the door; the glove compartment has been provided with a safety catch to prevent it falling open in an accident; the front seat passenger has been provided with a strong grab handle on the glove box locker and arm rests are of heavier padding.

The 1970 station wagon echos all the 96 interior modifications but has otherwise remained unchanged including the "spoiler" or wind deflector over the rear window that directs high pressure air downward over the surface to keep it clean and thus maintain rearward visibility, a feature that the SAAB station wagon has had since 1960 although others claim to have "invented" it since.

## FIAT (Continued from Page 30)

unlike the over-boosted 124 binders, and the Dino has vented discs.

Steering, by a thin wooden wheel, is nice and light and in fact, it's almost too responsive over 110. It makes 124 Series Fiats seem heavy.

The Dino's major gain for handling and putting power on the road is proper independent suspension at last. Modeled on their 130 sedan, this uses angled trailing arms, coils, stabilizer and thrust arm. The limited slip differential hooks elastically to a sub frame.

Despite its new vitamins the Dino is no dragster, turning the quarter right around 16 s, which is only one better than their old model. Long, fast

highway runs with an occasional Alp would be more its forte, judging by our brief trial.

Thin but well dished seats add to the image of GTing and you can choose dial layouts by specifying the (Bertone) coupe or (Farina) cabriolet.

In the coupe a big tach and speedo are separated by five small gauges for oil, water et cetera. In the Spider main dials hug in the middle, surrounded by other knowledge. The coupe dash is at least dished.

With all its improvements, and this 2.4 Dino is certainly far more car now, the V-6 still costs a lot of money for its class — unless you double-dig Italian styling. The 124 S line is Fiat's haulin' bargain range.

— Sloniger

## HOLDEN (Continued from Page 31)

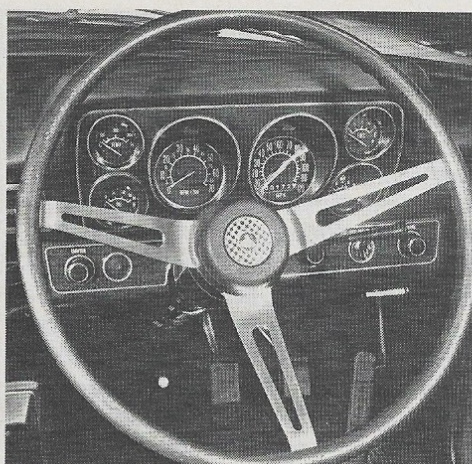
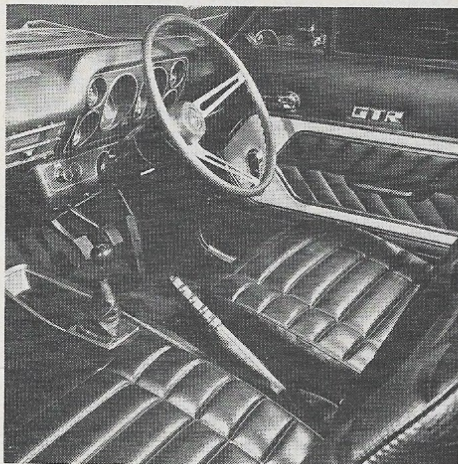
the suburban matrons with their Capri and buying all the boy racers with their Cortina GT duded about with black matt bonnets, real locking pins and ape tape, GM-H lobbed the new generation Torana LC sixes. They then stood back and said How Does That Grab Ya, and if they don't grab another five per cent of this savagely competitive market with the car, then all my years have been for nothing.

They made the Torana a part of the incredible options game — incredible in Australia because they play it on an annual market of only about 430,000 — giving it a 100-inch wheelbase for the

six, keeping the four on 96-inches, sleeving back the base 161-CID six-cylinder, seven-bearing engine from the Holden to a still-oversquare 138 cubic inches and used the 161-cuber in 114- and 125- hp form as an option. Around this lot they wrapped a very pretty body in both two- and four-door forms, and finished it with a price range that started \$100 under the cheapest 161 "big" Holden and ended around \$400 cheaper than the Capri GT.

This will make Ford choke, because the boss Torana at \$400 cheaper than the Capri GT is a little stormer that will run to just under 110 and cut a quarter in 17.4 secs, plus produce 250 horsepower in fully-modified race form, plus beat the ears off any Capri GT known





*Torana GTR interior is an enthusiast's delight. Seven grand tach obviously anticipates aftermarket tuning operations but in standard form, the engine is good for only 125 horsepower.*

to man. GM has produced a very good-handling, good stopping (10-inch discs) medium-sized car that will be tremendous in rallying and probably, series-production racing. It feels just like an unsanforized version of its big brother, the 350 GTS, which in October won the annual Bathurst 500 for standard production sedans, beating the works GTHO Ford Falcons home for the second year in succession.

But what makes it particularly interesting is that as far as anyone can discover, this is the only volume car in the world to appear as a six-cylinder on this wheelbase. Australia for years was a six-cylinder country, and even though Ford, GM and Chrysler are slowly weaning buyers to their new V-8's — all now being poured and built here — more than 55 per cent of the market still buys six-cylinders.

Essentially, the car still has the Torana look, but GM's Australian stylists, led by American Joe Schemansky, have very cleverly adapted the British outlines to the short-back, long-hood look that is essentially European rather than American. Personally I think it's better than the Capri although the back is a bit unfortunate, with a kinda half-finished look about it.

The 161 engine is the smaller of a pair — the other is 186 CID — of sixes designed and built here which form the mainstay of the bigger Holdens on a 111-inch wheelbase. It is a versatile, light-weight, free-revving, strong engine that GM-H claims could produce 250 horsepower in full race form. For some reason The General has labelled the 138 CID engine "2250" after its metric capacity, and the 161 CID "2600". The mill for the GTR stormer is the 161 on the same compression but with a two-barrel Bendix-Stromberg carburetor, special exhaust manifolds, exhaust valves and valve springs for an extra 11 horsepower.

Inside the cars, GM-H has swung the previously British-oriented trim and equipment over to duplicate the big Holdens, so much so that particularly when driving the automatics they feel just like one of the big cars. Inside, the GTR is almost a replica of the big GTS Monaro, complete with wild houndstooth trim option, all the instruments, wood-rim wheel and the rest.

I liked it. GM-H thinks the whole range will sell around 30,000 a year, which is about seven per cent of the market, and I can't see it failing.

— Bill Tuckey

charging for air. They do, though, sometimes add or, more often, subtract air at the wrong time, which is when the tire is hot. Assuming that the owner's manual for your car specifies 26 pounds front and rear, the reading will be close to 32 pounds when you pull in for gas after running for 10 miles or more on even a moderately warm day. Tire designers plan on this build-up so if you let the attendant bleed off any air, the tire will not be properly inflated and this condition of underinflation is potentially dangerous. An underinflated, slightly overloaded tire being run at 75 mph on a road with a surface temperature of 100 degrees will soon heat up to about 300 degrees. Then when you consider that tires are "cured" in their moulds at only 325 degrees, you can see that there is precious little margin left before the rubber will want to revert to its original "ready-mix" state. In that form rubber is a semi-liquid. Also at those temperatures the fabric has temporarily lost up to 50 percent of its design strength and a portion of this loss will be permanent. Symptoms of underinflation are pictured here, the tell-tale sign being premature wear in the shoulder area of the tire.

Extreme over-inflation breeds potential danger too. It prevents the fabric from flexing sufficiently to absorb the shock of hitting a pothole or foreign object on the road. The blow may rupture the fabric internally but it probably won't fail immediately and there will be no visible evidence of the damage on the outside of the tire. Then, maybe days later when you least expect it, the tire will fail. However, if tire companies had their say, they would recommend ignoring the car owner's manual and inflating to 28-30 pounds, depending on the size of the car and the load to be carried, before embarking on a long vacation trip. The lower pressure recommended by the carmaker is a compromise to obtain the soft ride expected by most motorists. The symptom of over-inflation is rapid wear in the center of the tread.

### Wheel Alignment

The various patterns of excessive wear caused by misaligned or out-of-balance wheels are better pictured than described. Alignment may be affected by even a mild blow to the front wheels, such as hitting the curb while parking, and few people realize that the rear driving wheels can get out of kilter too. Heavy loads, particularly in station wagons, can bend the axle housing slightly which will show up in fast wear

## TIRES

 (Continued from Page 41)

top line, is unsuited to extreme speeds because while long-lived, it retains heat. At the other extreme a good re-capped tire in some respects is a safer, better buy than a cheap new one but it should be remembered that the very factor that makes old shoes comfortable for a long walk conspires against a recap. Tire

fabrics of any type lose strength with age.

### Tire Care: Inflation

Proper tire care will never dirty anyone's white collar. The elixir of tire life is correct air pressure and as yet, the gas stations haven't gotten around to



of the inner shoulders of the rear tires. An inexpensive cure for this, available at most garages, is a tension bar that will stress the axle housing back to a straight line. Frequent alignment checks are far cheaper than paying for the damage to tires caused by faulty alignment. Misaligned front wheels can chew up a new tire in 5,000 miles or less.

### Balancing

After purchasing a new car or installing new tires on an older car, it is advisable to wait for about 100 miles of easy city driving before attempting to balance the wheels. One reason is that tires, just like new shoes, should be broken in. These few preliminary miles allow the tire cords to flex into their final shape and you can also tell during this period whether balancing is really necessary. That, of course, requires a short high-speed freeway run as balance problems usually evidence themselves at speeds of 50 mph or higher.

Various types of machines are used to balance the tire and wheel combination and the efficiency of any type is very much dependent on the skill of the operator. In general, if he must use more than two ounces of weight on each side of the wheel, he either doesn't know what he is doing or you have one of those rare tires with a structural defect that upsets balance. That is a problem which would be covered by warranty. In most instances you can get by with simple static balancing where weight is placed opposite the heaviest point of the tire and wheel. If, say, a total of two ounces was needed to counteract the heavy point, the weights would be evenly divided between the two sides of the rim so that dynamic balance would not be upset. A check for dynamic balance is usually made only when a customer complains that the static method hasn't solved his problems and this is done with the tire and wheel installed on the car. The driving wheels of cars equipped with locking differentials cannot be checked although in any case, the trouble can usually be traced to worn steering parts, loose wheel bearings or a bent wheel.

With luck, one good balancing job will last for the life of the tires. You'll notice I use the plural because tires should never be bought in quantities less than a matched pair and preferably, four at a time. However, if the tread of a single tire begins to wear unevenly whether due to improper balance or misalignment, you'll have to repeat the process after the condition causing the uneven wear has been corrected. Some-

times a cupped or chafed tire must be ground back into round, a costly procedure in that you'll be losing anywhere up to 10,000 miles worth of tread. Imbalance of the front wheels can be felt in the steering wheel or spotted by a constant jiggling of the hood or aerial. At the rear it evidences itself in a wheel hop that can usually be felt in the accelerator or by someone riding in the rear seat. A tire left unbalanced will soon take on the appearance of a partially eaten slice of cantaloupe.

### Tire Rotation

A few years back the practice of rotating all five tires in a criss-cross pattern every 6000 miles was universally recommended and I cannot deny that it is good practice, particularly since it brings the spare into use on a regular basis. You can argue that if you don't use the spare, you'll only have to buy four tires the next time but the catch is that an unused tire tends to deteriorate, whether it is sitting on the dealer's shelf or in the trunk of your car. Growing lack of emphasis on rotation, though, stems from doubt that the \$3-\$4 cost of the operation is paid back by longer tread life. The answer probably lies in what you have paid for the tires originally; an expensive set is worth rotating whereas a cheap one is not. In any case, all five tires on a new car should be given equal time as a spare.

### Tire Repairs

Tubeless tires which have been in almost universal use since 1955 pose certain repair problems that the old tube made simpler and perhaps because of this, a lot of service stations as well as customers install a tube whenever the tire is removed from the wheel. You shouldn't do this because tubes and the newer tubeless tire aren't designed to live together. Neither should you be tempted to try one of the many "on the wheel" methods of repair being offered except in an emergency because these plugs, very similar in principle to the old method of repairing bicycle tires with glue and a wad of rubber bands, are intended only to get you home where a permanent repair may be more convenient.

For a permanent repair a tubeless tire must be removed from the wheel and the puncture covered with a cold chemical or vulcanized type of patch. If you'll forgive an anomaly, the latter is the more permanent. Unfortunately, very few tires survive a sudden loss of air at more than city-traffic speed. The fabric breaks and if there is evidence of

this on the inside, the tire should not be used again — a warning in itself should rule out plugs as these fabric breaks can't be detected from the outside.

Slight cuts in the rubber, whether they be on the sidewall or in the tread, do no harm as long as they haven't reached the fabric. If the fabric is exposed water will weaken it, with nylon being more resistant to this type of damage than rayon. Recently manufactured tires have tread wear indicators moulded into the pattern (solid cross-bars between the grooves) and if these show, the tire is worn beyond the point of repair. On tires without indicators, you should *not* be able to read the date of a Lincoln-head penny when inserted in the center groove.

### Tires Of The Future

I have stated earlier that the new polyester fabric combined with a fiberglass belt under the tread is generally conceded to be the "standard", general-purpose tire of the near future. However, this is a fast-moving industry and a new miracle fabric or construction could be announced tomorrow. Nylon, particularly in radial form, is still the answer for those who demand the ultimate in safety and vast quantities of rayon will continue to be used in cheaper tires.

The next big breakthrough is coming in the area of a second, "safety" tire within the main one that will not only help preserve car control in a blowout but will enable you to get to the service station without damage to the tire. Goodyear pioneered this tire-within-a-tire concept and the construction is now mandatory on the race track. Firestone is following with a semi-solid substance affixed to the rim that accomplishes much the same purpose. Certainly anything that will eliminate the dangerous necessity of tire repairs on the shoulder of a crowded freeway will receive rapid public acceptance.

If anything there will be more new tire shapes to complicate the purchasing decision as well as the stocking problems of dealers. However, these new shapes are dictated by an improvement in traction which means safety.

As a measure of the progress that may be expected, 45 years ago tires averaged four punctures for a lifetime of 10,000 miles, cost \$2.35 per pound to buy and half-cent per mile to run. Today's tires can go three times as far, are relatively puncture proof, carry twice the load at three times the average speed and despite the inflated dollar, will wear for 10 miles on a half-cent. ●



Reducing cockpit heat was a simple matter of ventilation. After cutting a vent at the base of the rear window, Terry incorporated a ram-air induction system in the passenger footwell, thus establishing a flow-through ventilation pattern.

The faulty Ford shifter linkage, which has a habit of hanging during fast shifts, is soon to be replaced by a Hurst unit. The aforementioned heat problem also took its toll on the padded interior, requiring a heat resistant epoxy for mending. All of these remedies were more imaginative than expensive, with most requiring just a Saturday afternoon of tinkering.

What few people realize, and are surprised to learn, is that the Tuscan is also a fairly practical car. The initial price of \$5,000 plus is somewhat cheaper than many other imported performance cars and service is readily available at any Ford dealership. An average gas consumption of 17 to 20 miles per gallon in city traffic makes the car practical for everyday transportation. During a trip to Watkin's Glen for last year's Grand Prix, Terry recorded 24 mpg on the open road.

Whether it's on or off the track, the Tuscan is one of the more unique cars on the road today. It's basically a fun car — fun to drive and fun to own — and as such, its owner is inclined to look upon its idiosyncrasies with a measure of tolerance. ●

## REPAINTING

 (Continued from Page 47)

### Sanding The Primer

The color coat won't hide a thing, so the finish your repaired spot will have depends on how well you finish off the primed area. Here's where you'll want to use wet sanding. Most modern auto body sandpapers are waterproof, and can be used either wet or dry, but make sure that your finer grades are acceptable for wet use. A trickle from a garden hose is handiest for wetting large areas, but for small spots merely dip a sponge into clear water and wring it out slowly over the work area as you sand. Keep the area wet enough so that the sandpaper floats over the spot without catching and digging in.

After removing the rough edges that were next to the masking tape and any lumps in the primer with No. 360-grit paper, switch to No. 400-grit paper and plenty of water while smoothing the primer out into the undamaged paint surrounding it. Always sand in one direction and do not apply pressure, just lots of smooth steady motion. When your sanding is complete the surface should be absolutely smooth and unbroken right out into the surrounding finish.

### Spraying The Color

The primer should be dried off after sanding and given 24 hours in which to dry completely. Alternately, it can be left dry for a day prior to sanding. Mask off the primed area with tape, placing it just about 1/32-ins. inside the sanded area of the original color coat.

The color finish must be applied evenly and lightly to avoid runs and

sags. Lacquers should be sprayed in four or five very light coats. Enamels may require only one or two. Allow sufficient time for each coat to dry before spraying the next. Start spraying off to one side of the area just as you did when applying the primer. Depress the button fully to avoid incompletely atomized paint, and keep the nozzle about one foot from the work. Pass the spray smoothly over the primed area, being careful not to stop or change directions with the spray directed onto the car. It's a good idea to practice this technique first on a piece of junk metal or wood.

A heat lamp will help the paint to dry quicker, and is a *must* if you are working in temperatures below 65 degrees F. The first coat of lacquer will be dry enough to spray over in five minutes. Wait five minutes before spraying the third coat, 10 minutes before the fourth, and 15 to 20 minutes before applying a fifth coat if one is used. It cannot be emphasized too highly that each coat should be very thin. Do not attempt to cover completely in one or two coats. You'll probably still be able to see the color of the primer even after the third coat if you are spraying lightly enough.

### Rubbing Out

After the touched-up area is repainted, let it dry for 24 hours. The masking tape can be stripped off as soon as the paint is dry. Any fine lines left where the new paint has contacted the masking tape, as well as roughness or dullness in the finish, are removed with

an application of rubbing compound.

In the case of lacquer, any sags or particularly rough spray jobs can be smoothed by wet sanding the spot with No. 600-grit paper. Enamel must never be sanded. Use the rubbing compound on a soft cloth pad and work in spirals, starting at the edges of the repaired area. When the spot has been blended into the car's original finish, work inward until the entire job has a good luster. Rub lightly and avoid applying localized pressure.

After rubbing out, a higher gloss can be obtained by repeating the operation with body polish or a wax containing abrasive cleaners. Enamels, however, should not be waxed for at least two months after they have been applied. Lacquer, on the other hand, should be waxed as soon as possible after rubbing it out.

It might require time and careful work, but if you follow the procedures as outlined you'll end up with as good a touch-up job as you can get in any shop. What's more, you can be sure that the repair is permanent — and *that's* something that you can't say about the job you'd get from 'ol "Blow-Gun Earl," the village collision correcter. Build up your confidence on small jobs and someday you might even become brave enough to repaint your whole car! ●

## HI-PERFORMANCE

(Continued from Page 51)

horsepower engines, the main one being that the insulator tip extends out past the plug shell. This has two effects, one being that the extended length makes the plug a little hotter heat-range-wise. This is helpful in overcoming low speed fouling, and at higher speeds the effect of the cool, fresh mixture sweeping across the insulator that is extended out in the open, so to speak, cools down the insulator tip to prevent it from becoming incandescent, thus causing pre-ignition and in turn detonation. What we have in effect is a dual range plug that is retaining enough heat at lower speeds to burn off deposits that could foul up the plug, and which at higher speeds is transformed into a "cold" plug.

Another good feature of this plug from a design standpoint is the gap style. The gap is at the side of the center electrode and this type of design offers good idling and acceleration plus better spark at higher rpm's. This type of electrode design also is beneficial in



making the plug less prone to fouling, both at low speeds as well as when running with rich mixtures. The side electrode plug will, though, tend to have faster electrode wear as compared to a normal plug.

So how do you go about selecting the right plug for your engine? You go "cold" and start from there. If you have fouling problems, go up to a hotter type plug until you get the right coloring on the insulator, which should be a light brown. The obvious logic to this is that if you started out with a "hot" plug, and it was too hot, the holes burned in your pistons would tell you that you started out on the wrong end of the heat range, which is a pretty expensive way of finding out.

Now, a word to the wise about how to "read" the coloring of spark plugs. To be able to get any kind of reading on a plug, the car must be wound up through the gears and while it is still pulling under load the key must be switched off and at the same time, the clutch pedal shoved in. This enables the engine to be "cut clean" and you can then pull the plugs and take a reading. If they are white, this could mean that you have too hot a plug, too lean a

mixture or too much advance. If they are brown, then things are in order. If they are black you can have too cold a plug, too rich a mixture and in some cases, leaky piston rings. As you can see, "reading" a plug will tell you more than what the heat range of the plug should be; the plug will actually tell you what is going on inside the combustion chamber. It takes plenty of experience to be able to tell what is what. If your plugs are white, you can go down to one or two steps colder or if this does not help, start coming up on your main jets, and so on.

My own suggestions are as follows: Use Bosch W175T1 or W225T1 for stock VW engines and Bosch T-7 series plugs (side electrode) for higher horsepower engines. Keep in mind that the T-7 series has various heat ranges. For all out racing, either long distance or drag strip, the racing plug with its inside electrode is used. Also keep in mind that the "racing" plug is a cold one and more prone to fouling. Even with a racing engine, if you are continually fouling up plugs you may run out of heat ranges and be forced to go to another type of design that will serve your purpose better. ●



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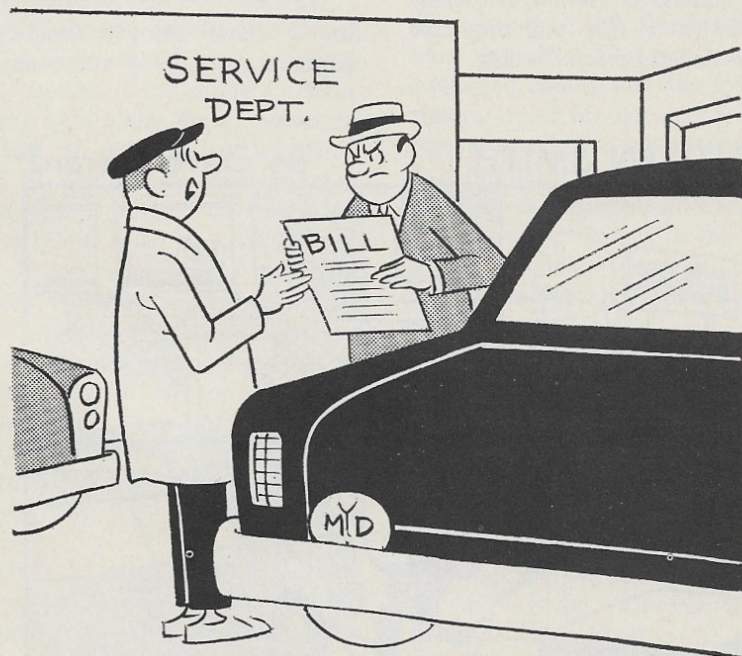
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### OFF THE RECORD

By Ed Reed



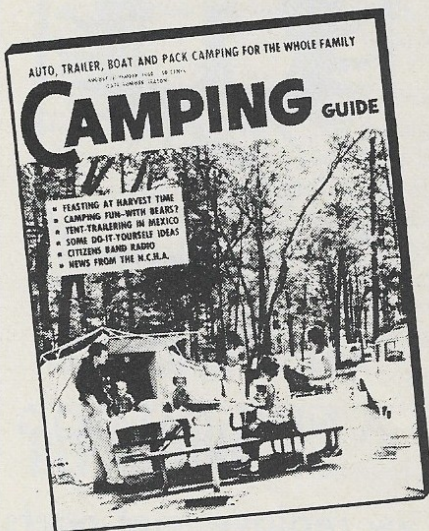
ED REED

The Register  
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"You must realize Dr. Lewis, that we had it in the intensive care section for three days."



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## READER'S FORUM

(Continued from Page 7)

through special Lotus reps for military personnel at a price considerably less than the \$6,000 you quoted. And finally, when will the Jensen FF and Interceptor be imported into the U.S. and who will be their authorized distributor? Your magazine is constantly improving. Keep up the good work.

Thomas J. Saunders  
North Las Vegas, Nev.

Thanks for the information, Mr. Saunders, but let's not create another "Operation Intercept" at our borders. As to the Jensen, it's already legal but you'll have to write to them at Jensen Motors Ltd., West Bromwich, Staffs., England to find out about their plans for U.S. distribution. But back to the Minis, who is it that we can contact to get one?

### Kit Lotuses?

Sirs: I've just heard that it's possible to buy automobiles such as the Lotus Super 7 in kit form. Is this a fact or is it just a rumor? If it is a fact, might you know who has a listing of these kits and might I get a hold of one?

Dave Mattox  
Flagstaff, Ariz.

Lotus's address is Hethel, Norwich, England and we're sure that they can give you the necessary information.

### Formula Vee

Sirs: In the November issue of WCG you have coverage of the Formula Vee race at Nurburg Ring. I'm very interested in this kind of racing and would like to build or buy a car. Therefore I'd appreciate any information you could give me on such things as rules and specifications, where some of the tracks are located and if there are any in Arizona. Any information at all will be appreciated.

Larry Simpson  
Leesville, La.

If you'll write Don Cheesman, Director, Formula Vee International, 1347 Fairmont Ave., East Wenatchee, Wash. 98801 and enclose a large, stamped, self-addressed envelope, they'll send you a primer on Formula Vee including a list of those who manufacture kits and complete cars. FVI charges a very nominal amount for membership and puts out a monthly newsletter giving race dates, etc. and most importantly, technical information. It would be difficult to seriously race Vees in this country without being a member as you wouldn't be able to keep up with the latest specs, legal and illegal. Also, to further complicate matters, a new formula called Super Vee has started, using current 1,600-cc Volkswagen engines and FVI can undoubtedly keep you posted on that as well.

### Where Was The Porsche 2.2?

Sirs: I have enjoyed reading your magazine since 1965 and today, seeing

## CITIZEN SMITH

By Dave Gerard



"A yellow convertible, he says . . . no bashed-in fenders, he says . . . not a scratch on it anyplace, he says . . . that's what HE thinks!!!"



the words "2.2-liter Porsche" on the cover (Dec. '69) I bought it expecting to read about the car. To my dismay, however, there was not one word about the car inside the magazine. I'm returning the magazine herewith. I don't want my money back but when you get around to writing about the Porsche 2.2, you can send me a free copy.

Joel Conrad  
Chicago, Ill.

Your proposition is a fair one and you already should have received your copy of the January, 1970, issue of WCG that does contain an article on the T, E and S 2.2 liter Porsches. This sort of thing happens occasionally to any magazine and it was not an oversight. Articles "blurbled" on the cover are the most interesting ones either in hand or

*promised. In this case, the newly formed Porsche/Audi Division had promised us material on the cars in question, but due to their internal problems they failed to produce by presstime. The cover, you see, is printed well ahead of the magazine body. Auto companies understandably try to time their publicity to the appearance of cars in dealer showrooms. If something goes wrong, they postpone the publicity. A magazine either goes along with this or "breaks" the release, the latter procedure inevitably resulting in strained relations with the manufacturer. We would then have to gather our data side-by-side with customers in dealer showrooms and the article wouldn't appear until two months later when it is no longer news.*

## TECH CLINIC

(Continued from Page 49)

*air-conditioning units specializing in VW installations, which indicates that there may have been need for better design liaison. However, let reader Al McCauley of Pasadena, Calif., tell the other side of the story. We quote from his recent letter: "Be advised that my bug just sold this summer - a '61 with 117,500 miles on it and still showing 140 psi compression in each cylinder - had a Volksair air conditioner on it from the beginning. It was never a source of trouble to me, either from the standpoint of robbing me of power or gas mileage. In fact, on one trip from Flagstaff to Needles at a steady pace of 55 to 60 mph, I averages 42+ miles per gallon. Around town I could always plan on 27 and while on the road with no special regard to saving gas, 31-35 mpg was no problem whatever. Around town I could notice it when the air conditioner cut in but on the road, unless on a pull, I was not particularly aware of it. I did have to increase the idling speed of the engine slightly for use around town."*

**COMMENT:** In your Nov. '69 issue the report on the '70 VW's says that they've added an enrichment device for the injected engine and a modified starting system. Well, it's about time! I have a '68 squareback that when the weather is cold, stalls and backfires and stalls and backfires. If the new system is any good, VW should call back all '68 and '69 Type III's. This is a defect and

should be treated as such at no cost to present owners. I'm a volunteer fireman and have some job trying to get this car to run to the firehouse. It stutters and backfires all the way. I'm a subscriber to your magazine and a member of the Volkswagen Club of America so thanks for taking the time to read this gripe.

Clyde F. McMurdy  
Wayne, N.J.

### Volvo

**QUESTION:** I have a '67 Volvo wagon with a hydraulic clutch. I have not been able to find from any manual or dealer the correct travel dimension for the slave cylinder. The service manager I contacted claims that the cylinder will always travel the correct stroke at the correct speed or it will not move at all. I find this hard to accept. Can you supply the correct dimensions? Can you also express an opinion as to the possibility of a marginal (possibly by-passing) master or slave cylinder causing abnormal clutch wear?

Edward Zawatson  
Fairview Park, Ohio

**ANSWER:** There are two adjustments for the clutch on your car that indirectly affect the function of the slave cylinder. One is clutch fork travel and there are two adjusting nuts for this that lock on the slave cylinder shaft at the bell housing. The clearance between the nut and lever with the clutch released should be 3 to 4mm (0.12 to 0.16 ins.). Too little clearance will cause the clutch to not fully disengage and also to slip. Too much clearance will cause it to not disengage and you will hear gears grating. In either case, accelerated clutch wear will result. The

(Continued on Page 63)

## AUTHORITATIVE TECHNICAL MANUALS ON VOLKSWAGEN AND PORSCHE CARS

By HENRY ELFRINK

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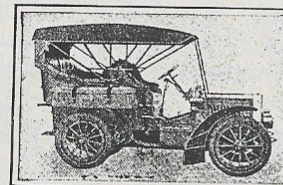
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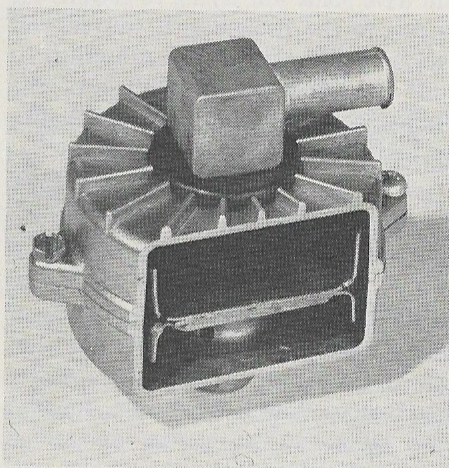
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(Continued on Page 64)



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# TECH CLINIC

(Continued from Page 61)

other adjustment is simpler, and one or both of them could be your problem. Clutch pedal play on your Volvo is measured by the distance from the bottom of the pedal pad to the floor, which should be 5½ inches. This adjustment is corrected by two nuts at the point where the "piano" pedal goes into the master cylinder. Remember that if faulty adjustment in the past has caused a badly worn clutch disc, no amount of corrective adjustment now will help. Chalk this one up to one service manager who would be out of his water repairing roller skates. ●

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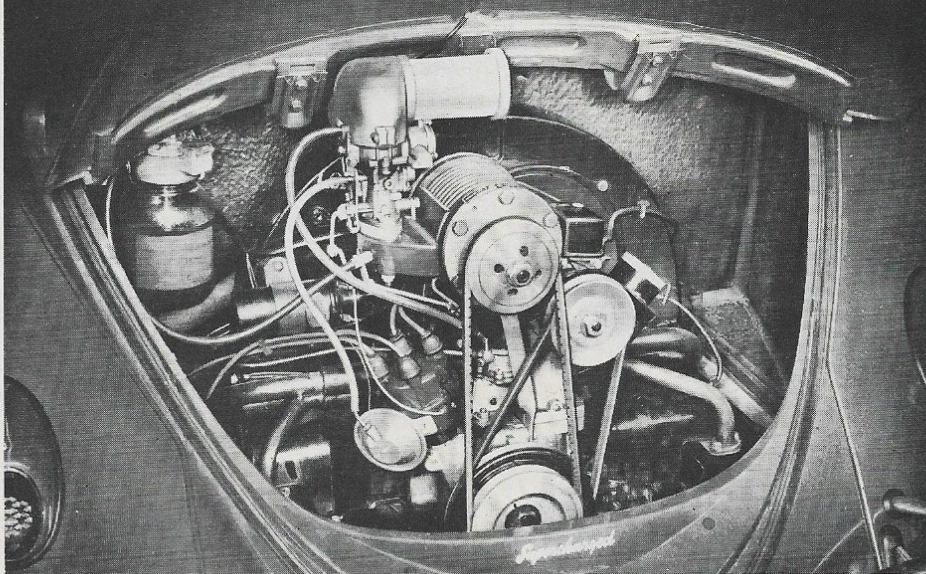
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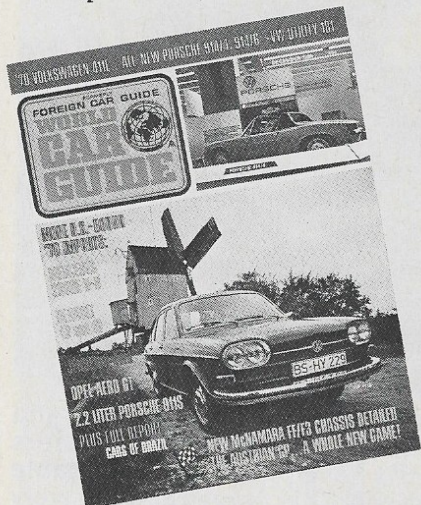
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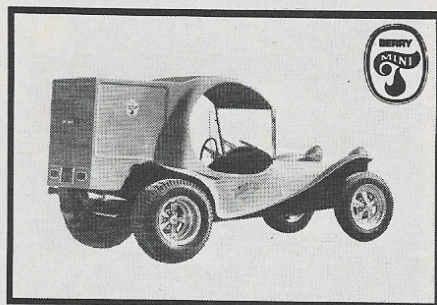
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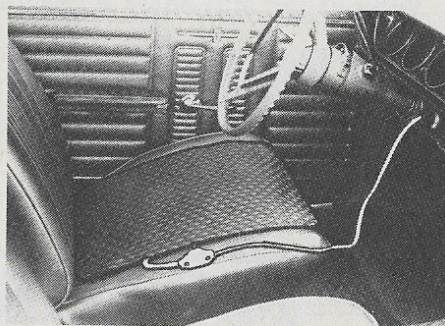
(Continued from Page 62)

installed in minutes by amateur mechanics. It's priced at \$7.95 plus \$1 for postage and handling from Milwaukee Sprayer Manufacturing Co., Dept. WCG, 2437 W. Fond du Lac Ave., Milwaukee, Wis. 53206.



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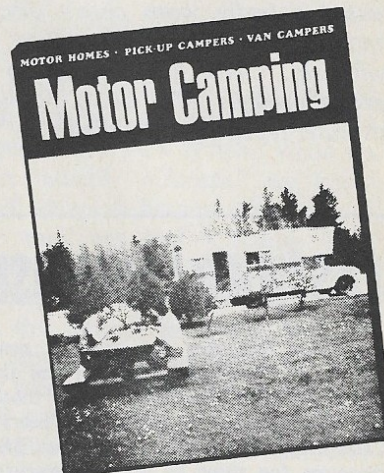
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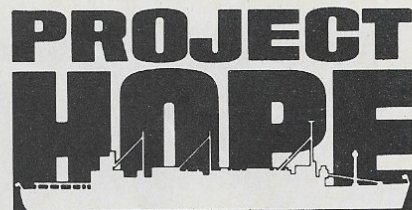
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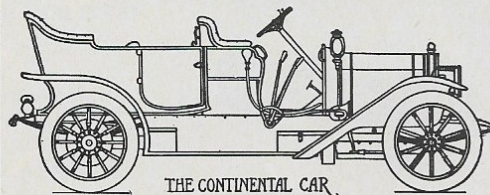
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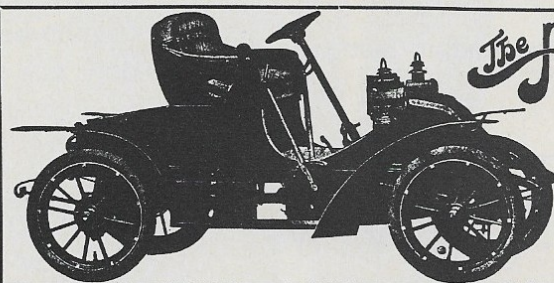
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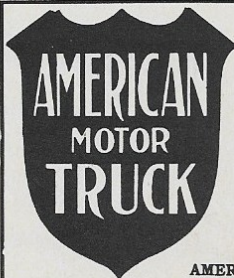
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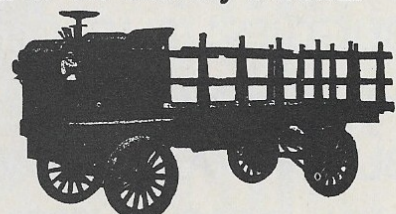
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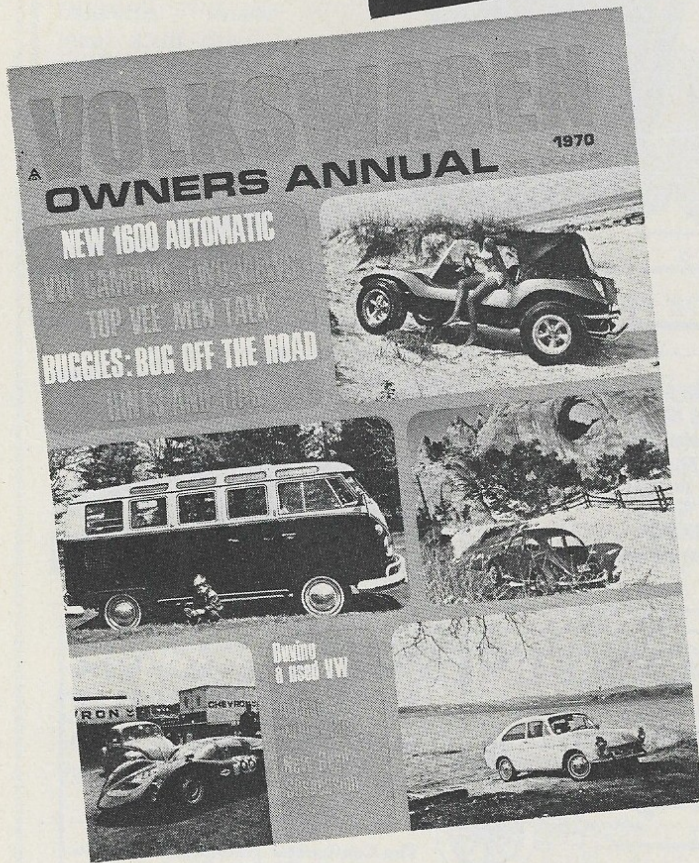
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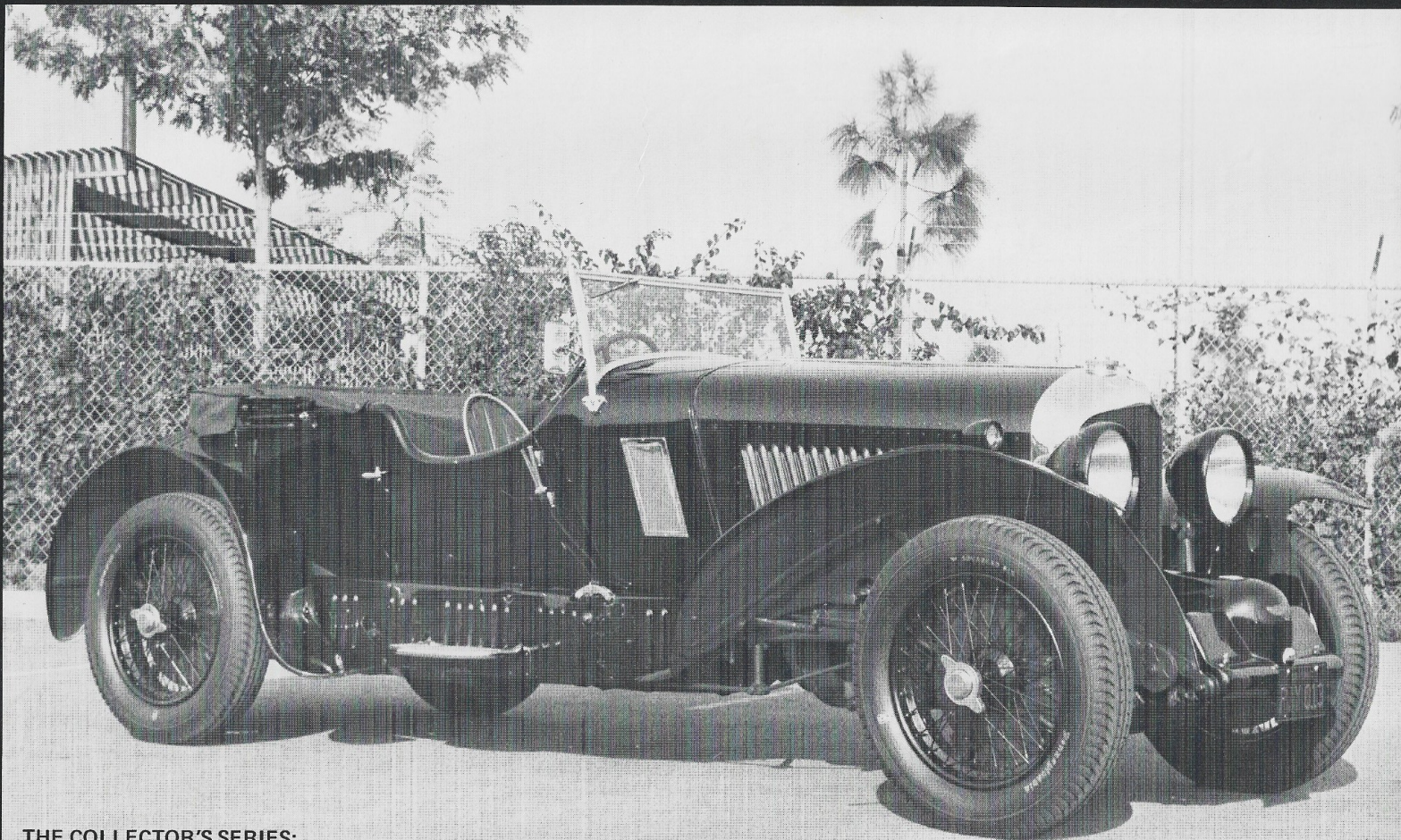
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