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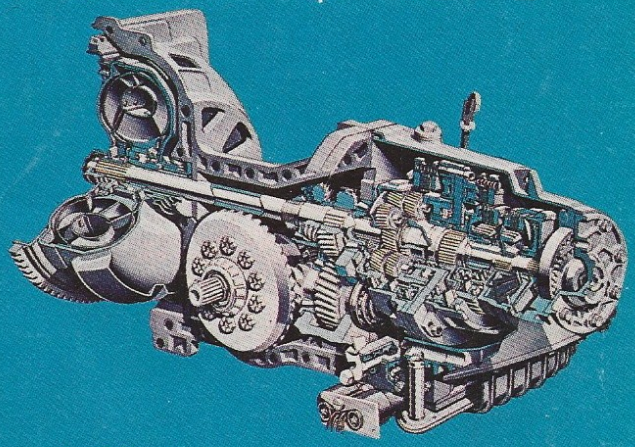
WORLD CAR GUIDE

JUNE 1970 60c



Renault 16 Automatic

ROAD TESTS: VW 411 E Variant • Jaguar XJ6 • Renault 16 Automatic • 70½ Gremlin

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Special Report: *Was The VW Invented in Cleveland ???*

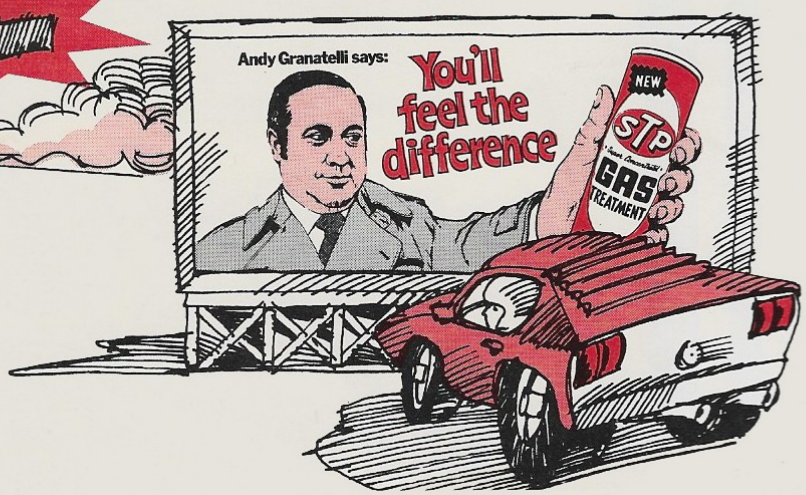
Jaguar XJ6

Keep that old spark alive.

If you and your car have something going, like love of the open road, consider this proposal. STP Gasoline Treatment.

Underneath that lovable red exterior lurks a fast-working solution that gives troublesome engine and fuel line deposits a fast brush-off. STP® Gas Treatment cleans and tunes your engine as you drive. Restores all the pep and power you expect from that four-wheel flame.

Next time you fill 'er up, try STP Gas Treatment in your tank. If that doesn't light her fire, nothing will.



WORLD CAR GUIDE

June, 1970 No. 148

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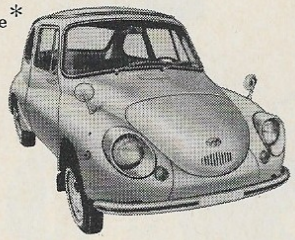
Subaru 360

Scoots up to 70 mph, gets anywhere on a teacup of gas, and seats four in style.

SPECIFICATIONS: 4-speed transmission, heater/defroster, push-out rear windows, padded dash, concealed radio antenna, fully reclining vinyl seats, independent 4-wheel suspension.

$1,297 poe*

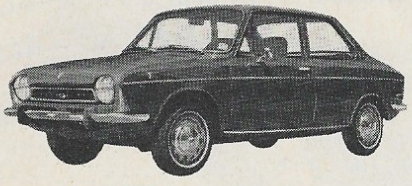


The Star 2-Door

Road-taming elegance and economy. Zero to 60 in 13.9 seconds, cruises at 70, and rockets to 90!

SPECIFICATIONS: Front-engine, front-wheel drive, complete safety package, hazard lights, reclining seats, 2-speed windshield wiper/washer, vinyl interior, back-up lights.

$1,699 poe*



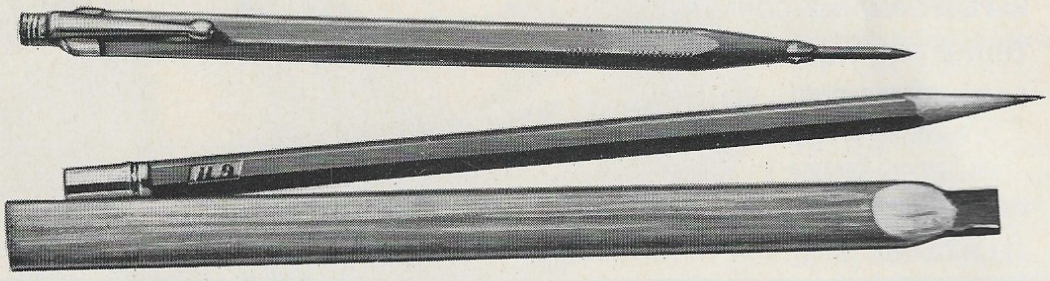
The Star 4-Door

Luxury, comfort, styling with ultra-wide doors, flat floors in the rear for more leg room, and a unique dual radiator system.

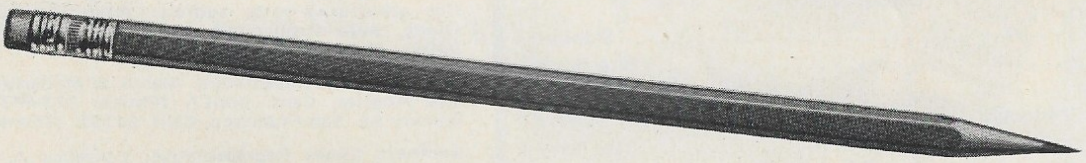
SPECIFICATIONS: Independent 4-wheel suspension, front-wheel drive, courtesy lights, flow-through air, rear-opening windows, bumper guards, and 18 cu. ft. trunk.

$1,799 poe*

OK Detroit:



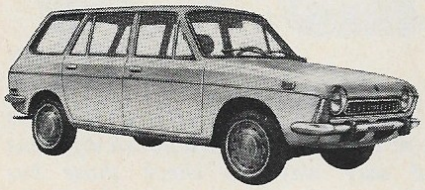
Grab your pencils and start copying...



The Star Wagon

Luxury and utility in a family-size station wagon. And, at a price any family can afford!
SPECIFICATIONS: Seats two or five. Complete with 4-cylinder, 4-stroke, horizontally opposed engine, dual radiator system, 4-speed synchromesh transmission, heater / defroster, foam cushion seats.

$1,899 poe*



The Subaru Van

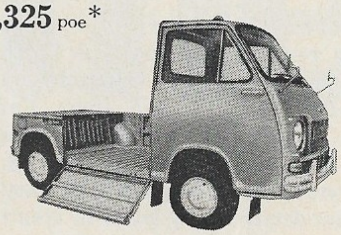
The only 5-door import van in the country—a mighty midget that'll haul four people plus a big payload, anywhere, on drops of regular gas.
SPECIFICATIONS: Hauls two or four with fold-down rear seat, 900 lb. payload capacity, heater/defroster, dual wiper/washers.

$1,397 poe*

The Subaru Truck

Perfect for deliveries in city traffic or suburbs, in-plant and between-plant transit or on-site construction jobs.
SPECIFICATIONS: Removable side gate, heavy gauge steel 2-level bed, hauls two passengers, 900 lb. payload capacity, heavy duty chassis, outside mirror, mud flaps.

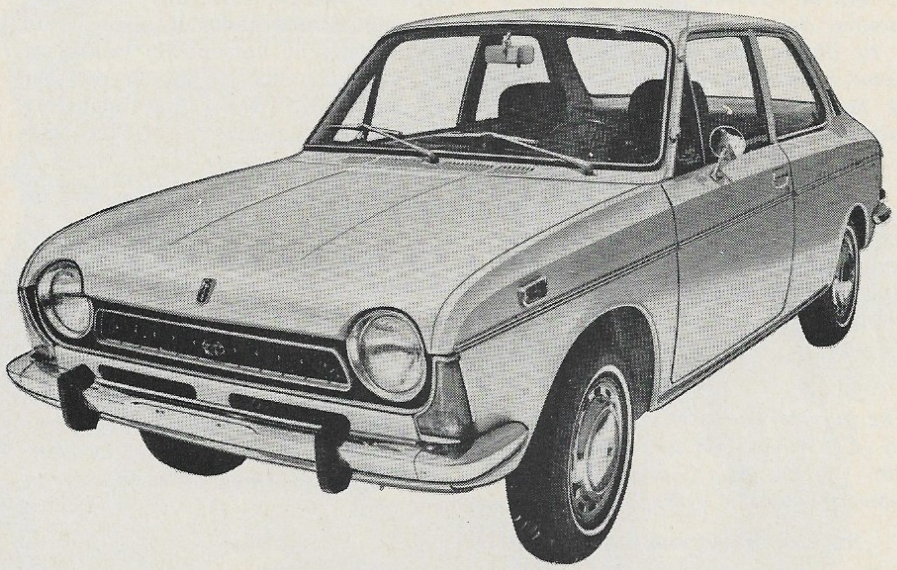
$1,325 poe*



We're not a bit surprised that the midnight oil began to burn in Motor City . . . once The Star arrived. The Subaru Star is something special. A sporty little car shining in a class all its own . . . an amazingly comfortable cross between a spunky sports machine and a luxurously appointed family-sized automobile.

Carpeting, flow-through ventilation, all-vinyl interiors, reclining front seats and a gigantic 18-cubic foot trunk . . . these make The Star beautiful to own.

Front-wheel, front-engine drive, independent 4-wheel suspension, dual radiator system for faster warm-ups and no overheating . . . these make a Star beautiful to drive. And **$1699** poe* . . . makes a Star just beautiful!



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The only family of cars starting at ***$1297*** poe*

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* Based upon manufacturer's suggested retail price. Federal taxes included. State and local taxes, destination charges, options excluded.

READER'S FORUM

Can't Get a M-B 250C

Sirs: I am presently stationed in Spain and while here would like to purchase a Mercedes-Benz 250C to U.S. specs. I'm getting a run-around over here about this car not being available to U.S. specs. I wrote the company and they either misunderstood my letter or aren't saying. Do you know if the 250C is made to U.S. specs for delivery in Europe? Thank you.

Lt. John C. Cook
FPO New York 09540

You are getting a run-around in a sense, but it's an official one. M-B 250C's sold on the European market to Europeans are quite different from the model exported to the U.S., and European dealers don't have parts to service the latter. As of June, 1970, the 250C will be released for the first time for tourist delivery and you should be able to obtain one then. You can't, however, have it delivered to Spain. You must take delivery in a neighboring country and bring it in yourself.

Australian Dune Buggy

Sirs: In the Dec. '69 issue of WCG there is an article on an Australian dune buggy. I would like to know what part of Australia the picture on page 38 was taken?

Ron Markell
Mentor, Ohio

The picture was taken by the author, Brian C. Wilson, in the vicinity of Curtin, Australian Capital Territory (Canberra) where he lives.

Stick to Showroom Stock

Sirs: You have a good magazine with an interesting variety of U.S. and imported cars plus a first-hand look at cars to come. Please keep it that way. Don't clutter it up with stories on dune buggies, homebuilt hot rods and professional race-track happenings. There are plenty of other magazines around full of that stuff. Stay with showroom vehicles that are available to the public. How about an article on the Auburn-Cord-Duesenberg Co. in Tulsa, Oklahoma? They make replicas of the old favorites and I never hear much about them. Keep up the good work. My subscription has been sent in.

James Grunchy
San Aranasco, Calif.

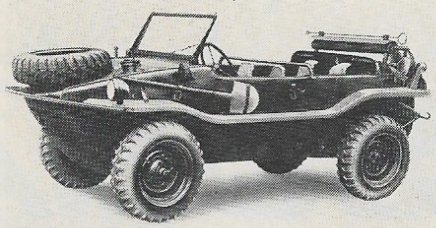
We wouldn't call the current Cord and Auburn replicars exactly showroom stock but we do plan an article on all the replicars on the market today. It will include these two, the Williams which vaguely resembles a Stutz Bearcat, Alfa and Bugatti replicas, the latest Excaliburs which are patterned after the Mercedes SSK, the Glassic which looks like a Model A Ford and many other little known makes. The advantage of all of them is that they use modern domestic powerplants and running gear and thus may be easily serviced. While relatively expensive, they give a lot of the flavor of the real thing at a fraction of the cost.

Schwimmkubels and Studebakers

Sirs: In your Nov. '69 issue you had an article on a wartime overland car called the Kubelwagen. However, Prof. Porsche also designed and produced another vehicle for the war, the amphibious *Schwimmkubel* which was a watertight VW with snorkel and propeller. I was wondering if you have or plan to do an article on this vehicle. I would like to hear more about it. It's mentioned in "Small Wonder: The Amazing Story of the Volkswagen" by Walter Nelson (Little, Brown and Company, 1965) but not much is told about it. Also, could you tell me the horsepower ratings of the 259.2 and 289 cu. ins. Studebaker V-8s of 1960? I enjoy your magazine very much and thanks for the informative articles in it.

Don Mattox
Afton, N. Y.

We're printing a picture here on the Schwimmkubel for the second time in recent months as many readers have inquired about this amphibian and its companion dry-land car, the Kubelwagen. Officially the Schwimmer was Type 166 and the Kubelwagen, Type 82. Raymond J. Van Giesen of Lumberton, N.C. is an American authority on



these vehicles and he has recently purchased two Type 82s and a Type 166 for his collection of cars. When they have been put in presentable condition, he has offered to work with us on a more complete article than has heretofore been published. Horsepower ratings on the Studebakers were 165 and 175, respectively. Thanks, too, for your kind comments.

Those Bus Batteries Again

Sirs: Since the matter is occasionally mentioned in various publications(including your March, 1970 issue on page 49) I thought you might wish to publish this hint for checking the water level in the VW bus battery. I use a small mirror such as from a woman's handbag and a flashlight aimed at the mirror to catch the reflection of the water level in the battery. This way neither the air cleaner nor the battery need be removed.

M. W. Curry
Clairton, Pa.

Thanks to Mr. Curry and others we're now armed with a dozen different and easy ways to check those bus batteries. Mr. Curry's, though, is the only one so far that doesn't require the purchase of a special device. A Dr. Robertson of Fort Bragg, N.C., uses his battery-powered laryngoscope but as these cost $40, this isn't a solution for everyone.

The Morgan Plus 8

Sirs: After reading the July '69 issue of WCG I became very interested in the Morgan Plus 8. I realize it may not be available in the U.S. yet but I'd greatly appreciate it if you could give me the name and address of their distributor if he is still in business. If at all possible I'd like to purchase a Morgan Plus 8 when I return from Viet Nam. I owned a 4+4 which I had to sell before being sent over here.

W. C. Van Dervoort
FPO San Francisco 96602

Sgt. Van Dervoort's letter is one of many we received after printing the Morgan Plus 8 road test. This is the new model with the ex-Buick aluminum block V-8 which is also now used in the Rover. The distributor, Open Road West, Inc., is very much in business, currently specializing in selling used Morgans. They tell us that emission control is not a problem as Rover has qualified the engine. They also say that Morgan is working on meeting crash test requirements and that Plus 8's along with the venerable 4+4 may be available in this country by the end of the year. They'll keep you advised if you express your interest to Mr. Ruel Sutton, Pres., Open Road West, Inc., 3020 Santa Monica Blvd., Santa Monica, CAlif. 90404. Please say that WCG told you.

And Also the Hanomag

Sirs: I'm interested in purchasing a Hanomag F25 to make into a camper. Has this car ever been road tested? If

(Continued on Page 31)

Their NGK is the same.

It's a fact. The beauty and the bug are both turned on by the same NGK spark plug.

That's pretty well pleasing everybody. It just goes to show that NGK's wide heat-range pays off.

Down deep an NGK spark plug is radically different with its central core of copper (instead of commonly used iron). NGK's heart of copper dissipates heat more quickly, more evenly. Thus, regardless of a hot or cold engine, hot or cold weather, or normal or high performance driving, the NGK plug delivers a constant, wide ranging performance. Fouling and misfires are cut way down. Along with gas waste, tip wear, pre-ignition. And you can go longer between tune ups.

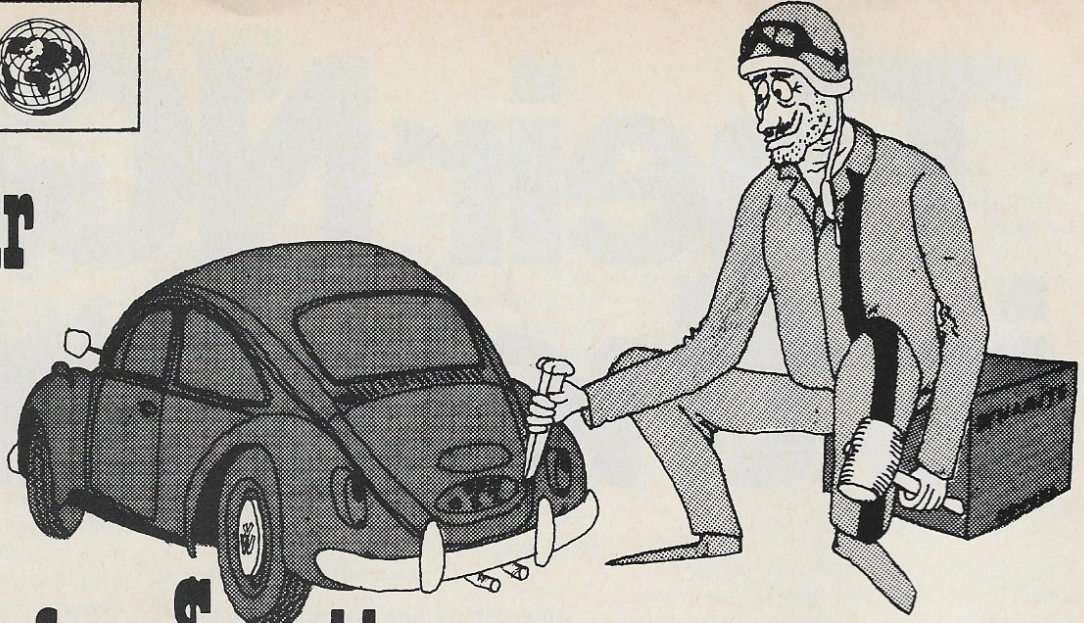
And NGK plugs don't cost a cent more.

Remember, no matter how much your car cost, the price of the NGK's stays the same.

NGK Spark Plugs (U.S.A.) Inc., 4010 Sawtelle Boulevard, Los Angeles, California 90066.

NGK

Rebuild Your VW Engine This Weekend.....for $60 !!



by Tom Spain

The forty horsepower VW is a very simple, easy to work on piece of machinery. Many owners, accustomed to more complicated powerplants, fail to realize how simple and inexpensive it is to do extensive repair work.

Most VW engines eventually reach a stage where they are no longer dependable, hard to start and drip or burn oil long before they actually quit due to some major mechanical failure. Completely rebuilding an ailing engine costs only a little more than a thorough servicing and tune-up, and, contrary to popular belief, only a few special tools are needed. The job is simplified by delegating the more specialized work to machine shops equipped to handle it.

A lack of metric wrenches is no problem as you can find an American size to fit most metric bolts. For instance, 1/2 in. and 13mm are almost exactly the same, as are 9/16 in. and 14mm, and 11/16 in. and 17mm. You will need only a 10mm open-end and a 15mm socket, which can be purchased from Sears' catalog if you can't borrow them. Parts come to just under $40, leaving $20 for the valve job, tool rental, etc.

In addition, you will need the following:

1. At least two jack stands (the front of the car can be blocked up with pieces of 2 x 6 nailed together).
2. A scissors jack, and several blocks of wood to lower the engine.
3. Some kerosene and a wire brush for cleaning parts.
4. A water hose with a nozzle.
5. A 1-7/16 in. socket and two pieces of flat steel an inch or so wide and about three feet long to remove the flywheel.
6. A torque wrench, which can be rented for about $1.50 a day.

The numerous VW repair manuals are very good, but they assume a previous knowledge and don't go into enough detail for the novice. Most specify the exact tool for the job, and sometimes fail to mention the short cuts that are available if you don't wish to buy a special tool for one-time use. I suggest that you purchase a manual that covers your VW model from one of the advertisers in this magazine and use it as a reference should you not fully understand any of the procedures outlined in this article.

The following is a step-by-step process which covers everything from removal to installation, and stays away from the "accepted" methods that would be used in a fully equipped machine shop. If you know the basic components of an engine, how they work and what they do, you can do the job without much trouble. If a problem does arise, most VW mechanics are friendly and willing to offer free advice.

While the methods of engine removal may differ slightly, this information applies to buses and Karmann Ghias built from 1961 through 1965 as well as the familiar beetle and many dune buggies.

Removal of the Engine

The car should be on a hard surface, level, and raised so that the rear bumper is at least 26 inches off the ground, and the oil drained from the engine. Remove the hood, being careful of the spring which holds it open, and both rear tires. Disconnect the battery. Remove the air cleaner and loosen the throttle cable clamp near the base of the carburetor. Push the spring sleeve toward the front of the car and work the little split washer off the cable. Now you can remove the sleeve, spring and washer, and pull the cable from the clamp.

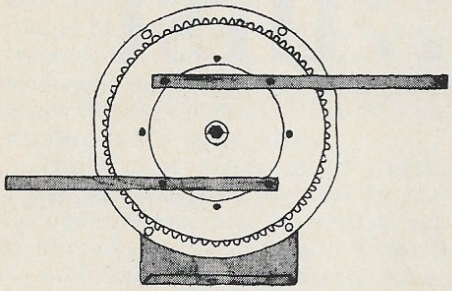
Next, remove the distributor cap and wires. Remove the screws holding the rear splash pan and pull it out. Disconnect the wires from the generator, coil, carburetor and oil pressure switch, and label each with masking tape or tags. Crawl under the car and remove the two lower engine mount nuts from their studs, located just inside the ends of the Y-shaped frame member which supports the transmission. Find where the flexible gas line meets the steel one and pull them apart. Have a round pencil handy to plug the line if gas leaks out.

Reach up over the transmission and find the throttle cable. Pull it free of the engine while someone guides it from the rear. Using a small screwdriver, disconnect the two heater control cables near the ends of the Y-shaped frame member. Directly above these, pull off the two large flexible heater hoses.

Out from under the car again, remove the fuel lines from the fuel pump and set them aside. Using a 13mm (1/2 in.) socket, remove the nut which holds the distributor clamp to the case and the vacuum advance hose, and pull the distributor straight out. You may have to pry up on it slightly with a screwdriver to work it loose. Then fish the small spring out of the distributor drive pinion. Remove the carburetor. Always replace all nuts on their studs whenever possible.

The engine is now ready to come out. Using a concrete block and/or pieces of wood, locate the scissors jack directly under the oil drain plug so that it is one inch below the engine and has about two inches of upward travel left. Reach around behind the fan housing and remove the two upper engine mount nuts, using a 17mm (11/16 in.) open-end wrench. If the bolts turn, it's much easier to hold them from the top. To get to them, remove the front splash shield which is in an upright position

behind the engine. It's held in place by three screws at its base and two sheetmetal clips which snap over the engine mounting flange. With the screws removed it pulls straight up, leaving easy access to the bolts behind. With the nuts off, push the bolts back out of the way but do not try to remove them completely.



A. Two flat steel bars across the flywheel in opposite directions make handles to facilitate loosening the center nut. Fig. 1

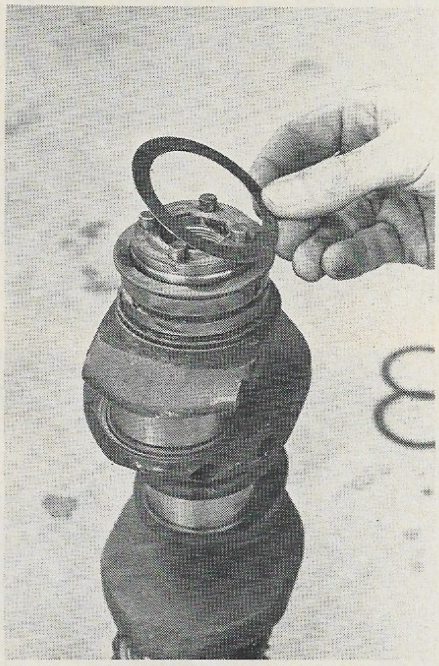
Lowering the engine from the car is a three-man job. Standing one person on each side, each should grab the engine with one hand on a tail pipe and the other on a front exhaust pipe or heater duct, and rock it side to side and up and down until it breaks free from the transmission. Then have the third person raise the jack and slide the engine back until it clears the transmission mainshaft. With two people still balancing the engine, lower the jack to the bottom of its travel, moving the engine as necessary to clear the body panels.

The next step takes brute strength. While the two people balancing the engine pick straight up, have the third man pull the jack out. Repeat this process until all the blocks are removed and the engine is resting on the ground. Slide the engine from under the car and move it to a work bench or a clean garage floor for disassembly.

Disassembly

Using a 13mm socket and open-end wrench, loosen the strap clamp around the generator and generator tower and slide it toward the fan housing. Turn the engine until a slot appears in the front half of the generator pulley. Insert a screwdriver and loosen the pulley nut with a sparkplug socket. Carefully pull the rear half of the pulley off, and don't lose any of the adjusting shims. Remove the fan belt and replace the pulley and shims for safe-keeping. Pull the throttle cable tube out. Remove the screw at each end of the fan housing and the entire housing and generator will lift straight up and off as a unit. Using the 10mm wrench, remove the four nuts (on the heads) and four bolts (at the exhaust heater tube) and lift off the intake manifold.

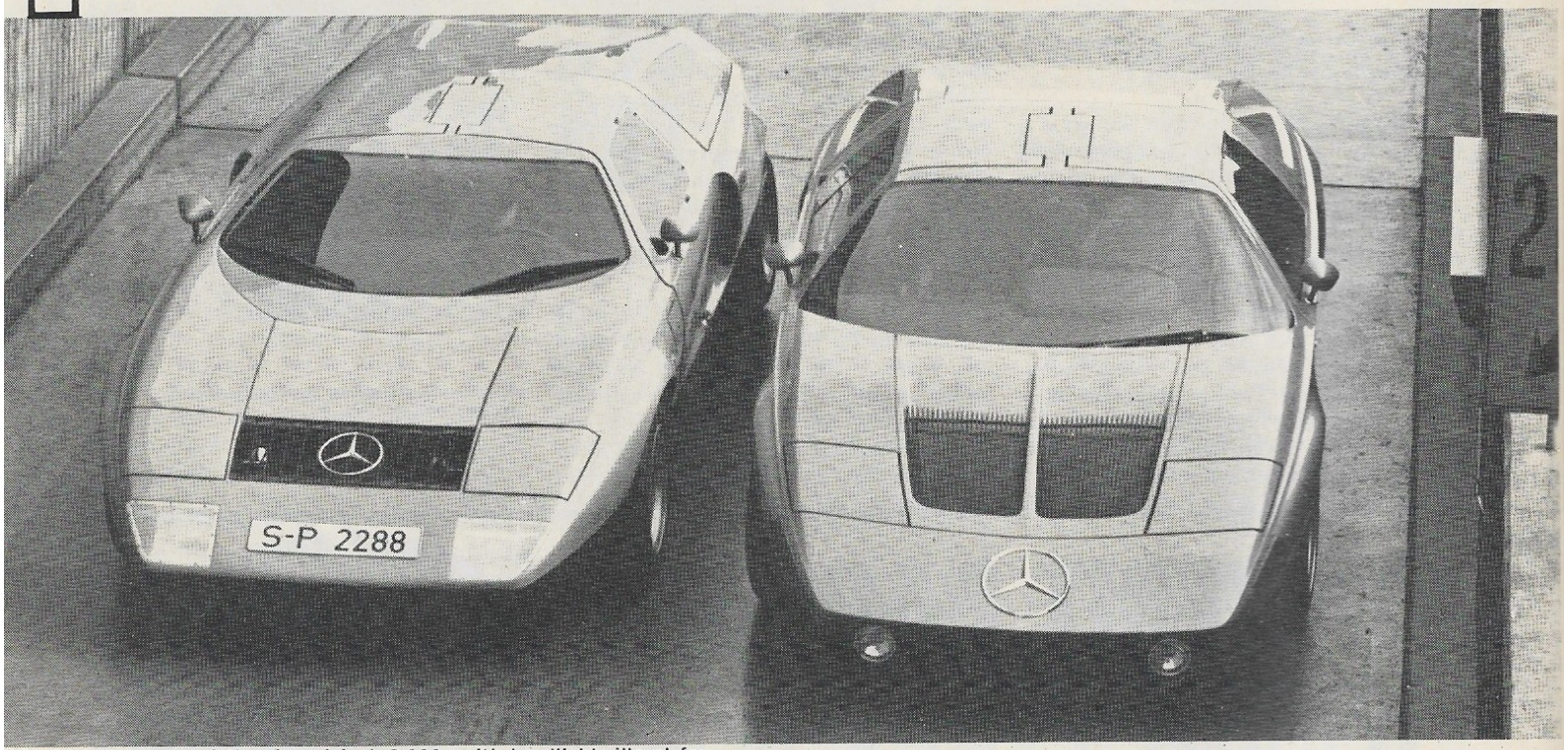
Remove the various screws holding the sheetmetal pieces on and lift them off. Inspect the muffler and exhaust pipes, poking them with a screwdriver. If any parts are rusted thin, they will need to be replaced, adding $12–$20 to the total cost. If all appear serviceable, squirt some Liquid Wrench or brake fluid on all the clamps and nuts on the exhaust system and let them soak. Remove the fuel pump, generator tower and oil cooler. There are three 10mm nuts holding the oil cooler on, two under it and one on top.



B. Crankshaft shims should be saved for use in re-assembly. Fig. 2

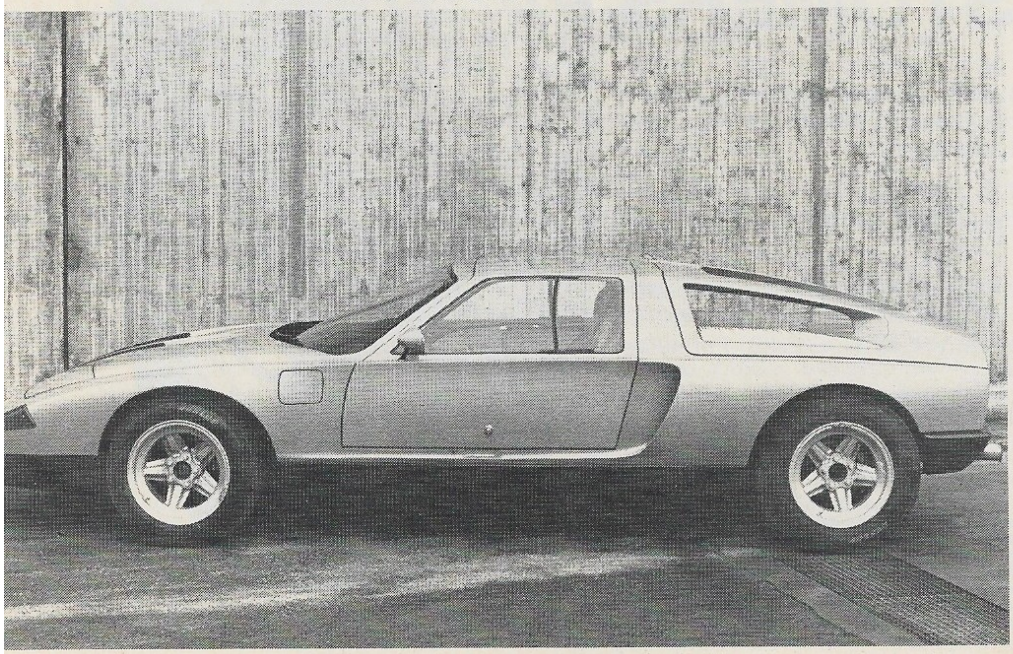
(Continued on Page 34)

MERCEDES-BENZ C-111 Mk II...first 4-ROTOR WANKEL



OP: At left is one of the six original C-111s with headlights illegal for reet use and relatively restricted visibility. The new model, right, medies these defects.

BOTTOM: With a 103.1-inch wheelbase, 174.8-inch overall length and a curb weight of 2,734 lbs. the C-111 is claimed capable of 186 mph and zero to 60 in 4.8 seconds.



After building only six of the projected 50 of the original C-111s, Mercedes-Benz engineers have completely restyled the fiberglass body and a new four-rotor Wankel engine in numbers seven and eight. These latest versions made their debut at the Geneva Auto Show and one of them followed up with an appearance at the New York International Show.

The engine, which is the world's first four-chamber execution of the Wankel principle, weighs only 397 pounds complete with starter, alternator and air cleaner. Conventional V-8 engines producing the same 400 horsepower weigh approximately 700 pounds.

The new cars stand only 44.1 inches high and have a curb weight of 2,734 pounds compared to 2,425 pounds for the original. The four-rotor version can accelerate from zero to 60 mph in 4.8 seconds, as opposed to the 4.9 of the first models, and top speed has been increased by 24 mph over the 162 mph of the 335-horsepower three-rotor version.

The body of the mid-engined car has been subject to considerable revision. The new C-111s are 8.3 inches longer at 174.8 inches overall, a little wider than the original's 70.9 inches and fractionally higher, standing 44.1 inches at the curb. The interior has been considerably civilized even though officials keep stating that there are no plans to build these coupes in series production. Immediately before or after making that statement, they'll also say that there are no plans to race them, either.

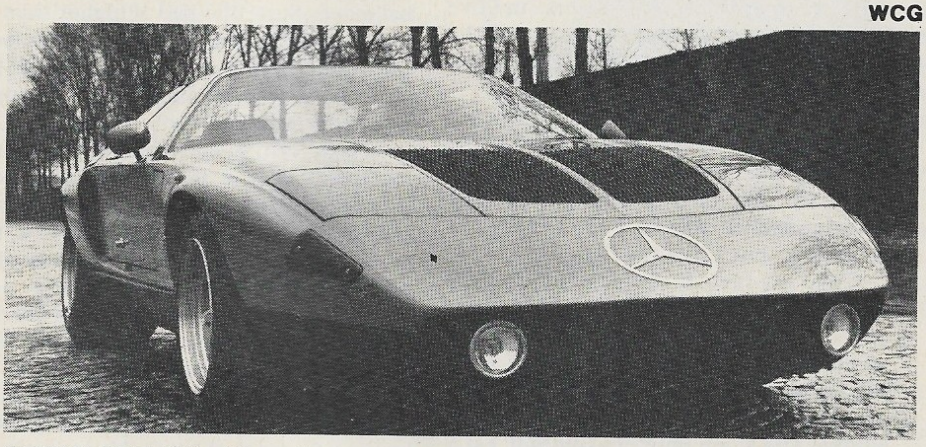
The Wankel engine in its various forms as pioneered by NSU in production and now used by them as well as Mercedes and Toyo-Kogyo's Mazda is by now familiar to most readers. Power is provided by triangular-shaped rotors which spin inside an aluminum housing, each bank requiring a single injector nozzle and spark plug even though it is the equivalent of three cylinders. Thus, M-B's new version rates as a 12-cylinder engine but smoothness is not related to this. Even a single-bank Wankel feels and sounds quite similar to turbine as there are no reciprocating parts.

Wankels don't produce torque in a league with reciprocating engines but this is made up for in performance by operating at considerably higher rpms. You start out at a high rpm and stay there, ideally using mostly the gear box to govern speed. All Wankels to date have been liquid cooled and apparently there was a problem with the original C-111 design as air circulation through the radiator and oil cooler has been increased by 50 per cent in the present model.

Other chronic Wankel problems are durability and emission control. The first is mainly due to lack of extensive experience with the design by companies that have followed after NSU. The second was not considered as a problem when Felix Wankel first conceived the design, but cutting down emissions with afterburners now has M-B's top priority. Next to this are crash tests which are actively in progress.

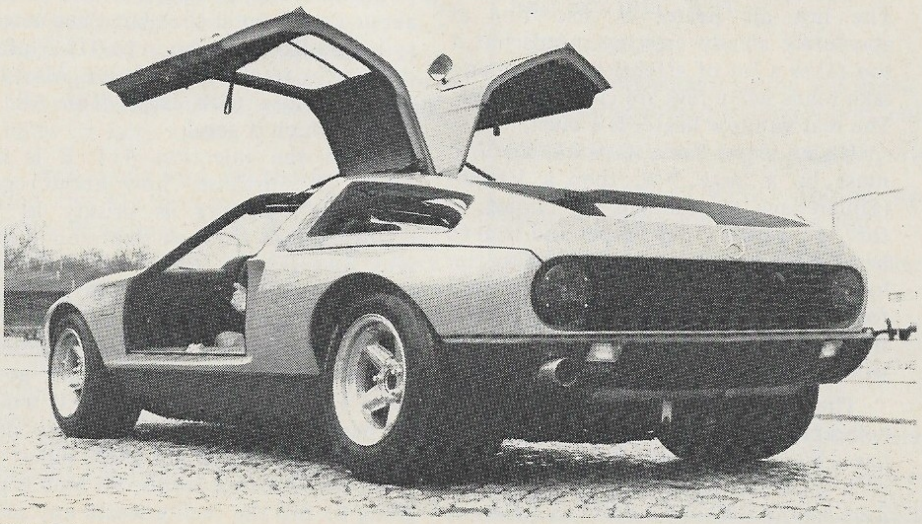
You might ask why they should crash a car that they say is only for research, not to mention volumes of publicity. The answer, obviously, is that the C-111 will be placed on the world market if all goes well. Racing plans depend not so much on the ultimate capabilities of the machine as they do on M-B's own internal policies of the moment.

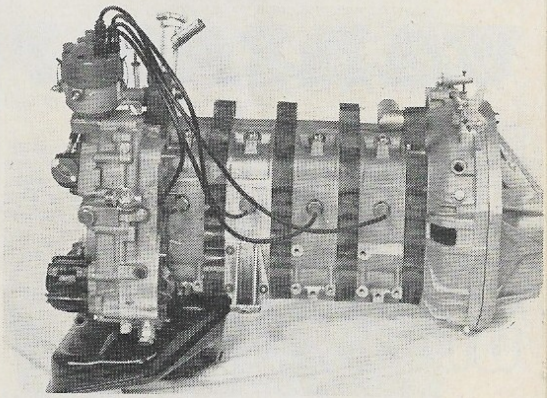
WCG

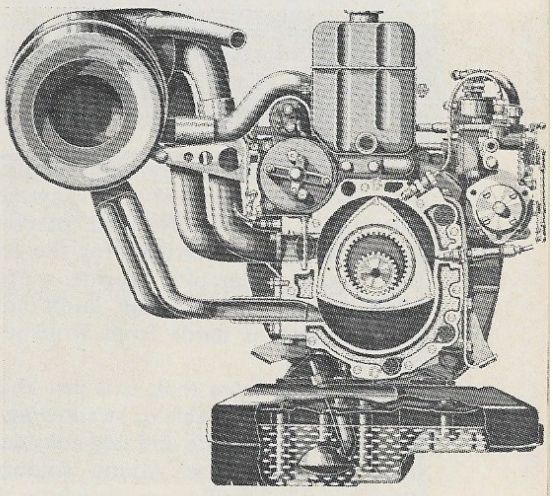


ABOVE: Main lights flip up in the manner of Corvette and side-marker lights have been added. Front cooling area has been increased 50 per cent to improve traffic capabilities.

BELOW: Gull-wing doors permit easy entrance and exit, at least if you don't garage the car in Levittown. Engine sits just forward of the rear and 5-speed gearbox.





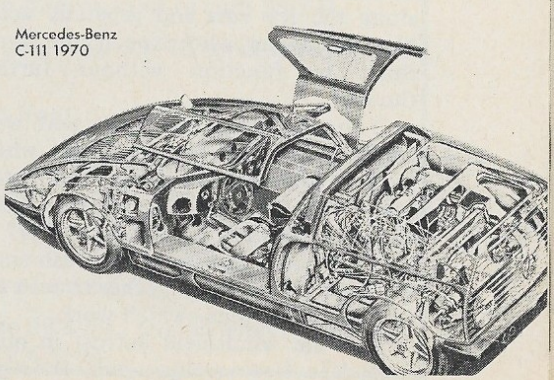


TOP: Prototype 2nd generation interior has provision for both air-conditioning and a mobile telephone. The originals were crude by comparison.

2ND FROM TOP: This is the spark-plug side of the new M-B four-bank Wankel stripped. The unit weighs only 397 lbs., half that of a conventional V-8.

3RD FROM TOP: Wankel principle and cycle is clearly shown in this view. Engine is tolerant of fuel grade but rather thirsty, about 13 mpg being probable.

Mercedes-Benz
C-111 1970



Road Test

VW 411 LE VARIANT HERE BY SEPTEMBER

The 411LE is powered by the same 85-horsepower, 1,679-cc injected four that's used in the Porsche 914. It goes from zero to 60 mph in 16 seconds and serves up 20 miles to the gallon.

text and photos by Sloniger

CAR AT A GLANCE: Willing beast of burden . . . Bonus under-cover, locked luggage compartment . . . Best VW heating system yet . . . Quieter and faster than carbureted 411s . . . Luxury trim in "L" form.

Catechism for today: What boileth not nor doth it freeze? A Volkswagen, what else. Yea verily, and precisely which VW is predestined for the toils and rigors of an olde worlde winter? Why, the 411 LE Variant, latest body and powerplant mode from Wolfsburg, that's which.

And apart from that, it is just about the only Volks capable of swallowing all the detritus our wife and dog consider a bare minimum for Alpine sojourns. Wolfsburg was willing so the winter test was launched.

Be clear, though we're talking about the nitty gritty here. No primped and polished posed photos, no before-lunch run around the block. I left the 411 outside all night, every night, shoved it up mountain roads that intimidated tractors, drove both loaded and empty along the icy ruts and generally acted like any owner who expects the damn thing to function without further thought.

You uncover a few flaws that way, granted, and find more features which grow on you with the live-in. Did it start every time as directed by the Bosch electronic injection mini-computer? It did, whether I bothered to brush snow off first or not. I did bother to read the special instructions—which work.

Did the windshield defrost in milliseconds? Not really, but the gas-powered boost heater would completely shift scraper-thick ice layers in five minutes and run you right out of the automobile in ten, when the spirit moved it.

Incidentally, VW offers a pre-set clock option to be programmed the night before so you arrive at an already-warm car the next morning. The test machine lacked this so I can't report its efficiency, but I like the idea.

This gas-fueled supplement to VW hot air has been described as the best part of any 411. Our's lived up to billing when all systems were go but you want an instrument-rated copilot with two manuals and deep intuition to keep it happy. The thing only consumes 0.2-0.6 quarts per hour too, which is reasonable for comfort.

Frankly, though, four levers between the seats and a bouquet of knobs is too much forcold-benumbedbrains to juggle. The hot air heater is also fine at absolutely steady cruising speeds but it too takes a lot of attention on give and take roads when revs are changing often. The rear window heater is a must.

It's no secret I've always felt that *if* it must be a large VW, then a Variant (Squareback to some) is the choice. In this "L" version they carpet and trim to best sedan standards, you have better looks (sedan styling is not Wolfsburg's forte) and it absorbs one great load, front and back. Four doors plus tailgate would be my only deep desire.

The nose bin is particularly handy, being twice the capacity of their 1600 line. We loaded five bulky suitcases with space left for several soft items and were happy nothing showed to covetous eyes. One warning, and that's be sure all items are well tucked in. The front lid is flexible enough to close with normal (i.e., heavy) hand pressure when in fact one corner is slightly sprung. Then you get wet luggage.

For really bulky loads there is always a tailgate to lift that's nicely counter-balanced. Sure, the bed is higher than its peers to clear the engine, but that begs the point. Other wagons have to put it all in back whereas the 411 has a proper size trunk up front too.

Which brings me to handling, a subject easily solved if you carefully store the lot up front. Even those of us who prefer final oversteer appreciate a VW which ignores gusty crosswinds and behaves with totally predictable neutrality on pack ice until you want the tail out. 411 wagons do normally lack the sedan's rear stabilizer which we would always want.

So long as you travel two-up with luggage forward the 411 Variant can be pure fun. Run up and down winding mountain roads empty and with fuel supply low and it is noticeably less stable.

Incidentally, I've been known to carp about Continental tires but their newest spiked radials are a boon to 411 Variant drivers for tracking and quiet. Also, the wagon comes with larger 165 SR 15 rubber which is good.

Since the injection 411 E is not cheap to purchase, how about costs underway? Driving as briskly as we could manage through sleet and storm, plus several runs down dry highways where all spikes gulp gas at 80 mph and using the heater even more than their handbook suggests for those five-minute runs around a ski resort, I still got a good 16 mpg. At U.S. speeds it would be hard to go under 20. It also consumed a quart of oil per 1,000 miles.

In performance terms, 96 mph is not going to flip the racing world any more than is zero to 60 run in 16 seconds

one better than the original 411 did on carbs. 85 SAE horsepower at 5,000 won't dent the cool of friends with VW-size competitors either, particularly on long up-grades. What it does do is out-perform the first 411.

Maybe the car is plain geared wrong for long trips through hilly country. You can take 3rd over 70 but noise rises so sharply that 65 is a more likely upshift point and then passing is tricky. The wagon has a shorter final drive than their sedan. Overall noise is only disturbing during really hard acceleration.

Four headlights are stock now with low beams easily sufficient for average driving and there are outstanding high beams which are iodines in Europe of course. You would enjoy the reversing light more with a rear-window wiper. (VW is not alone in this slip as any wagon smears its back pane.)

Lesser things you learn to live with include those "safety" switches which defeat gloved hands and a screw-out dipstick a la Type III which took two men and a boy with a large wrench for every oil check.

Far more bothersome, 1st and 2nd gears were awol as often as not and for no apparent reason. For a while it would shift like VWs should, then suddenly all starts had to be made in 3rd. I gather from owners this is not unknown in the 411 line.

A short wheelbase and fine brakes make for easy general action and steel wheels with large vent holes plus rear drum brakes allowed us to mount strap-on chains for those very rare times when even a VW can't get uphill bite on snow.

Pedals allow driving in ski boots which is foolish but illustrative. I'd like them better with less offset to the right. Seats move up, down, forward and back as well as recline fully. Yet, I never found an ideal combination for long-distance comfort. Perhaps the multiple opportunities encourage fiddling. With the rear seat folded forward—a cinch to do—I couldn't recline the driving seat as much as I like, either.

What it comes down to in any VW, and particularly an "L" version of their biggest one, is value for the dollars, even after ignoring two hubcaps and a front bumper badly rusted after only 8,000 miles on salty roads.

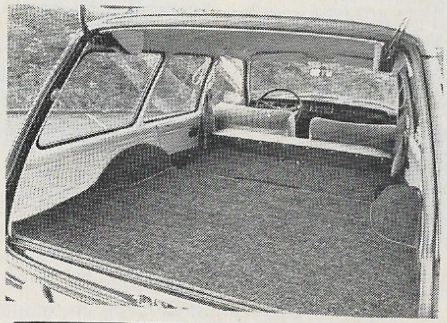
Pros, cons and sophistries aside, I find the 411 line pricey. A three-door from Wolfsburg costs about the same money in Germany as peppier five-door peers, but you must throw in expected longevity, fine injection feel and good looking trim before deciding.

If you should spring for the big VW when it shows in the U.S. next December, by all means go with half or more of the 411 buyers so far who have bought a Variant.

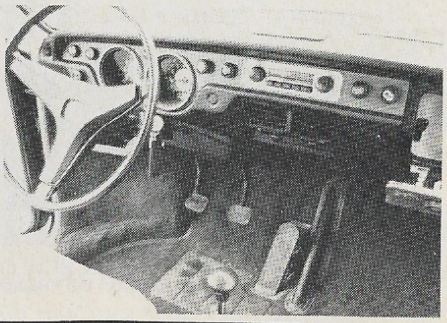
WCG

For 1970 the 411 had its nose lengthened which did as much for its appearance as a similar operation did for Type IIIs. At least half of all 411 sales in Europe are wagons.

With second seat folded forward, the load area is as capacious as any Detroit wagon. Carpeting is standard on the "L" version and U.S.-bound cars woul, of course, have head rests.



Instrumentation consists of a large speedo on the left, an equally large clock and a gas gage. Control knobs have been given the full safety treatment, making them hard to grasp.



VOLKSWAGEN 411LE VARIANT

Specifications from the Manufacturer

ENGINE:

Type: Rear-mounted (under-floor), overhead valve, horizontally opposed, air-cooled four.
Bore and stroke: 3.54 x 2.60 ins.
Displacement: 102.4 cu. ins. (1,679 cc)
Horsepower: 85 @ 5,000 rpm
Torque: 99.5 lbs. ft. @ 3,500 rpm
Compression ratio: 8.2 to 1

TRANSMISSION:

Type: 4-speed, fully synchronous manual
Gear ratios: 1st-3.81, 2nd-2.11, 3rd-1.40, 4th-1.00, R-4.30
Rear axle ratio: 3.91

SUSPENSION:

Front: Independent spring and shock legs with stabilizer
Rear: Independent trailing A-arm, coil springs

STEERING: Recirculating ball, hydraulic damper, curb-to-curb 38.7 ft.

WHEELS AND TIRES: Bolt-on steel disc, 165 SR 15 tubeless radial tires (winter profile and spikes for test)

BRAKES: Hydraulic dual circuit, discs at front

CAPACITIES:

Fuel: 13.3 U.S. gals.
Oil: 7.4 U.S. pts.
Transmission: 5.3 U.S. pts.

BODY AND FRAME: Steel body, platform chassis

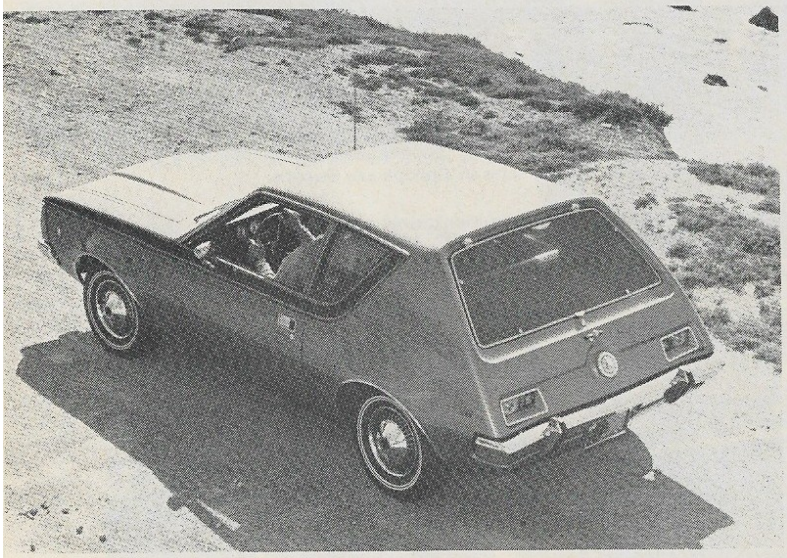
DIMENSIONS AND WEIGHT: Wheelbase 98.4 ins., Overall length 179.3 ins., Width 65.0 ins., Height 58.5 ins., Weight 2,425 lbs.

Road Test

'70½ GREMLIN..

ZERO TO 60 IN 11.7 SECONDS

CHART ON PAGE 51



A. Most distinctive feature of the Gremlin is its oddly shaped back-end which allows four-passenger seating plus plenty of luggage space reachable through a lift-up window.

B. Front sheetmetal of the Gremlin is shared with the larger Hornet, saving millions in tooling costs and permitting use of interchangeable engines and running gear.

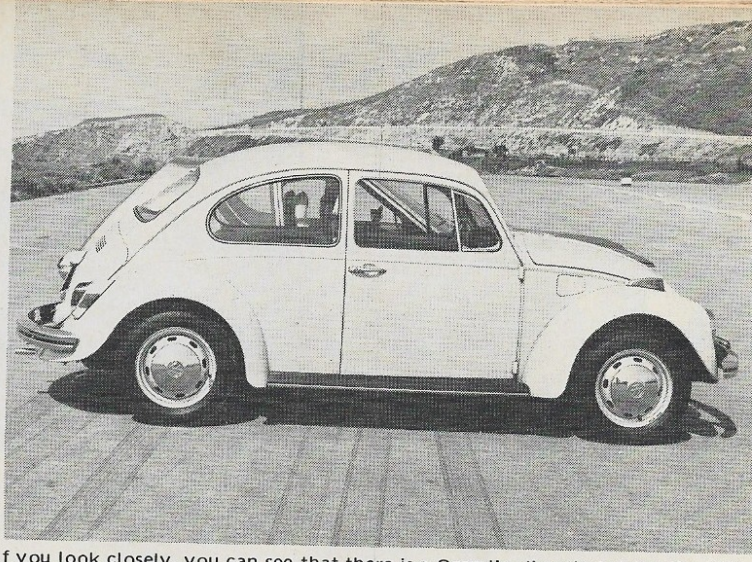
CAR AT A GLANCE: With optional 232 six, unusually peppy performance .... VW beetle sized with room for four ... Stable in cross-winds ... Beetle priced at $1,895 ... Feels like a big car to drive but gives 23 mpg.

Whatever else might be said about the Gremlin, it should be given credit for attracting more attention than any other car American Motors has made since its formation back in 1945. It invariably drew a covey of viewers when parked, turned heads at stoplights and disconcertingly encouraged tailgaters on the freeway.

Comment, in general, was favorable and even some doubters were converted once they were convinced that there actually was room for two adults in the optional rear seat. This is not to suggest that it's adequate for a cross-country trip, but there's more space back there than you'll find in a beetle. Also, critics were universally delighted by the lift-up rear window which comes as part of the rear seat option. Most people likened the car to a "chopped-off station wagon" and then questioned why they

C. Like the Hornet, the Gremlin grille is a plastic composition and bumpers are shared. Special feature of all AMC headlights is a filament that glows after burn-out.

D. In fast cornering it can be seen that the angle of the front wheels bears no relation to the tracks that are actually followed.



E. If you look closely, you can see that there is a Gremlin directly behind the VW. Cars are within two inches of being the same length but Gremlin is much lower.

F. Hood opening is a bit awkward because you have to bend to reach the latch and use your other arm to free it from the safety spring. It won't wait while you stand up for better leverage.

chopped it off.

The reason, obviously, was to keep overall length within a couple of inches of the beetles, the figures being 161.3 and 158.6 inches, respectively. You could do this by installing a tiny engine crosswise up front or flat in the back, or you could put in a full-size American six and not waste the space left for passengers with a sloping roof line. There was another motive, too, and that was to use the existing Hornet engine and front end structure and thus save vast sums on tooling. These economies permitting meeting the targeted $1,895 price. Appearance as such was a secondary consideration although a majority of the people who saw the car while we had it prior to showroom introduction likedits looks. At worst, they conceded that it was "different."

Aside from economical manufacture, the use of a full-size engine was dictated by survey results which indicated that owners of Volkswagens and the like wanted 25-30 mpg economy but begrudged the sacrifice in performance normally associated with these figures. In the case of the Gremlin we tested (not photographed) with the optional 232-cubic-inch, 145-horsepower six, economy averaged out to 20.0 mpg on the nose. This included our performance testing during which zero to 60 mph was obtained in the startling time of 11.7 seconds.

If driven carefully with economy in mind, it's likely that the bigger six will be less thirsty than the standard 199-cubic-inch, 128 horsepower engine. American Motors always used the bigger engine for its many Rambler class wins in the now defunct Mobil Economy Runs. The theory is that within limits, a bigger engine doesn't have to work so hard at allowable highway speeds. With the mammoth 21-gallon fuel tank provided, even at the worst you'll have a 420-mile cruising range compared to under 300 for most imports. Passing by every fourth gas stop does wonders for cross-country averages.

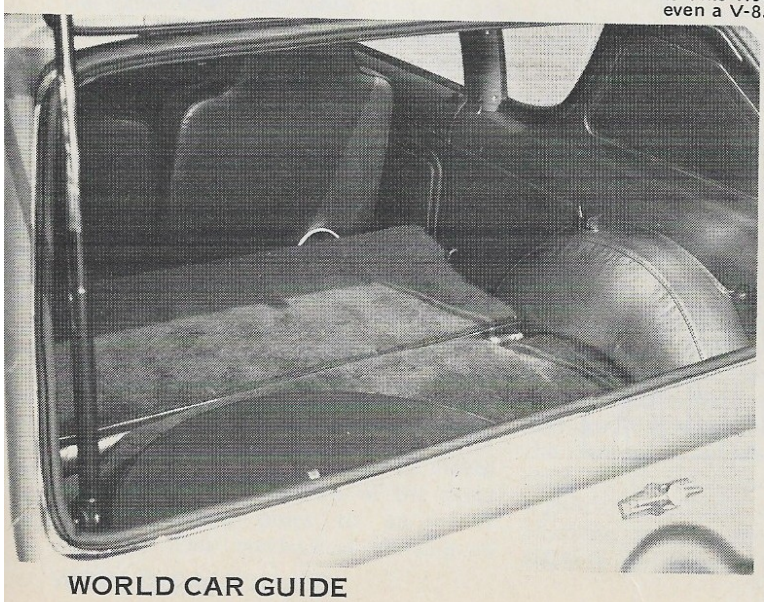
Our pictures show a Gremlin equipped with the small engine, standard three-speed transmission with column shift and bench seats. Our test car had the big engine, the same transmission but with a floor shift and bucket seats. Both had the optional rear seat and openable rear window. At 5 feet, 11 inches which is not much above average, we could consider owning the bucket-seat Gremlin but not the bench. The latter seat is higher and cuts down headroom below usable minimums. We're talking here of the "deluxe" bench, not the standard which has less foam rubber and is therefore lower. In any case, a person our size would find it advisable to shell out first, $80 for the four-passenger model which in turn permits you to spend another $89.90 to get the buckets. You can't get buckets for some reason in the two-passenger model.

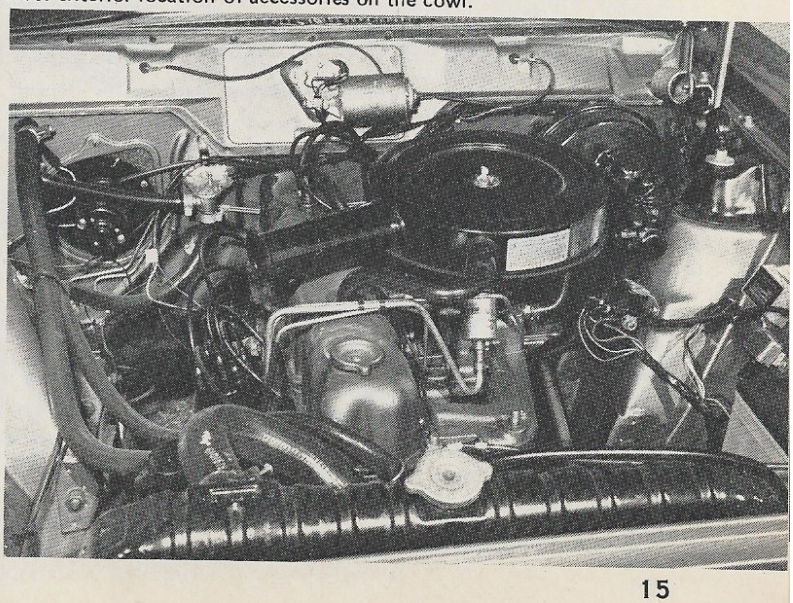
The bigger engine, incidentally, is only $43.30 extra and must be rated as a good buy. You don't compromise economy by much and you get a 35 per cent improvement in performance, not to mention receiving most or all of this sum back at trade-in time. We didn't

(Continued on Page 32)

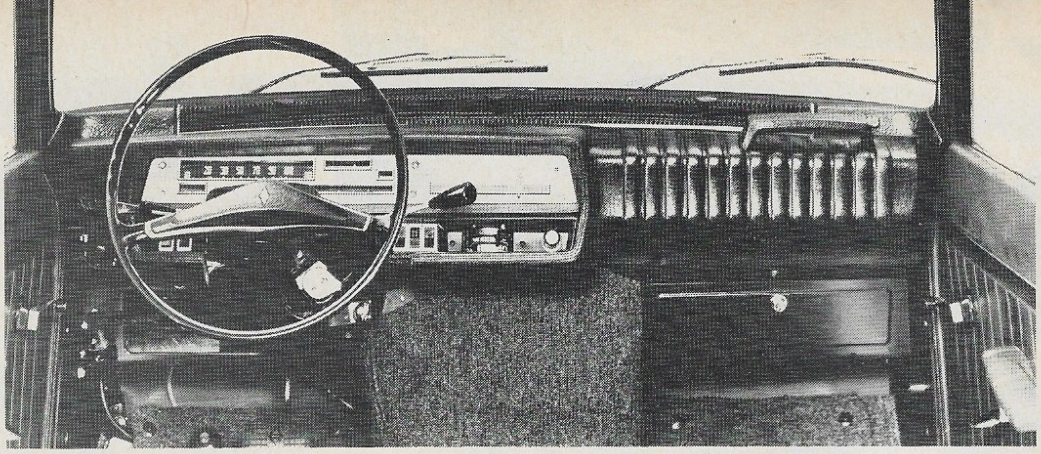
H. Rear window hinge on left is nicely balanced, allowing opening and closing with a flick of the finger. Here seat is shown in down position for grocery carrying.

I. This view is of the small six but it can be seen that there's plenty of room for even a V-8. Note exterior location of accessories on the cowl.





Road Test



G. Dial to the right of the speedometer is actually the quadrant for the new automatic.

A. Only evidence of a full-throttle acceleration given by the Renault 16 is that the rear squats down to a more normally level position. You can't spin the front wheels.

RENAULT 16 AUTOMATIC SEDAN/WAGON

by Don MacDonald
Photos by OCee Ritch

CAR AT A GLANCE: Outstanding interior room, comfort and versatility . . . Industry's second-best ride . . . Reasonable performance with 30 mpg economy . . . Snappy shifting new automatic for only $198 extra.

The Renault 16 has been around since 1965 and it's still one of the most sophisticated cars on the world market. Its ride is second only to the Citroen DS-21. It has an interior that's transformable from a sedan/wagon to a van. While no hot rod, few cars that get 30 mpg have such long cruising legs. Sytling? Well, frankly, it's best called controversial. We happen to like it because it's functional. Others don't.

Now, for $198 extra, the Renault 16 may be had with a three-speed automatic that's shifted by a miniature computer which, unlike those that answer your complaints to oil companies and department stores, may be overruled by the driver at will. There isn't much point in second-guessing it, though, as it shifts faster than a blue-printed Torqueflite and much more smoothly. Proof of this pudding is no loss of performance or economy over the manual model. It's also fail-safe in that should the electronic shifting circuits fail, you can always manually select neutral for starting and third or reverse to get you home or to a point of service.

Aside from its much lighter weight (93 lbs.) and lack of trouble-prone bands, the basic difference between the Renault automatic and the usual domestic variety is the substitution of the computer for hydraulics to sense when a shift up or down is needed.You "program" the computer initially when you position the shift lever and this program, in turn, is modified automatically by road speed and engine load. When it's ready to shift, the computer actuates or deactuates one or two solenoid-type ball check valves in the hydraulic circuitry. The ball valves hold oil pressure in certain passages in the valve body and, when commanded by the computer, open and "dump," permitting shift valves to move.

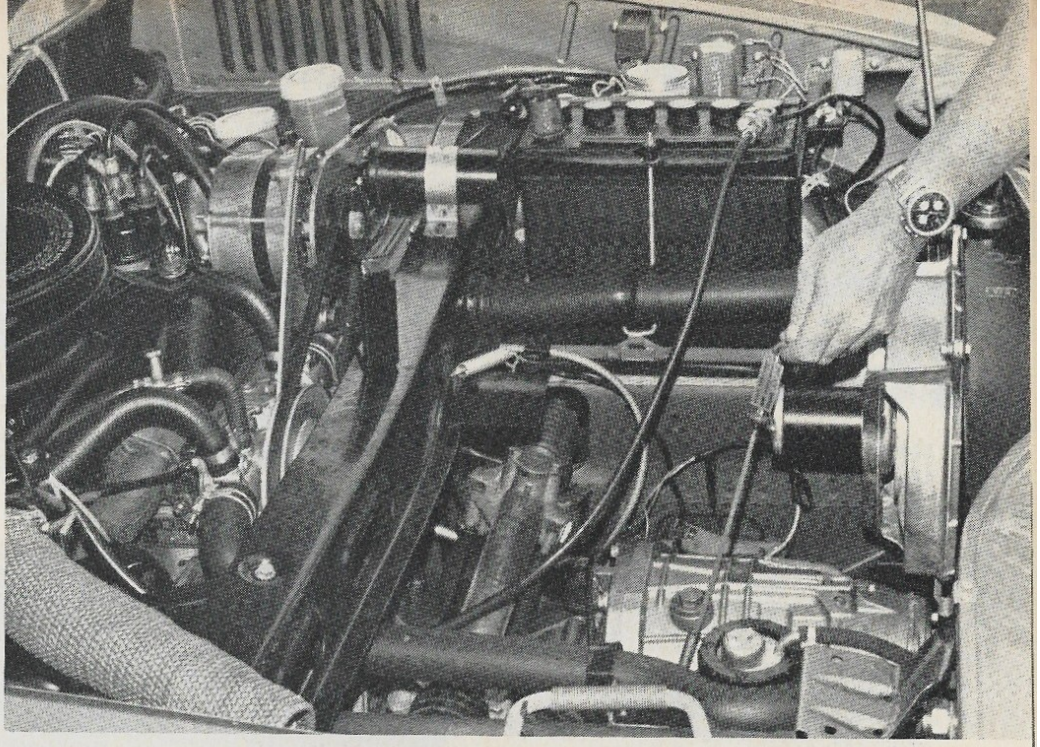
Road speed information is supplied by a tiny, variable-field alternator of one-watt maximum output. Driven off the differential, the alternator produces current that decreases as road speed increases. The decreasing current signals the computer to actuate one solenoid ball valve to shift into 2nd and then the other for 3rd. Conversely, as road speed falls current increases and the computer signals the solenoids to downshift.

The alternator has a linkage-controlled field arrangement to provide a response to load. If the driver tromps down on the gas pedal he moves a linkage that shifts two of the three alternator field poles to an offset position. This mechanical shifting of poles reduces the strength of the magnetic field and therefore, the output of the alternator. This is in addition to the usual kick-down switch in the throttle linkage.

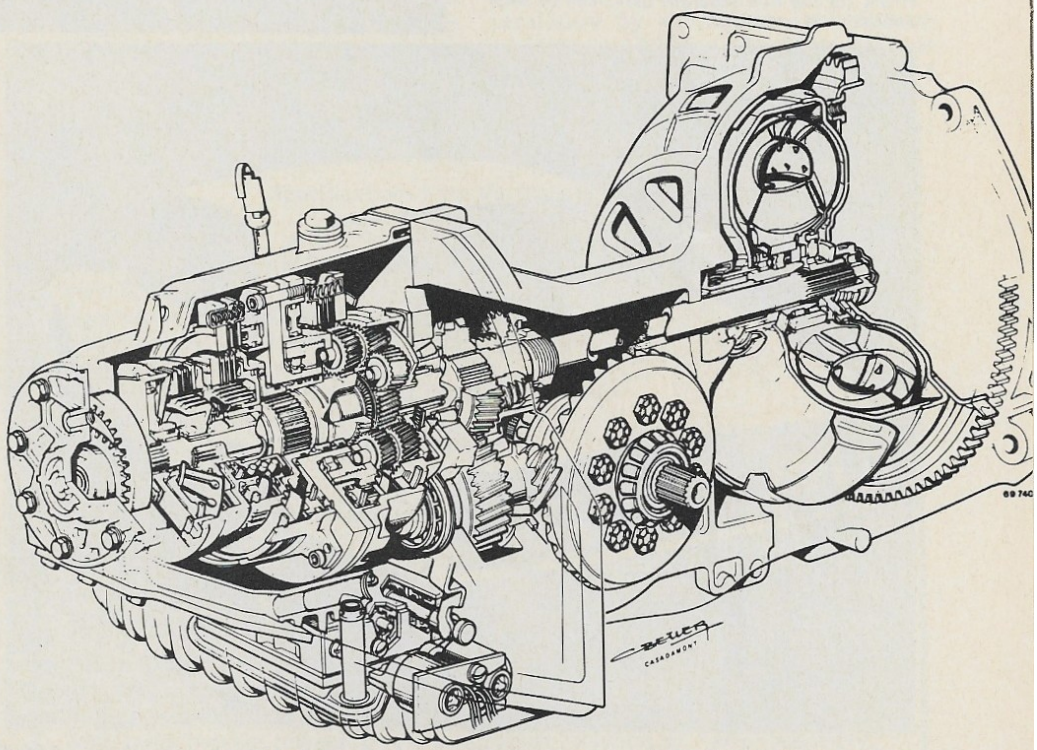
At full throttle and relatively high speed, when engine load is high, the poles are so offset that maximum current output is reduced by 67 per cent. The result is a smaller current signal to the computer, which then may downshift the transmission. This high-speed, high-load condition might occur when climbing a steep grade. An additional fail-safe provision is two separate field windings in the alternator so that if one breaks, the other will provide enough current to produce an acceptable shifting pattern.

The torque converter and double-planetary gearset in the Renault automatic are conventional but the normal bands, which require periodic adjustment in most transmissions, are replaced by multi-disc brakes and clutches. Oil pressure in the unit is only 45 psi at maximum which is much lower than usual and keeps operating tempera-

(Continued on Page 45)



H. Spare tire was removed to permit view of new automatic in front of the engine. Also visible is the motorized, thermostatically controlled cooling fan.



I. The new automatic is conventional except for computer controlled shifting with a brake and clutch arrangement to replace the normal bands. It weighs only 93 lbs.

Road Test

JAGUAR XJ6

WORLD'S BEST ENGINEERING?

text and photos by Joseph Lowrey

CAR AT A GLANCE: Wonderfully quiet comfort . . . 80 mph in 17.5 seconds for the quarter . . . 400-mile cruising range . . . New Borg-Warner 3-speed automatic . . . "Makes you feel at least like half-a- million dollars!"

RIGHT: Frontal cooling area, always marginal on past Jags, has been much enlarged on the XJ6 as it carries standard air-conditioning in U.S. form.

BELOW: Large English plate clutters an otherwise clean rear end. Trunk lid flush with bumper facilitates luggage loading and fillers for the two separate tanks can be seen beneath the backlite.

Snow, fog, iced roads and a bout of influenza came one after another. That sort of a week should give one an angrily critical view of any car, but the Jaguar XJ6 was a pleasure to have around even in such trying conditions. It offers a good deal of performance, wonderfully quiet comfort in almost any kind of driving and the peace of mind which comes from really sure-footed roadworthiness. If you are in the mood to enjoy motoring, you can enjoy it in the XJ6. Or if motoring temporarily becomes just an unfortunate necessity, the XJ6 provides just about as painless a form of transportation as can be found.

At 108.8 inches wheelbase, 189.5 inches length and 258.4 cubic inches displacement, this 4.2-litre Jaguar is one of Europe's biggest quantity-built sedans. Its makers balance on a tight wire; they must offer furnishing and finish which are far above mass-production standards, but they can only afford to develop and tool-up really well-engineered cars to achieve the volumenecessary.The trim materials and hand craftsmanship cannot be of Rolls Royce quality, but the engineering design underlying them is surely the best in the world.

Jaguar planned this car from the road upwards. Dunlop were told to design tires which would give a heavy sedan the utmost road grip and controllability, and to leave the Jaguar engineers to worry about possible harshness or road noise. Textile-braced radial-ply tires of low profile, to fit wheel rims of 6-inch width and 15-inch diameter, do indeed grip and go where they are pointed in either wet weather or dry.

On top of these tires, Jaguar built two sub-structures. At the front, a sub-frame carrying the anti-dive suspension, power-assisted steering and engine provides the mass of metal to absorb road noise. At the back, the unique Jaguar independent suspension linkage pivots on roller bearings for absolute accuracy of wheel alignment, forming with the differential, coil springs and telescopic dampers a sort of "internally sprung" axle.

Atop all this, Jaguar have a really strong integral steel body, entered over wide and deep door sills rather like the sides of a "monocoque" racing car. Rubber mounts spaced well apart confine noise to the two sub-structures without upsetting precision of handling.

It works. Except at the lowest speeds, there is almost complete exclusion of road noise from the car interior. Besides not hearing bumps you hardly feel them either. Ride comfort on flexible springs is outstanding on normal roads, yet the suspension is well enough controlled not to get upset by roller-coaster condtions. And the whole lot steers. This is one of the very few power-steered jobs which feels even more under control when you are hurrying than when you are going slowly.

Around tight turns this is a big car with reasonably quick power steering, as it needs just 3¼ turns from lock to lock. There is surprisingly little body roll on the soft springs, but not enough steering "feel" for a sports car. Get up to the open road speed limit however, or to a very much faster pace, and you can aim the XJ6 into a series of curves as accurately as if it was a racing job. Bumps or changes of road camber don't put it a single inch off the line you intend. This could be because Jaguar first proved their four wheel independent springing at the LeMans race track, and then at a later date quietened it for street use.

Outright speed is not such a striking aspect of today's Jaguar sedans as of some predecessors. Displacement and horsepower increases over the life of the dohc "six" have just about kept pace with growing car weight while some rival products have been getting faster. As an automatic-transmission job, this 4.2-litre sedan is still faster than most with a top speed around 120 mph, and the ability to reach almost exactly 80 mph in a 17.5 second quarter-mile. Those who opt for four on the floor plus an overdrive, and use the stick-shift to best effect, can reach 85 mph in a quarter-mile time well below 17 seconds and touch 125 mph on the level. That's plenty of speed for most buyers of luxury cars and although Jaguar know that some buyers would pay extra for yet more horsepower, they are still keeping us waiting for promised 8- and 12-cylinder engine options.

If the dohc Jaguar "six" with its 5500 rpm maximum speed has lost some of its "performance" image over 20 years of production, it's still a fine, smooth, high-torque engine to have under the hood. It runs far longer than a rocker-arm engine between valve jobs, and this means more to most people than the cost of the eventual job. Buyers of a high-grade sedan may not worry too much about gas mileage either, but 14 mph means that two 15-gallon tanks (with a change-over switch for separate electrical pumps) will take you more than 400 miles between fuel stops. The motor cold-started easily in my winter test, but had a hesitant minute when the automatic choke finished its work a mile along the road. De-toxed cars for U.S. have extra carburetor heat which takes away five of the 245 horsepower, and could be either better or worse on warm-up.

The car I drove recently was obsolescent in its American-built automatic transmission. It had the Borg-Warner Model 8 whereas by the time you read this, Jaguar will be shipping cars with the Model 12 installed. Basically it's the same transmission with some extra strength to handle forthcoming engine options, the ability to select "2" or "1" manually instead of just inhibiting 3rd ratio by selecting "L," and reputedly smoother shifting. Ratios do not change and shift points are almost the same, so performance should be unchanged also. I hope, though, that the new transmission really is smoother because the old one was jerky in comparison with anything else on the car, unless you treated the gas pedal properly.

Once you have stepped in over the big structural door sills, front seat travel in the XJ6 is delightful. The individual seats are truly comfortable for me and the surroundings of pile carpet, leather and polished walnut make you feel like at least half-a-million dollars! It's a surprise to find that neither window lifts nor seat adjusters use power, but Jaguar prefer to spend money on basic engineering than on gadgets which are not really necessary.

Put your women in the back seat, and you will hear enthusiastic praise for its comfort, once you have shown them how their fresh air and heat controls operate. Ride behind a chauffeur yourself and you may be more critical, rear seat ride comfort is the best that money can buy but rear seat dimensions are slightly mean for man-sized limbs.

Out back, the trunk has a big area of carpeted, flat floor which hinges up for access to the spare tire. Height above the luggage floor is less generous, but loading heavy trunks is easy in the absence of any sill across the aperture.

My week with the Jaguar XJ6 represented a return to the model, which I first drove in heavily-disguised form ahead of its first public showing. At that time I criticized the choice of axle ratio, and Britain now gets the "Continental" 3.31 gear set instead of the "American" 3.54 ring gear and pinion. I'd rather see all cars geared at 3.31, because gearing for extra acceleration makes the engine audible at Freeway speeds. My memory of the earlier car is that it maintained steering perfection down to lower speeds, either because its power steering had more feel, or more probably because it was on less-worn tires with the tread-edges intact.

Just one thing worries me and that is how long can Jaguar keep up their standards? Bill Lyons founded and built up the company, his low prices for quick and refined cars driving such once-famed rivals as Alvis, Armstrong Siddeley, Daimler, Lagonda, Riley and Wolseley out of independent existence. Now an active 68-year-old, however, Sir William Lyons is just one Director of British Leyland Motor Corporation to whom he sold his company. As more and more of the decisions which once came from the Boss gradually come to be taken more slowly and more cautiously by committees, will Jaguars of 1975 or 1980 have such magnificent "character" as do those of 1970? I doubt it.

WCG

JAGUAR XJ6 (4.2-litre, Automatic Transmission)

Specifications from the Manufacturer

ENGINE:

Type: Front-mounted 6-cylinder with double overhead camshafts and seven main bearings
Bore and stroke: 3.63 x 4.17 ins. (92.1mm x 106mm)
Displacement: 258.4 cu. ins. (4235 cc)
Advertised Horsepower: 245 @ 5,500 rpm
Maximum torque: 283 lbs. ft. @ 3,750 rpm
Compression ratio: 8.0 to 1
Carburetion: Two S.U. constant-depression

TRANSMISSION:

Type: Borg-Warner automatic with torque converter and 3-speed epicyclic gear
Gear ratios: Low-2.38, 2nd-1.45, Drive-1.00
Axle ratio: 3.31 on test car, 3.54 for U.S.

SUSPENSION:

Front: Independent by coil springs, anti-dive transverse linkage and telescopic dampers; suspension sub-frame rubber-insulated from car hull
Rear: Independent by coil springs, transverse linkage and telescopic dampers, with roller-bearing linkage pivots and rubber isolation of "axle" assembly from car hull

STEERING: Rack-and-pinion gear with power assistance, 3¼ turns from lock-to-lock
Turning circle diameter 36 feet

WHEELS AND TIRES: Bolt-on steel disc with 6-in. rims
E70 VR 15 Dunlop textile-braced low-profile radial-ply tires

BRAKES: Girling discs on all wheels, with vacuum power assistance
Disc diameters 11.8 ins. front and 10.4 ins. rear

CAPACITIES:

Fuel: 30 gals. divided equally between left- and right-hand tanks with independent fillers and pumps
Oil: Engine 8.75 qts., automatic transmission 9.75 qts., axle 1.65 qts.
Coolant: 18 qts.

DIMENSIONS AND WEIGHT: Wheelbase 108.8 ins., Track 58 ins. front and 58.6 ins. rear, Length 189.5 ins., Width 69.7 ins., Height 52.9 ins., Weight 3,700 lbs. (52.5% front, 47.5% rear)

TOYOTA CROWN

RESTYLED for SAFETY

Toyota has given its top-of-the-line Crown model a face-lifting that makes it look more like the circa 1969 Rambler American than ever. But, from the side, Ramblers and therefore Crowns look like current Rolls-Royces so the comparison is not exactly unkind.

The major change involves the grille, hood and front bumper. The previous Crown (see picture) had a black matt grille with dual headlights set rather deeply on each side. The new grille has more chrome relief and is flat, rather than curving around into the fenders. This, in turn, necessitated the insertion of separate running lights in the front fenders.

Apparently previous Crowns encountered some cooling problems as the new one has a rather large cut-out in the front bumper to admit additional air. The bumper now houses the parking lights that were formerly combined in a wrap-around design with the running lights. Running lights in the rear have been enlarged and the taillights have been restyled without necessitating any changes in the sheetmetal.

The series is offered as a four-door sedan and a four-door wagon at POE prices of $2,844 and $3,149 respectively. For a car that is between the Hornet and Dodge Dart in size (overall length is 184.6 inches) and is undistinguished in performance, these prices may seem a little steep but the Crown does offer luxurious trim that makes it worth the money. Also, it has standard front disc brakes and a four-speed fully synchronous transmission. A three-speed automatic is optional and both types are floor-shifted, even on the wagon.

The six-cylinder overhead-valve engine of 137.5 cu. ins. displacement is a rather sophisticated design with its seven main bearings and overhead camshaft but its output of 115 horsepower at 5,200 rpm is disappointing. Toyota is capable of better as witness the low revving 145-horsepower cam-in-block six used in the Land Cruiser and the 150-horsepower six with dual overhead cams and triple side-draft carburetion that's been a mild racing success in the 2000-GT. However, neither of these units fit the Japanese concept of a luxury car and it must be remembered that a Crown in its homeland is the equivalent of a Cadillac here.

The Crown wagon is unusual in offering a standard third seat. It will hold two passengers sitting with their backs to the driver's side of the car, giving a total capacity of seven. The sedan now has flow-through ventilation so the vent windows, while retained, are fixed. The wagon keeps its moveable

Front end of a 1969 Crown is shown here to illustrate the styling changes.

vent windows. Suspension is by coils at each wheel with a solid hypoid-type rear axle. Instrumentation is complete except for a tachometer.

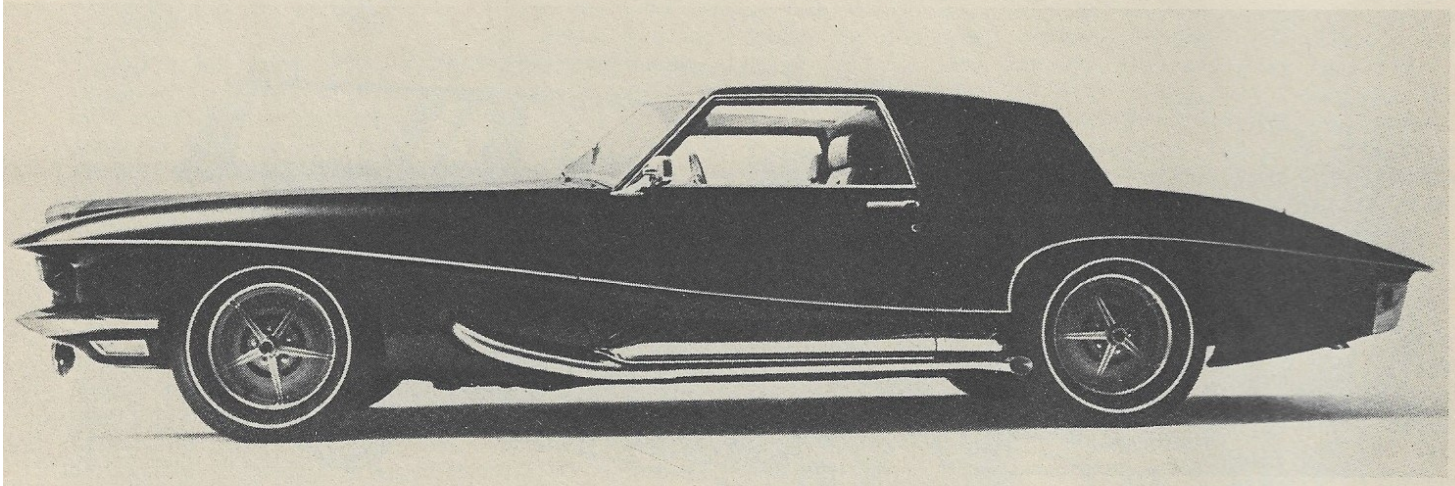
In summary, Crowns are for people to whom luxury is more important than performance. These cars should be looked at if you think in terms of the small Mercedes as trim standards are equal and performance, such as it is with a zero to 60 figure of 15.4 seconds, is superior.

WCG

Crown wagon is one of the few on the market that features fully reclining front bucket seats and a floor shift. Also standard is a third seat for two.

The Crown sedan bears a strong resemblance to Rambler Americans of the recent past. Body is unitized but an impact absorbing perimeter frame is provided.

STUTZ REVIVED



Yours for $25,000–$75,000

An ambitious venture into U.S. luxury car market was unveiled recently in the form of the Stutz Blackhawk. The promoters, suitably holding forth at the unveiling in the Basildon Room of New York's Waldorf-Astoria Hotel, stressed thatthe car did not resemble the original Stutz in any way. That was obvious. It does, though, resemble a similar, ill-fated attempt of a few years back to revive the Duesenberg.

Only one Duesenberg was built and Stutz production as of this writing totals one. The blend of classic and modern styling is obviously the work of Virgil Exner, as was the Duesenberg. The Stutz uses a "blue-printed" 400 cubic inch Pontiac V-8 with Turbo-HydraMatic mounted in a 118-inch General Motors frame whereas the Duesenberg was fashioned from Chrysler mechanicals.

What you do get for your $22,500 and four months wait is a two-seater coupe body by Carrozzeria Padana of Modena, Italy, in '45' gauge steel; a free set of suitcases to match the interior; Firestone LXX tires and wheels; electrical operation of everything from the windows to the sun roof; air-conditioning; full instrumentation backed by warning lights; four-wheel disc braking; Koni shocks; an empty compartment for a mobile telephone; an electric jack from Sears; and finally, something called a "snag-resistant" steering wheel.

The car is claimed to meet all Federal and state emission requirements but no mention is made of having passed safety requirements. It would be kind of hard on the new company to ask them to crash their only order-getter.

According to president James D. O'Donnell who is also chief product planner and a banker planner on the side, no more than 100 Blackhawks will be built during 1970 although he doesn't give an equal handicap to other styles planned which include a $25,000 convertible, a similarly priced Indianapolis 500 style racer modified for street use, a $29,500 limousine and for the Tammany trade, the $75,000 "V.I.P." which is or will be designed for parade and ceremonial use. Idling down Main Street at 5 mph will be a new design problem for Pontiac engineers assigned to the Stutz account.

Stutz does its own blue-printing of the ex-GTO engine and transmission, presumably from premises at 52 Broadway, New York 10004, and claims that 425 horsepower results. Crankshafts are said to be balanced at 17,000 rpm, key engine parts chrome plated and each engine individually checked out on a dynamometer.

O'Donnell is right in citing the advantages accruing to future Stutz owners in that they can drive into any of the more than 2,000 Pontiac dealers in the country and once the shock wears off, receive intelligent service at least for the engine and transmission. This compares with about 41 Rolls Royce, 267 Mercedes, 21 Ferrari and 17 Maserati dealers and of course, O'Donnell expects his Stutz to further reduce the ranks of these.

Don't think that he and it might not. George Barris of Hollywood has become a millionaire handcrafting bizarre specials with even higher price tags from mundane Detroit iron. The deal is to get Frank Sinatra or some such in a Stutz, have him make reference to it in a *Life* interview and suddenly, the Stutz will become as popular as the Dual-Ghia once was in such marketing areas as Palm Springs, Bel Air, Palm Beach and Rome. If worst come to worst, all O'Donnell has to do is hang on to the prototype for 10 years and then sell it to a collector for $45,000.

WCG

SAAB SONETT III

STYLED by COGGIOLA

One of the highlights of the recent New York International Automobile Show was the premier of the SAAB Sonett III sports coupe, representing the third generation of these popular two-seaters powered by a German Ford V-4 engine.

The car retains its basic lines which were determined by wind-tunnel tests but it has been extensively facelifted by the Italian designer, Sergio Coggiola. It is as though he attacked the fiberglass structure of the original with a modeler's knife, scraping off the profusion of bulges and scoops that made it look as if it were suffering from a bad attack of boils.

The front end has been squared off and given a grille and retractable headlights. Quarter windows have been added on the sides and the top re-shaped to resemble a fastback Mustang. The overly large rear window of the past model has been replaced by a flat pane of glass that opens to give access to the luggage area.

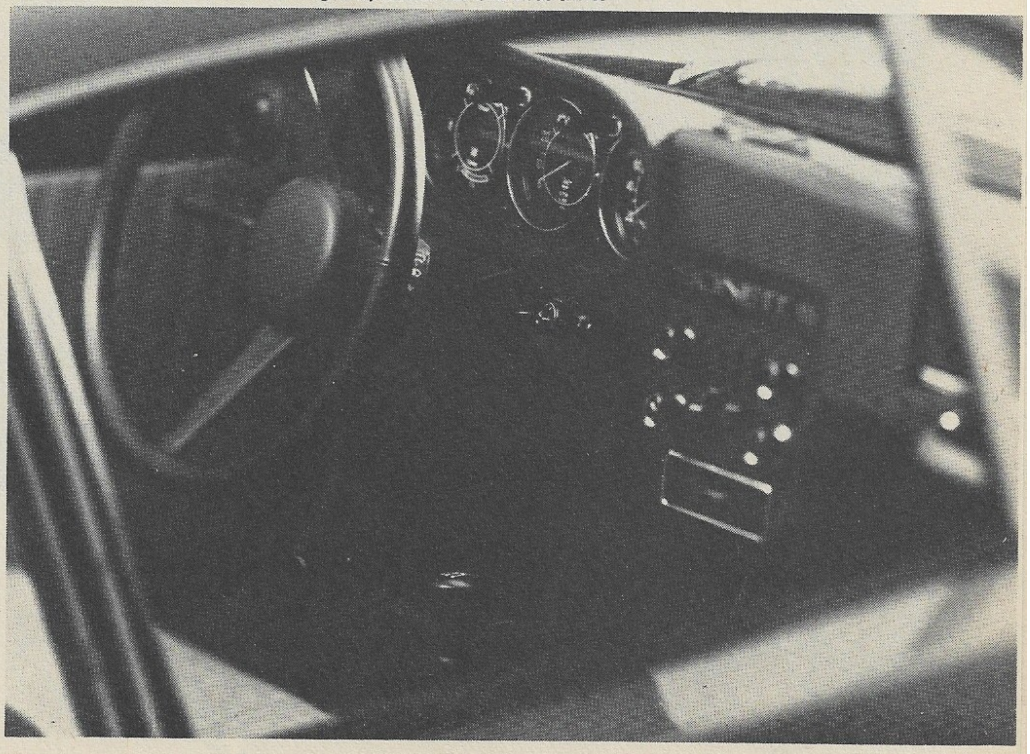
Mechanical specifications of the front-drive, 84.6-inch wheelbase car remain much the same. Horsepower rating is 73 at 5,500 rpm and the peak torque of 87 lbs. ft. occurs at 2,700. Downdraught carburetion is retained along with the four-speed fully synchromesh box and 4.67 final drive ratio. Fourth, however, is an overdrive which reduces the overall ratio to 3.90 and gives a road speed of 18 mph at 1,000 rpm. Claimed top speed is 110 mph, same as before, and zero to 60 mph is said to be achieved in 12.1 seconds.

The Sonett is one of the few true sports cars with coil springing front and rear. Steering is a delightful 2.7 turns from lock to lock with a turning diameter of 30.8 feet. Standard rubber is 155x15 Pirelli Cinturatos and braking is by discs in front and drums at the rear with, of course, SAAB's unique diagonal separation of the hydraulic circuit.

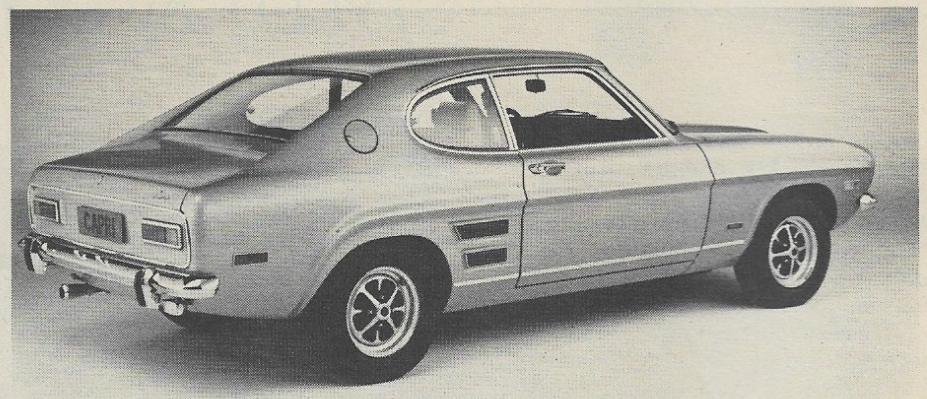
Luggage capacity is 7 cu. ft. and when rated in terms of accessibility, this is 7 cu. ft. more than before. Another desirable feature is the 15.8-gallon gas tank which gives a cruising range of over 400 miles. Price had not been set at presstime, but the Sonett II's basic POE on the East Coast was $3,725. **WCG**

ABOVE: Retractable headlights highlight the completely new front-end design of the Sonett Mark III. Fiberglass body seats two, has a standard built-in roll bar.

BELOW: Complete instrumentation set in a black, non-reflective dash compliment the interior. Factory-installed air-conditioning is optional for the first time.



A CLOSER LOOK AT MERCURY'S CAPRI



Rear styling carries a trace of the "sail" once a feature of GM intermediates. Back-up lights are in a vulnerable bolt-on position under the bumper.

The Capri has been made for about a year now in nearly identical form by both Ford of England and Ford of Germany and by European standards, the car has been a great success with approximately 156,000 sold so far. One German model is now being sold in this country by Lincoln-Mercury Division dealers for a base price of $2,295.

With an overall length of 167.8 inches and a wheelbase of 100.8 inches, it is somewhat shorter than a Maverick and costs more. With only 71 horsepower compared to the Maverick's base of 105, it also is considerably less powerful. Capri emphasis, though, is on luxury, a commodity not available with the Maverick at any price.

One could have wished that L-M had imported the V-6 Capri and they may still just do that. It would have better fitted the "baby Cougar" image they're trying to peddle as the Capri in four-cylinder form is more akin to a household tabby. It won't get from zero to 60 much faster than a Volkswagen. It is, though, capable of 30 mpg economy on regular thanks to a 97.6 cubic inch block, a low 8 to 1 compression ratio and a single barrel carburetor. Valves are overhead but the cam is located in the block. For those interested, quite a bit of speed equipment has been developed for this engine in Europe and some of it will undoubtedly be made available here.

Standard and only transmission offered is a fully synchromesh four-speed box with a floor control. This features a single rail shift mechanism which according to European testers including our own Sloniger gives faster, smoother, more precise shifting. In this design a single rail enclosed and fully lubricated within the box transmits the motion of the lever to the gears. It saves

Black matte grille indicates this Capri is equipped with the optional "decor" package, most goodies of which are inside. Styled steel wheels and radials are standard.

a lot of parts and can't get out of adjustment as the conventional external linkage is sometimes prone to do.

The single coupe body style is unitized and its inner structure is almost identical to the Maverick. Wind noise is reduced by ventless side glass, a sharply raked windshield, a fastback roofline that turned out to be rather good aerodynamically and the elimination of the A-pillar drip rails. In no test of the European versions that we have read so far has any comment been made as to how, with the elimination of these troughs, water is kept out of your lap when you open the door. We know that in convertibles, which lack drip rails, this is an annoying problem.

Suspension follows the common Ford small car practice of using McPherson struts with high-mounted coil springs in front and conventional leaf springs in the rear. The Capri's importers claim that "suspension and steering have been designed for sports car handling" and overseas testers indicate that the car is strongly understeer, only becoming tail slithery on slippery roads. Understeer is not necessarily a desirable characteristic in a car that lacks power for correction. Small engined Capris, however, inherited the staggered shock absorber mounting in the rear from more powerful models. This is an uncomplicated way of eliminating axle hop which in the case of this car, would occur during braking and not acceleration. Standard tires are 165 x 13 radials mounted on 5-inch styled steel wheels.

The Capri joins the MGB/GT and the Triumph GT-6+, both much more expensive cars, in offering rack and pinion steering and the 17.7 ratio does indeed border on being sporty. The car can be U-turned between curbs 34 feet apart. No power assist is offered although the front disc braking system has this feature as standard.

Interior dimensions are within fractions of those offered by the Maverick and the allowances are generous for a car of this type, more generous, indeed, than anything to be found in a Mustang or Camaro. It is also further proof of the fact that the Maverick and Capri were packaged on the same computer at the same time in Dearborn, not Cologne. In the front the Capri has 41.4 inches of legroom and 37.4 inches headroom. Counterpart dimensions in the rear are 30.3 and 35.9 inches, respectively. (Legroom figures are maximum for the front and minimum for the rear.) The trunk will hold 7.2 cubic feet of luggage, about four less than Maverick because of less overhang. The Capri, at 2,115 lbs., weighs 400 lbs. less than the Maverick.

Instrumentation consists of two round apertures in front of the driver, the speedometer occupying one and gauges for fuel and temperature plus lights for the rest, the other. Switches are all of the rocker type. Flow-through ventilation is provided and the promotional material handed out to the press notes that "heater-defroster operation is comparable to American standards," a snide remark that won't be argued by the owners of most imports.

The standard interior is vinyl with color-keyed carpeting and courtesy lighting limited to the passenger's side. The decor option includes a blacked out grille and bucket seats throughout, the front ones being fully reclining. In addition, you get a leather covered wheel and gearshift knob, a console with a clock, a map light on a flexible extension that swings out from under the full length storage bin beneath the panel, bright pedal trim and a courtesy light for the driver. That all sounds like a fairly expensive package but it hasn't been priced at this writing.

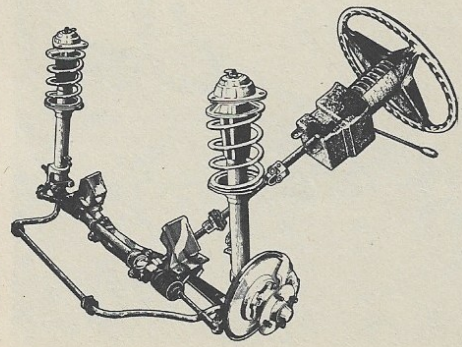
Very few additional options are offered. You can get a vinyl roof in any color as long as it's black, AM/FM radio, a manual sun-roof, larger tires and a dealer installed "hang-on" air-conditioner. That constitutes the entire list for the moment.

As was mentioned, the Capri has been received favorably in its two homelands. England's *Motor* has said: "Despite its sporting aspirations, the Capri is quite a refined car; its firm but not uncomfortable ride emphasizes a suspension bias towards taut handling but the car is certainly not lacking in creature comforts. It is reasonably quiet—particularly up to 70 mph because wind roar is very low—and largely free from booms, vibration and unpleasant road noise." The prestigious *Berliner Morgenpost* adds: "The supershort shift-stick is a real pleasure. The steering system is convincing. It is direct and cornering is a joyful experience. Speedy straight-on driving needs but little correction."

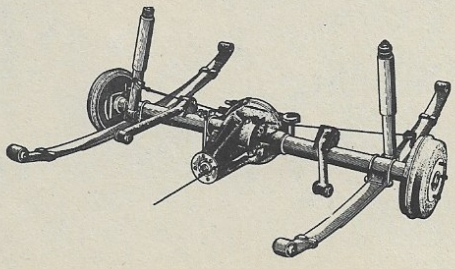
In next month's issue WCG will road test the U.S. version of the Capri under U.S. driving conditions. It will be interesting to see if the de-smogged, relatively underpowered version offered here will merit the raves accorded to it by the overseas press. **WCG**

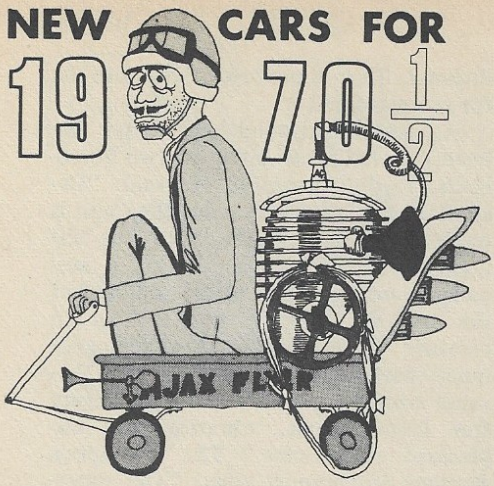
Presumably all this can be carried in the Capri's 7.2 cubic foot luggage compartment. Note position of the gas tank well inside the trunk area.

McPherson suspension is used in front. Note impact absorbtion area directly beneath the steering wheel.



Staggered mounting of rear shock absorbers helps eliminate axle hop while accelerating and braking.





NEW PEUGEOT WAGON 90-HORSEPOWER ZF Automatic

Roomy Peugeot wagon is newly equipped with a twin-carbureted, 90-horsepower four and a ZF automatic transmission heads the option list.

Peugeot's idea of turning its venerable 404 station wagon into a 1970 model is commendable, consisting of a switch to the 1,796-cc XM engine used in one model of the 504, adding an extra carburetor and making available the fine ZF three-speed automatic. The result is 90 horsepower at 5,500 rpm and 108.5 lbs. ft. of torque at 3,000 rpm.

The car must be the only 97 mph, four-cylinder wagon around with the possible exception of the Datsun. It's also the only conventional wagon designed so that both the rear seat and front passenger seat may be easily removed for maximum cargo capacity. The extreme conversion gives a loading area on one side 115.5-inches long and you can carry 1,100 lbs. including the driver.

The angular styling, which looks well from the view shown in the photograph but rather unbalanced and awkward from a straight side view, is continued unchanged as are trim details inside. John Bond of *Road & Track* once said—so long ago that he must have been referring to the discontinued 403 model—that Peugeot was "one of the seven best cars made in the world today" and the company has never let him forget it, applying the compliment to any and all subsequent models in their advertising.

They are indeed reliable, with diesel versions of the 404 sedan forming the bulk of the Parisian taxi fleet and as anyone who has visited the city knows, that duty is the toughest in the world. The 404 also vies with SAAB as a persistant winner of major rallies, notably the Trans-African Safari.

Wagon wheelbase is 111.8 inches and its overall length of 180.0 inches puts it in a class with domestics such as the recently deceased small Falcon, Chevy Nova and Hornet, when and if a wagon model of the latter appears. So, too, does the curb weight of 2,535 lbs. and width of 64.0 inches. By current French standards it's a big car.

For all its ruggedness the Peugeot 404 lacks certain niceties that you might expect for its $2,995 price at East or Gulf Coast ports. Brakes, for example, are of the unassisted drum variety instead of at least the front discs to be found on many, much cheaper imported wagons. Neither is there anything particularly sophisticated or costly to produce about the suspension which is by coil at each wheel with a solid rear axle. Another deficit is the meager 13½-gallon fuel tank. There are, though, stabilizing bars front and rear and the patented Peugeot *(pronounced "Purr-Joe")* shock absorbers are in a league with Konis and Bilsteins, and there are four coil springs instead of the usual two at the rear.

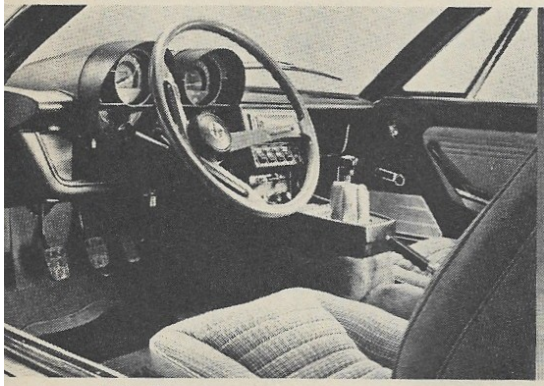
The automatic ZF *(for Zahnradfabrik-Friedrichshafen AG)* costs $200 extra and the quadrant is set up in the usual American fashion; namely, park, reverse, neutral, 3, 2, and 1, with torque converter and planetary gears. No mention is made as to whether or not this will carry the same rather high (numerically) axle ratio of 4.63 used in stick-shifted models. The latter transmission, which is standard, is a fully synchromesh four-speed box.

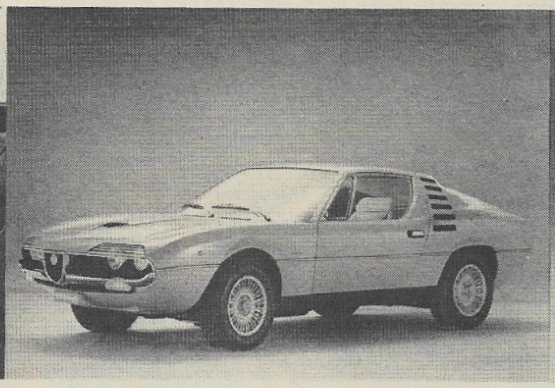
The engine is inclined 45 degrees to the right which lowers the center of gravity as well as improving access to components that need routine servicing. Heads are aluminum and the block cast iron, with removable wet-type liners. Electrics are provided by Ducellier and the carburetors by Solex. As in earlier models, the fan is thermostatically controlled and it does not operate when the coolant temperature is below 157 degrees F.

A Portfolio of New Cars...

KIT, GRAND TOURING and SHOW

Alfa Romeo





Alfa Romeo

Alfa Romeo's Montreal is a Bertone creation, originally for the Montreal Exposition and now in series production and for export. Though the price has not been set, it will obviously be high and thus, the Montreal fills a great gap in the Alfa line which for a number of years has lacked a truly prestige series. This Grand Tourer is on a wheelbase of 92.5 inches, measures 166.0-inches overall and weighs 2,790 lbs.

With a V-8, dohc-engine of 2,593-cc (158-cu.-ins.) and 230-horsepower, the Montreal is capable of the standing quarter in 11.3 seconds at 123 mph, and a top speed of 135 mph. The engine is a development of the successful Type 33 racing car and is the first V-8 built by Alfa since the prototype S11 series of 1936-1940. About the only other series approaching it since was the 6-cylinder 2600 Sprint of 1962. It is the first 8-cylinder Alfa since the Type 159 racing car of 1951.

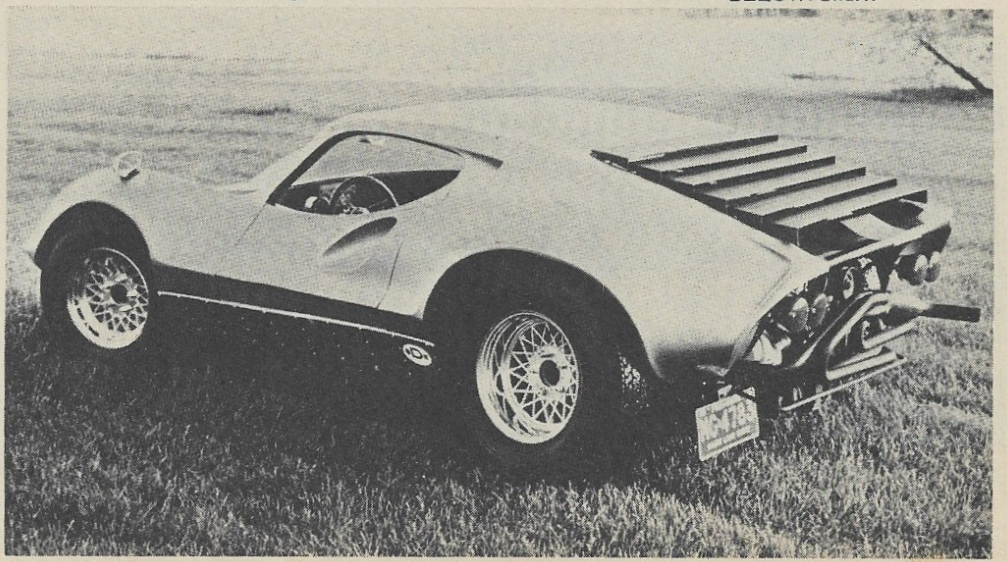
With high domed instrumentation reminiscent of certain Mercedes models, the Montreal offers, in the words of the press release, "a real command module." Provision is made for air-conditioning. Disc brakes, 5-speed transmission and a light-alloy live rear axle are standard, as is a self-locking differential. There is 1.46 horsepower for each cubic inch of displacement and fuel injection is provided to meet U.S. emission requirements.

Dodge Challenger

In order to meet homologation requirements for SCCA's Trans-Am series for "production sedans," Dodge will place on sale a limited (2,500) number of Challenger models with a triple-carbureted 340-cubic-inch V-8 that also has a modified block, special cylinder heads and a valve train modified for its own unique cam and push-rod angle. The exhaust exiting from in front of the rear wheels is standard, making the car

ABOVE: Challenger

BELOW: Shark



ABOVE: Maverick

technically illegal in some states. There is front-disc braking and the hood is of fiberglass with functional scoops. Thankfully, "Scat Pack" decals and racing stripes have been omitted.

Manx SR

Representative of the new generation of dune buggies is Bruce Meyers' new Manx SR, featuring a removable Targa-type sunroof which stores in a locker under the front hood. The rear part of the roof and window remain in place. The kit body fits on the usual VW chassis shortened to 80 inches and all operating systems are intended to originate from VW. The SR is essentially a two-seater but has a platform in back which can be upholstered to accommodate small children. What Bruce calls his "all-inclusive" kit is now being marketed through 200 B.F. Meyers & Co. dealers for $895.

Shark

Following more normal practice for VW sports conversions in fiberglass but wilder than most is Kellison's new Shark. Apparently Ford never patented the useful and removable rear-window styling that is both busy and functional. The wheels shown are by Trans-American. This kit requires 10 inches to be taken off your VW chassis and since sports conversions are quite a bit more complicated than dune buggies, in the sense that they are designed around non-VW components such as window glass that must be scrounged in wrecking yards, we suggest you first send $5 to Kellison, Inc., Dept. WCG, Highway 99-E, Lincoln, Calif. 95648 for their assembly manual. This should tell you just what you need but maybe don't have.

Garmisch

Bertone has also from time to time been commissioned by the Germans to "soften" their typically heavy coachwork. An example of what he can accomplish is a modification of the BMW 2002 TI called "Garmisch." Actually, this implied criticism of German styling is not the publicly stated reason-for-being of the Garmisch. It is one of several recent Bertone efforts, the most notable previous one being the Fiat 128 Executive, to give distinction to a volume small sedan at a modest surcharge if the modification is placed in production. The Garmisch you see here probably will be produced minus, of course, its auto show garnishings such as the wrap-around glass over the lights.

Citroen SM

The long-awaited Citroen SM with 180-horsepower, 2,670-cc, dohc Maserati V-6 power is finally appearing at auto shows. From some angles it is an extremely good-looking car; from others, it is strongly reminiscent of the familiar and always controversial DS whose complicated hydro-pneumatic underpinnings it uses. They claim 135 mph for it, but one must really love Citroens to pay in Europe close to $9,000 U.S. It's expected for sale here at some indefinite date and Citroen enthusiasts—mainly cyrogenic and the like engineers when the prosperity of our aerospace industry permits the indulgence—may just take to it. In any case and under any body at any price, the Citroen is currently the world's most advanced motor car.

And finally back to reality we see what may be a portent of things to come, what with agitation for lead-free gasoline and the high insurance costs if you specify anything over 250 horsepower. This portent is in the form of "Grabber" models by Ford involving, reading the picture from rear to front, a 302-cubic-inch Mustang and a gussied-up six-cylinder Maverick. It's hard to get excited about them but they could be all that will be left to honk your horn in 1972 or so.

(Continued on Page 58)

BELOW: BMW

BELOW: Citroen

BELOW:Manx

STOP CAR THEFTS!... ...advice from a pro

by Robert Beasley No. 72422

From behind the walls of the world's largest prison at Jackson, Michigan, comes authentic word on how car thieves think and operate—and, what you can do to protect your car from being looted or stolen.

You would probably laugh at the thought of helping a thief steal your car. Yet, last year over two million Americans did just that! Not voluntarily or consciously, but through plain carelessness.

How do owners help thieves steal their cars? Well, police records over the years reveal that more cars are stolen from dark streets than any other place. Records also show that most stolen cars are reported as unlocked at the time of loss.

As one thief with over 25 years experience put it: "Any car I see on a dark street, with doors unlocked or windows ajar, belongs to me if I want it. It's stupid to risk getting caught stealing a locked car on a lighted street when I know that within a block of that one, I can find another car I can steal under ideal conditions."

Another veteran thief commented: "It's amazing how easy people made it for me. I've stolen lots of cars that had keys in the switch, and some with titles and gasoline credit cards in the glove box."

While locked cars aren't a guarantee against theft, unlocked ones offer definite invitations to criminals. If they want a car badly enough they will force a vent, smash a window or slit a top, and quickly close the ignition switch with jump-wires hooked up either from behind the dash or under the hood.

Experienced thieves avoid exposing themselves under lighted conditions. Teen-age joy riders, who are responsible for at least 75 per cent of all stolen cars, also avoid lighted streets. Both will generally pass up cars that are securely locked.

When you park on the street select one with a lot of traffic and find a spot near a utility lamp, or where there is light from store windows. Since thieves generally don't know who owns a car, they're frightened away by *anyone* approaching.

The best protection is to install an extra ignition switch in a hidden spot, which opens the circuit directly at the coil or distributor. Regardless of how much a thief might want your car, if the hidden switch makes it difficult to start, he'll abandon the attempt in a hurry. A 50-cent switch concealed in the glove compartment, behind the dash, or under the seat, will give as much protection as a $50 alarm system.

Next to dark streets public parking lots are great favorites for both professional and joy-riding car thieves because many lots make you leave the ignition key in the car. Whenever possible avoid these lots and find one where you can lock your car. It might mean walking an extra block, but your car will be much safer.

If you do park where you are required to leave your key, leave the ignition key *only*. Many thieves work with parking lot attendants. If you leave house or office keys in the ignition, you might be victimized by burglars who can make duplicates from your keys. If you leave the trunk key, you are in danger of losing your spare tire and wheel plus anything else of value that you might have in the trunk.

When claiming your car from a lot make a visual check of the tires. Where cars are parked for several hours, they can be shuttled to a remote corner and new tires and batteries switched for old ones. Before driving away from a lot, also check the ammeter. If it registers full charge, and you know your new battery shouldn't be charging so heavily, or if the car is hard to start, check your battery to make sure it hasn't been switched for a derelict.

Dishonest lot attendants sometimes rent cars scheduled for several hours parking to fellow thieves. This way, crooks have reasonably safe transportation for other crimes since the owner doesn't know it's being used and the car isn't reported stolen. After the car has been used for the designated illegal purpose, it is returned to the lot. This "rental" racket is particularly prevalent on lots catering to the evening show trade, where it is easy to tell how long the owner will be gone. One thief interviewed told how he "rented" cars in this manner, which also contained house keys, and burglarized the home using the victim's own car, a technique that did not attract attention from neighbors.

Whenever possible select a lot with the rear and sides fenced in, since most cars are stolen from these areas while attendants are busy at the front. Never tell attendants you'll be gone for a long time. Be evasive if they ask how long you'll be. Say: "I don't know . . . 10 minutes . . . maybe an hour." Your evasiveness will provide some protection against "switch thefts," usually perpetrated on cars sure to be parked at least an hour. Check your gas gauge and mileage record when leaving your car and before driving it away. Your mileage reading will instantly tell whether anyone has driven your car. The gas gauge will show if gasoline has been siphoned, a common practice on some lots. Report any irregularities to the management, and police, *before leaving the lot.* Once you have driven away, it's almost impossible to establish that a theft occurred while the car was parked.

Thieves specializing in stealing *from* automobiles, rather than taking the actual cars, are known in criminal parlance as "car boosters." Although they steal from any car, anywhere, they generally operate along well traveled highways or around vacation and sports areas. Working from predetermined and proven patterns, they simply wait for victims to come to them.

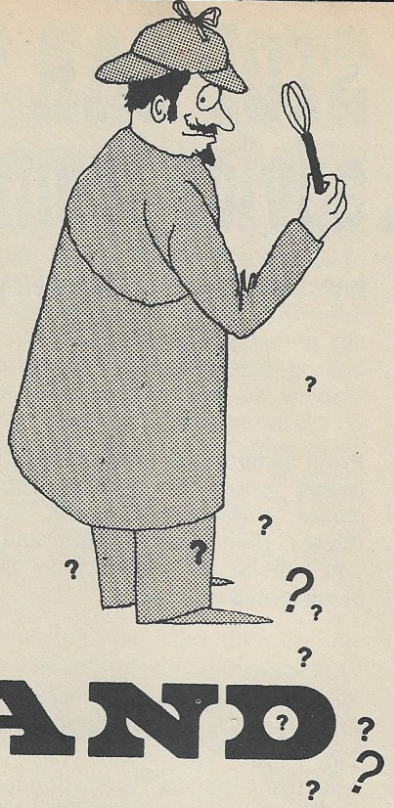
A popular procedure is to wait near large restaurants along interstate highways. When a car loaded with luggage is parked and the occupants go inside, the thieves know they'll be gone for about an hour. A tire iron is applied to a vent, or a sharp blade to a convertible top, and the luggage is transferred to their car before the victims are comfortably seated at their table. Again the protective factor is light. If a car is parked in a well lighted spot in front of the restaurant, thieves probably won't bother it.

Sportsmen who leave guns, fishing gear, outboard motors, cameras and other valuable equipment in plain sight are inviting car boosters. While it may be inconvenient to carry these items in your trunk, they're much safer there because this type of thief usually steals only what he can see.

A final caution is to know your license tag numbers and check them daily. Frequently thieves steal tags (or just one) from parked cars and later use them on stolen cars for other crimes. They sometimes steal plates and substitute them with "hot tags," knowing the average person doesn't check his plates. This can cause your arrest for using a false license, or becoming involved with the law from your numbers being used on another vehicle connected with a crime.

A few drops of solder on bolt threads, or burring of the threads, will safeguard your tags. It might mean a little extra work changing them next year, but it offers good insurance against theft of your tags this year.

WAS THE VW INVENTED IN CLEVELAND?



by Daniel M. Costigan
photos courtesy White Motor Corp.

No one has seriously made such a claim but something did occur in Cleveland, Ohio, in 1939 which was, in retrospect, curiously prophetic. It was in the spring of that year that a little panel type delivery van called the "White Horse" was unveiled by the White Motor Corporation, a prominent Cleveland manufacturer of trucks and buses. The event may not have been particularly unique, but the White Horse was.

For one thing, it *looked* different. It lacked the customary protrusion up front where the engine ought to have been and yet, the interior did not appear particularly compressed. Otherwise, it had a rather plain look about it, which some might even have characterized as homely.

But the little truck's real uniqueness lay hidden between its rear wheels. There beneath the floor resided an integrated engine-transmission that delivered power directly to the rear axles. To make things even more interesting, the designers had chosen to make the engine a four-cylinder, air-cooled aviation type. Now, is this beginning to sound familiar?

There was, of course, nothing particularly unique about an air-cooled engine *per se.* It was standard for aircraft and motorcycles, and was the only type of engine America's Franklin car had ever known. And as for mounting it in the rear, that had been standard practice in most of the early runabouts.

Nevertheless, by 1939, both concepts had been pretty much consigned to oblivion by the automotive world, and that was what made the White Horse something special.

A year before the little truck made its debut, a similar unveiling had taken place across the Atlantic in Germany. The occasion was the dedication of the new Volkswagen plant in Wolfsburg. On display at that event were a handful of prototype autos, beneath whose bug-like exteriors resided power plants remarkably similar to those that were then being readied for production for the White Horse in Cleveland.

As things turned out, the world was not to see the first production VWs until 1945, and it was to be yet another five years before the "Transporter", the VW equivalent of the White Horse, was officially introduced.

But, getting back to Cleveland, we have to backstep a bit to pick up the real beginning of the White Horse story. According to O.F. Quartullo, the now retired engineer in charge of the project, it was sometime in 1935 that the decision was made at White Motors to provide merchants, particularly house-to-house retailers, with an economical light delivery vehicle that would be in keeping with depression austerity. The first prototypes were turned out at the end of that year.

It is ironic that Ferdinand Porsche, the celebrated Austrian engineer who had been given the task of designing the Volkswagen, had visited Cincinnati in the fall of 1936. It was one of several U.S. cities where he had visited factories to pick up pointers on American mass production techniques.* Had his itinerary included Cleveland, some 200 miles northeast of Cincinnati, he might have had a glimpse of the little truck which embodied some of the very ideas that had only recently taken shape on his own drawing boards back in Germany. (The first VW prototypes were completed in October of that year.)

In the advertising campaign accompanying official introduction of its little steel "Horse" in the spring of 1939, White Motors cited the statistic that there were ". . fewer than 5,000,000 motor trucks in the U.S. today, and 11,163,000 horses." Hopefully the new little truck, despite its name, would play a big part in correcting that imbalance.

It had a lot going for it. Besides the cleverly designed air-cooled propulsion unit which could be easily removed from the rear for repairs, it was compact, being about two feet shorter than the average truck of comparable capacity. It had an all-welded steel body, and could get 25 miles to the gallon. The price was $1,260, FOB Cleveland.

White also sought through its ads to

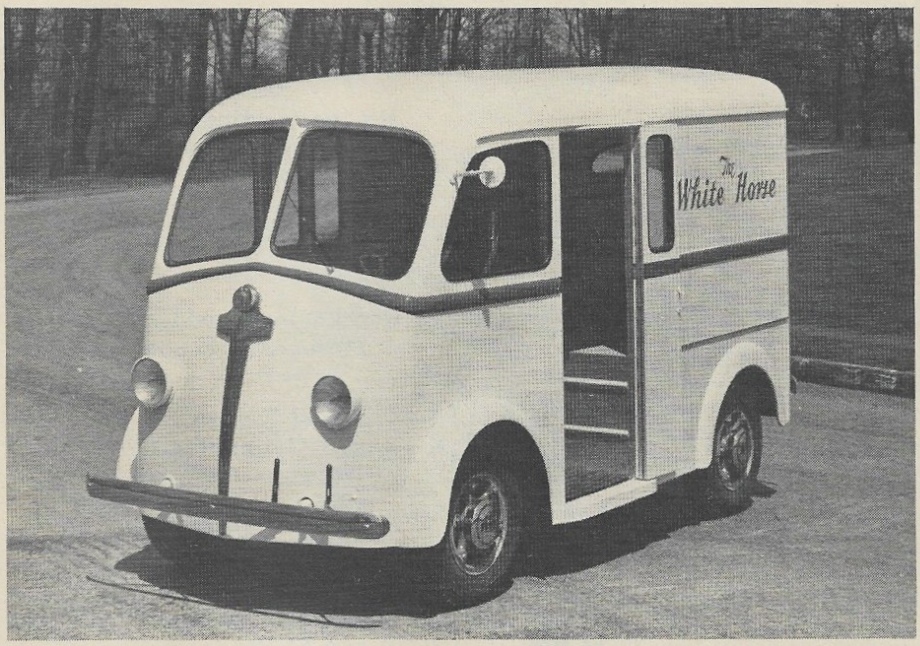
stimulate interest among car dealers to handle the little truck as a sideline. How successful this aspect of the venture would have been, had the war not interfered, is hard to say.

By early 1940 bakeries, dairies and various other businesses by the hundreds, from coast to coast and even in some foreign countries including Germany had purchased White Horses. Of these many were multiple purchases, a couple of them amounting to entire fleets of more than 200 trucks to a single customer. By the end of the following year when the U.S. entered World War II and White Horse production had to be suspended, a total of some 4,500 units had been produced and sold. That may not sound like much by today's standards but, considering the depressed state of the economy at the time, it was not a bad score.

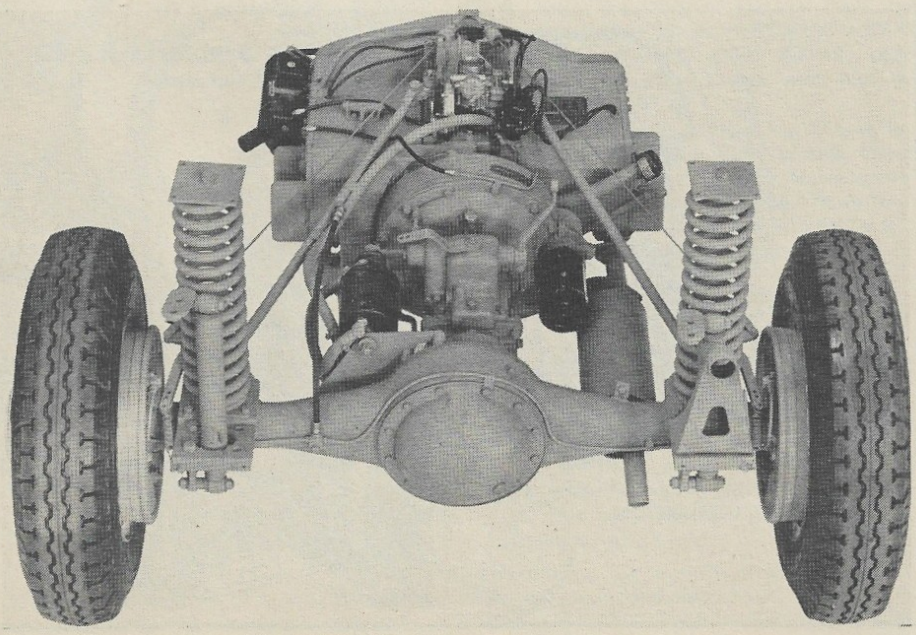
Throughout the early years of the war White Motors continued to bill itself in its advertisements as the builder of " . . . the famous White Horse." But, according to G.C. Frank, an administrative assistant with the firm, the White Horse production line had meanwhile been entirely dismantled to accommodate production of sub-assemblies for army tanks.

No doubt it had originally been White's intention to resume production of the White Horse after the war but by the time the war ended, the changing economic picture had apparently caused a shift in product emphasis and, sadly, the once-triumphant little van was retired to the status of a little known automotive milestone.

So, while it is well established that the Volkswagen *did not* originate in Cleveland, Ohio, one almost has to concede that the VW Transporter, introduced in 1950, was the reincarnation of a vehicle that *had.* The Transporter's introduction marked the return, in spirit, of a "horse" of the same breed that was born in that midwestern city, and perished there—a war casualty—within an all-too-brief span of time, some thirty years ago.



1939 White Horse with its air-cooled, rear-mounted four-cylinder engine resembles in many respects Porsche's basic Volkswagen design but both were developed independently. It lacked, though, a swing axle.



Power unit was an adaptation of the Franklin air-cooled aviation engine designed by the late Carl Doman. His firm survived the Franklin closure and later furnished engines for the prototype Tuckers, becoming Tucker's major asset upon his failure.

* See Nelson, W.H. - *Small Wonder* (Boston - Little, Brown & Co. - 1965).

WCG

Reader's Forum

(Continued from Page 6)

not could you please give me an address where I could get more information?

J. O. Conner
Manhattan Beach, Calif.

You can get full information, inspect the vehicles and have a ride in one right around the corner from where you live. The U.S. distributor for the 55-horsepower, diesel-engined Hanomag is General Propulsion, Inc., 16222 Pacific Coast Highway, Huntington Beach, Calif. 92647 where a Mr. William J. Norton presides over sales. The 116-inch vehicle in bus form but without camping equipment costs $4,400 and it is also sold complete with conversion. There are two types, one outfitted in Germany at $5,900 and the other done locally at $6,400. Mr. Norton has promised WCG a road test vehicle in the near future. We hope that this answers the questions about Hanomags from many other readers that have written too.

Comments on the Fiat 850

Sirs: Some comments on your Fiat 850 Sports Racer test in the March '70 issue of WCG: I own a '67 Fiat 850 fastback, which seems fairly comparable, and I enjoy it greatly. Though I am 6' 2½" tall and weigh about 245 pounds, I find little difficulty getting into my 850 as long as there is room to open the door fairly wide. But my height might be helping me here, as the seat is all the way back. By the second day of driving my shoes (12E) stopped getting tangled in the pedals. It takes some getting used to, but it's not that hard. With that straight-arm driving position, the car is a delight to drive, 500 miles in a day leaves you tired, but without all the assorted kinks that Detroit iron usually gives me. As to the 90 mph claimed, I've gotten 88 indicated from my '67, with 6 hp and 50 cc less, and the engine certainly sounds happy enough. About 70 mph, though, there's no acceleration to speak of. I question your 35 mpg, but maybe

(Continued on Page 32)

Reader's Forum

(Continued from Page 31)

you drive easier than I do. In Manhattan traffic I average 20.7 mpg; flat-out it's 26.4 mpg. At 45-60 mph it would be higher, but I don't know how much. I also don't know about the Sports Racer, but the coupe has a tendency to lighten at the front and wander slightly about 60 mph unless you put a big suitcase in the trunk. Then it's stable all the way up to that indicated 88 top speed. Crosswind stability is good.

Ivan Berger
New York, N.Y.

We do drive more easily on the highway because with no license there would be no road tests and with no road tests, there would be no magazine. Also, the cops will pick on a red sports car while ignoring a black Chevy sedan going by at twice the speed.

WCG Gremlin

(Continued from Page 15)

test an automatic but we presume that the bigger engine would be rather necessary for it to perform measurably better than an economy import, and if you don't want this performance, why a Gremlin?

There is one solid argument in its favor with either engine, but it applies only when the Gremlin is compared with rear-engined cars. It is rock stable in strong crosswinds, partly due to the conventional location of the engine and partly to its relatively wide 57-inch tread. Also, when driving the car you don't notice the chopped off rear end, only the long hood in front of you with American standards of space between you and the windshield. Although the overall dimensions proves you're not, your impression inside will be that you're driving a full-size American "compact."

This impression carries over into handling. There is an impression of mass and stability. You don't hippety-hop over joints in the pavement or get tugged at by road irregularities in line with your motion. It's a weird feeling, though, the first time you back into a parallel parking spot. You first have to watch the long hood and then it seems like you never can get close to the car behind. It's kind of the opposite of parking a Volkswagen bus.

We can't, however, get quite so enthusiastic about the Gremlin's cornering abilities. The car has American Motors' usual McPherson struts and coil springs in front with leaf springs in the rear. As we mentioned in our first report (WCG, April '70) AMC has never quite mastered this arrangement as well as have Sunbeam and several Italian makes. If you go around a corner too fast, you'll end up shoveling off at a tangent to it. With the big engine this can be corrected to an extent by the application of power, but not with the smaller one. However, it's a symptom that will never bother you in normal driving and we doubt if Gremlins will ever appear on race tracks. Their cubic inches would put them into the Grand Touring category and the Gremlin isn't a Grand Tourer, nor meant to be.

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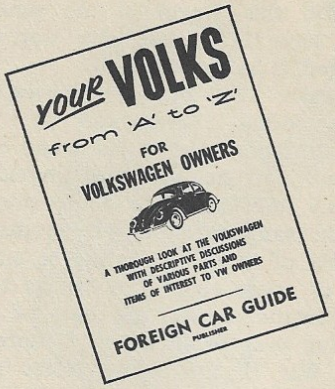
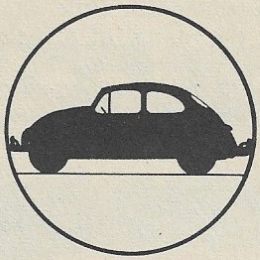
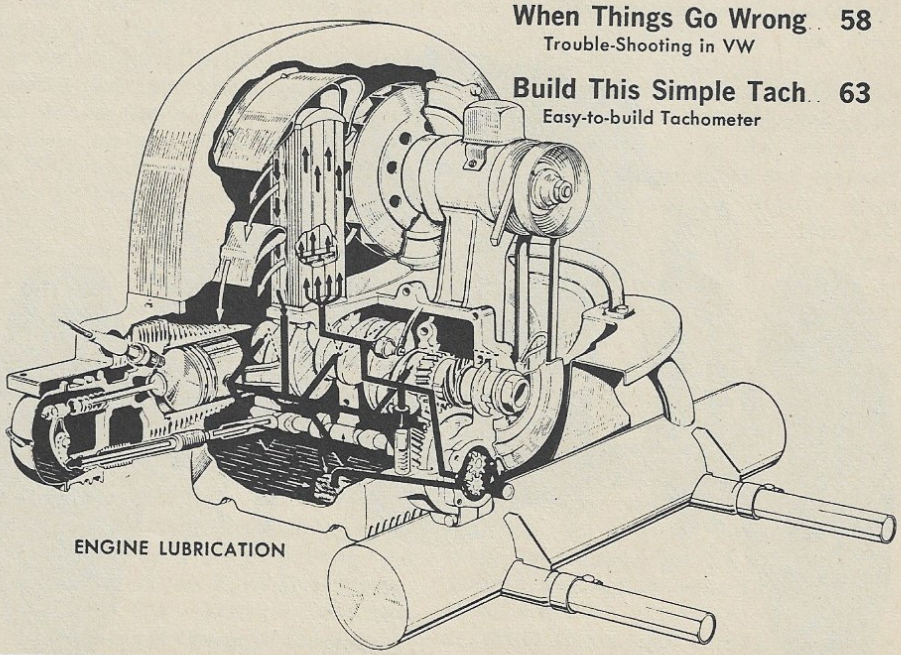




VW FACTS INFORMATION INSTRUCTION VW



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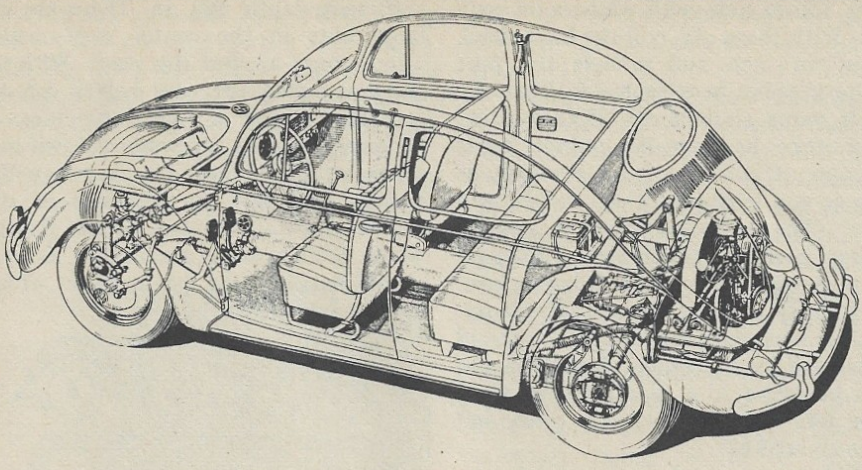

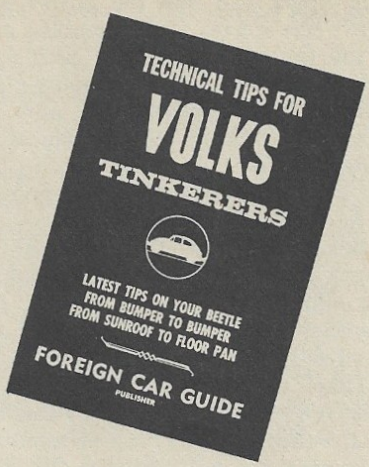

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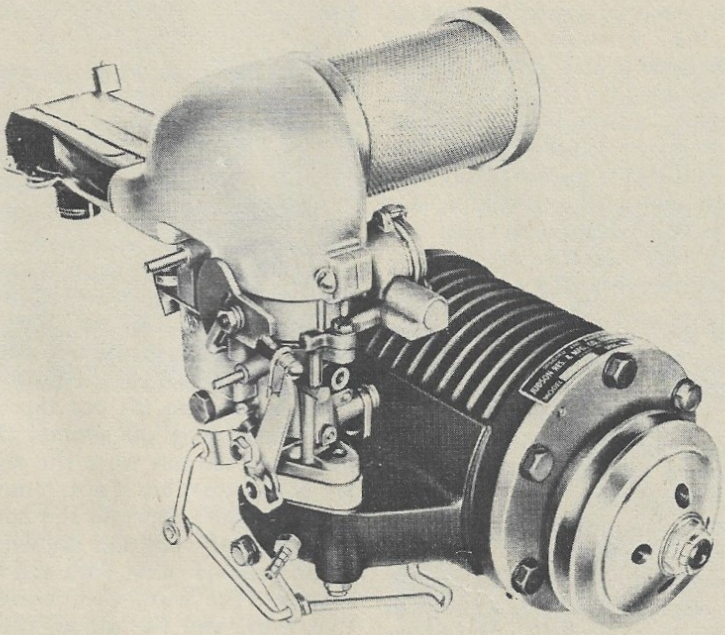
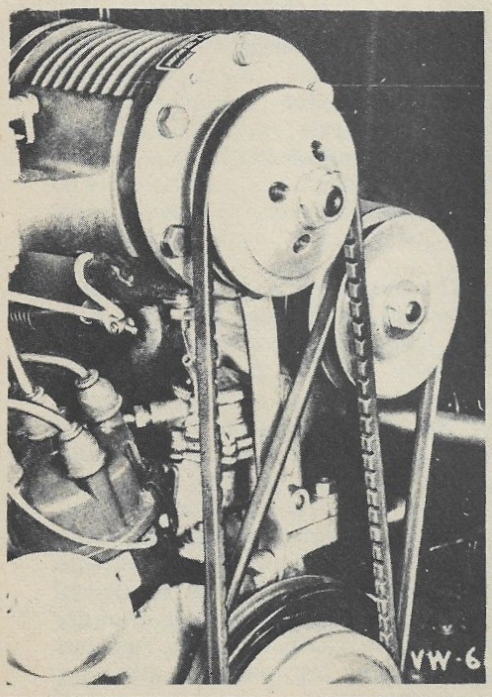


Complete supercharger and air cleaner for 40 hp VW of 1961 and after is basically the same as earlier model but differs in detail so the two are not directly interchangeable.



VW

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VW

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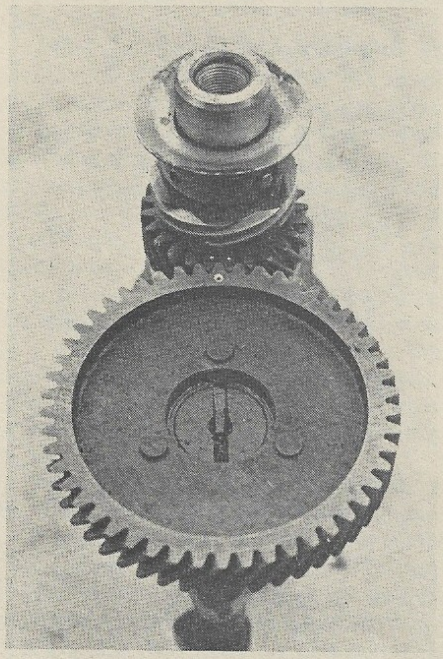
(Continued from Page 9)

Snap the spring clips on the valve covers down and pull the covers off. Remove the rocker arm assemblies and pull the four pushrods from each side. Remove the clutch and pressure-plate assembly. The flywheel can now be removed by bolting the two pieces of flat steel across it, using the clutch plate bolts, so that they extend in opposite directions (see figure 1). Use the 1-7/16 in. socket and a stout handle (not a ratchet). It may be necessary to extend the handle with a piece of pipe to get enough leverage. Once the big gland nut is removed, the flywheel comes right off. Leave the steel bars attached to it.

The fan pulley is held on by one big bolt. Usually, the pulley can be removed by screwing the bolt without the lock washer back for four or five turns, prying on opposite sides of the pulley with a pair of big screwdrivers while someone taps the bolt squarely with a hammer. Hitting it too hard can damage the threads so if this method fails after several tries, a pulley puller can be rented to do the job. After the pulley is off, the sheetmetal belt guard comes off with two screws.

Screw the thermostat off and disconnect the linkage. This unit is rarely needed in warmer climates and the entire assembly can be discarded if desired.



C. White dot on the crankshaft (driving) gear should fit between the white dots on the camshaft (driven) gear. Fig. 3

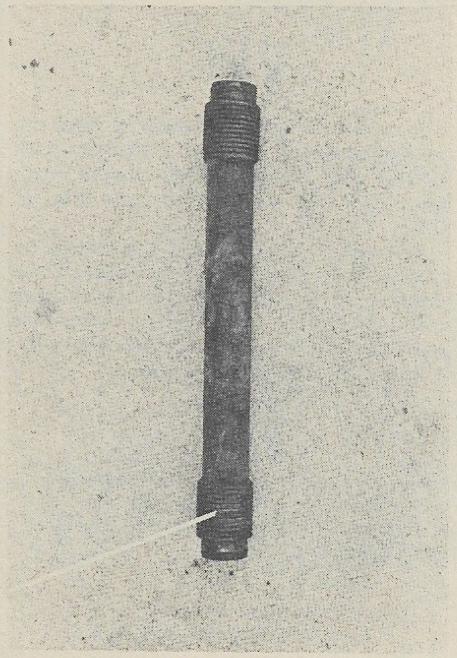
Back to the exhaust system, remove the clamps between the muffler and lower exhaust pipes, and the eight bolts attaching the pipes to the heads. Separate the muffler from the lower exhaust pipes. This, though, is sometimes impossible due to rust. If all else fails, hacksaw the pipe just to the engine side of the clamp flanges. The remaining piece can be worked from the muffler and repair kits are available to fix the lower exhaust pipes.

The heads come off next. There are eight 15mm nuts with washers on each side. With these off, pull the heads back about an inch and remove the four push-rod tubes from each side. Then the heads come straight off. If they stick, use a rubber hammer. If a cylinder starts to come off with the head, it's okay as long as you label it as it can be removed later. (The cylinders, pistons and all related parts are numbered as follows: Number one, right front; number two, right rear; number three, left front; number four, left rear. All parts should be labeled in that order.) The heads can now be taken to a machine shop for a valve job. This usually takes a day and costs about $12.

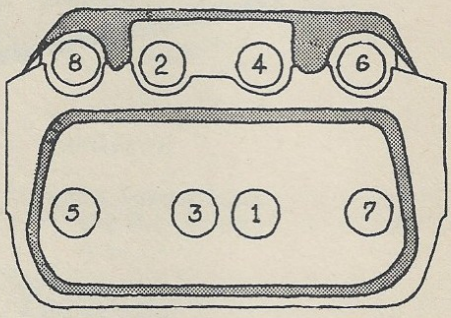
Slide each cylinder off and label it. Label the pistons to match. These parts *must* be put back as a unit. The pistons can be numbered by scratching the top. Remove the wrist-pin clips using needle-nose pliers and discard them. Using a 1/2 in. drive socket extension and a hammer, tap the pins out just far enough to remove the piston, while someone holds the piston firmly. *Do not* attempt this alone, as applying side pressure to the connecting rods can bend them. Remove the old rings by simply breaking them off.

Remove the oil screen plate and oil screen from the bottom of the engine. Remove the oil pump cover plate from the front of the engine and then pull the gears (impellers) out. Carefully pry the pump housing out by applying equal pressure to opposite sides. Be very careful not to gouge the soft aluminum, or an oil leak will develop.

The case is now ready to be split. It should be clamped lightly in a vise with the cylinder studs pointing straight up and down, the lower ones in the vise. If no vise is available, a wooden box of sufficient depth will do. There are six large nuts in the center and smaller 13mm ones around the seam. With all these removed the case halves can be separated, using a rubber hammer. If necessary, grind a screwdriver down to a sharp wedge and tap this between the halves, but *only* on the top of the engine and *only* on one of the flanges where bolts or studs are located. *Do not* wedge between the two surfaces which have to form a seal.



D. Flexible press seams in push rod should be excercised, using motion similar to extracting the cork from a champagne bottle.



E. First tighten the bottom and then the top row of head bolts to 7 lbs. ft. Then re-tighten in this order to 23 lbs. ft. Fig. 5

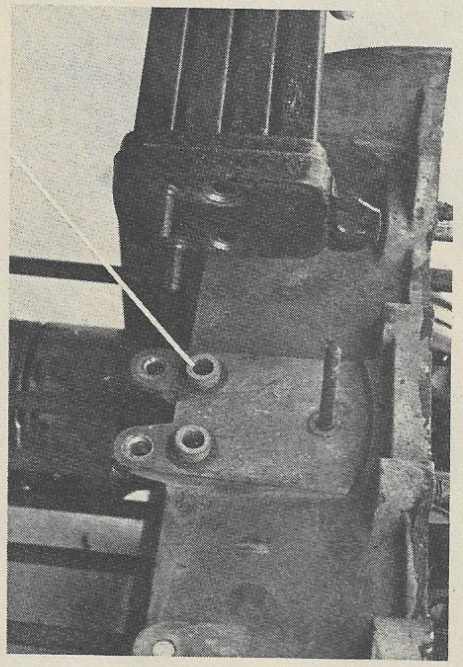
The case halves can be pulled apart and the crankshaft and connecting rods will remain in the lower half to be lifted out as a unit. But before doing so, remove the old oil seal from the flywheel end of the crankshaft. If there are shims (see figure 2), remove and set them aside. Also lift out the camshaft and set it aside. Sometimes the valve lifters will fall out when the case halves are pulled apart but if not, remove them and set aside. Separate the connecting rods and rod caps and discard the old insert bearings. Keep rods and rod caps together. The center main bearing is the split type, and the others sleeves. All come off easily except the one behind the timing gear, which will be explained later.

Main bearings	$10.40
Connecting rod bearings	5.60
Piston Rings	9.40
Overhaul gasket set	5.50
Engine main seal	1.50
Wrist pin clips (8 @ 5¢)	.40
Set of sparkplugs	4.00
Set of ignition points	1.95
	$38.75

The next step is to clean all parts thoroughly inside and out with kerosene. Use a wire brush where necessary, especially on the pistons. The ring grooves accumulate carbon, which can be removed by scraping them with a piece of the old ring. A piston-ring-groove cleaner is available from most "rent-all" shops for a first-class job.

Clean off all old gaskets completely. Hose all parts off and clean again with warm soapy water. Set all sheetmetal and aluminum parts out to dry, but dry off the crankshaft, camshaft, cylinders and any other cast-iron parts with a rag to prevent rust.

You can now take the crankshaft, pistons and cylinders to a VW shop and have them checked with a micrometer. Usually they are okay and standard bearings and rings can be used. If everything checks out, but the following parts plus any others you may need: (Prices shown are for genuine VW parts and may vary slightly from area to area.)



F. Oil-cooler seals are shown here in place on the case, with the oil cooler directly above. Fig. 6

Have the VW shop install the new main bearing behind the timing gear. This should cost around $2. You can also have them hone the cylinders for a small charge, or you can rent a glaze-breaker and do it yourself. Now, with all parts thoroughly cleaned, dry, and set out on the work bench, you can start putting it back together.

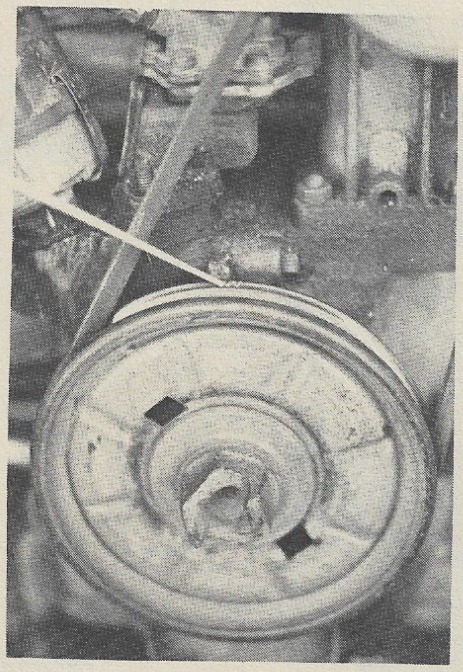
Re-assembly

The new insert bearings are installed in the connecting rods and caps. Coat the back of each with STP, Motor Honey or the like to hold them in place. Oil the surface of the bearings with a good 30-W oil, and re-install the connecting rods as they came off. There is a number stamped on the rod and cap and these numbers should both be on the same side of the crankshaft. Use a torque wrench to tighten the rod bolts to 36 lbs. ft.

Re-installing the crankshaft and camshaft is a little tricky. All parts should be assembled in the half of the case which has the alignment pins for the main bearings. This is the left side with the distributor drive. Place half of the center main in its place, and slide the others on the crankshaft, taking care that the alignment pins and holes will correspond as they are off-center. Before lowering the crankshaft into place, look at the ends of both timing gears (see figure 3). On the camshaft, there is one dot which must be aligned between the two dots on the crankshaft gear.

Check the end of the crankshaft and make sure the oil-thrower washer is cupped toward the pulley (also shown in figure 3), then lower the whole unit into the case. Starting at the flywheel end, slide the bearings around until the pins line up in the holes. You will feel them when they drop in, and the bearings will no longer slide around.

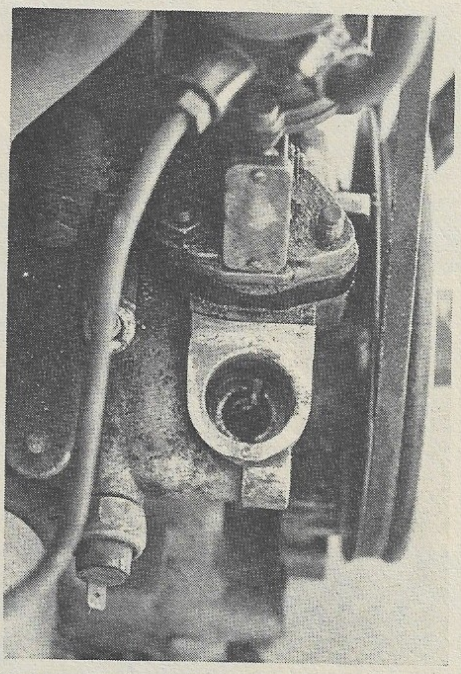
Push down on the distributor drive until it is firmly seated. Coat four of the valve lifters with oil and drop them in their holes in the case. Install the camshaft, being careful to align the timing marks as described. It is necessary to lift the end of the crankshaft in order to get the camshaft into place. Double-check the timing marks.



G. Timing marks on the fan pulley must be aligned with the seam in the case. Fig. 7

Spread a thin layer of sealing compound such as Permatex No. 2 around the edges of the lower case half. Install the one remaining half of the center main bearing and the four valve lifters in the upper case half, again using STP to hold them in place. Lower the case halves together and tighten the six large nuts to 25 lbs. ft. Wipe off excess sealing compound which oozed out. Replace the oil screen and its cover, using new gaskets and a liquid gasket sealer. Install the oil pump housing, then the impellers and cover. Tighten the smaller 13mm bolts around the seam in the case to 14 lbs. ft.

Next install the new rings. Clamp the piston lightly in a vise between two pieces of wood, or have someone hold it. Work the new rings on, oil ring first on the bottom. The two compression rings are stamped "TOP" on one side which should be up. Mash each ring down in its groove to make sure there are no remaining carbon deposits. The rings should turn freely in the grooves. Turn the crankshaft around so that the number one connecting rod is at the top of its travel. Install a new wrist pin clip in each piston opposite the rod, and replace each piston in order, using the same method as for removing them. There is an arrow stamped on the top of each piston which should point toward the flywheel. Take care when turning the crankshaft around for each successive piston that you do not break one of the pistons on the opposite side. With the wrist pins tapped all the way, the other clips can be snapped in with needle nose pliers.



H. Here the distributor drive pinion is in the correct position to install the distributor. Slot is approximately parallel to the pulley. Fig. 8

Pry the old copper gasket off the top of the cylinders and replace it with a new one, seam down. Coat the lower cylinder paper gaskets with STP to hold them in place. The rings should be arranged so that the gap in the oil ring points straight up (12 o'clock) and the gaps in the compression rings at 4 o'clock and 8 o'clock. A ring depressor can be fashioned by cutting a piece of plumber's strap three inches long and clamping it over the rings lightly with a hose clamp. The rings should be all the way down in their grooves and the inside of the cylinders coated with oil. Tap them on past the rings using a block of wood across the top. Remove the clamp and push the cylinder in until it seats against the case. With the cylinders all in place, next snap the sheet metal air deflectors onto the studs beneath the cylinders.

The ends of the push rod tubes have press seams similar to those on flexible drinking straws (see figure 4). Work

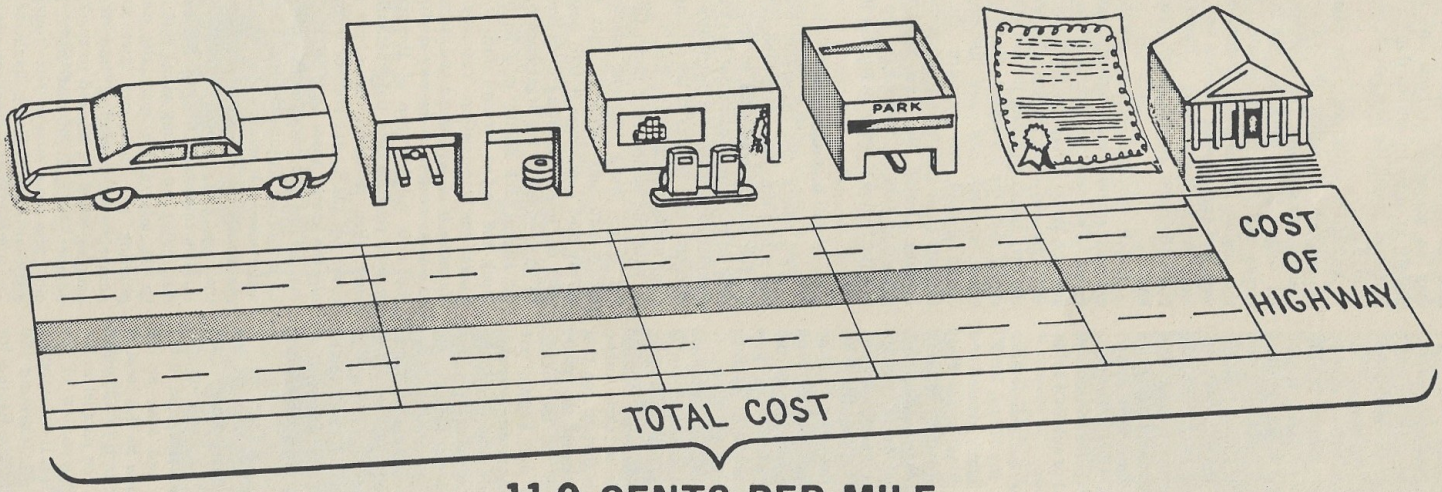
(Continued on Page 38)

WATCH THE LEGS—Entering a 1970 Dodge Challenger or any of the other lower new cars in a Mini skirt without drawing a crowd is really a simple procedure. Model Paula Mitchell demonstrates the three easy steps. First, sit with your back to the inside of the car. Then, keeping your knees together, swing both legs up and over the door sill. Once your feet are inside the car, center yourself in the seat and move your feet into position to operate the foot controls. Now, close the door, buckle your seat belt and shoulder harness and you're ready for the highway.

COST OF OPERATING AN AUTOMOBILE

CENTS PER MILE

3.2 CENTS	1.9 CENTS	1.9 CENTS	1.8 CENTS	1.7 CENTS	1.4 CENTS
VEHICLE COST DEPRECIATED	MAINTENANCE, ACCESSORIES, PARTS & TIRES	GAS & OIL (excluding taxes)	GARAGE, PARKING & TOLLS	INSURANCE	STATE & FEDERAL TAXES



11.9 CENTS PER MILE

An analysis of automobile operating costs by the Federal Highway Administration's Bureau of Public Roads shows that the cost of highways (taxes) is only 1.4 cents of the total 11.9 cents per mile it costs to own and operate an automobile. The analysis is based on a $3,185 car driven 100,000 miles over a 10-year life span.

(Continued from Page 35)

these around with your thumbs in the same manner as you would work the cork from a champagne bottle. This stretches them a little and assures an oil-tight fit. Install the new seals, curved edge out.

You're now ready to install the heads. Slide the head part way on the studs. Align the push-rod tubes carefully and push the heads on until they seat. Tighten the nuts first to 7 lbs. ft. and then retighten to 23 lbs. ft. (see figure 5 for the correct tightening order).

Install the shims on the end of the crankshaft, and then the flywheel, and tighten the nut down snug. Push the flywheel hard toward the engine, then pry it out with a screwdriver. There should be a very slight movement—about .002 to .006 ins. Usually the same shims that were in it before will be all right, but you can add or subtract shims as necessary.

When the end play is right, remove the flywheel but not the shims. Install the seal. It should be lightly greased and tapped into place, using a block of wood, until it is seated which is about 1/32-in. below the surface of the case.

Put the flywheel back on and tighten the nut—217 lbs. ft. is correct, but most torque wrenches don't go that far. With a piece of pipe over the handle of the wrench so that it is about four feet long over all, and someone standing on the engine and holding the steel bars, you can get a sufficient amount of leverage to tighten it satisfactorily.

Install the clutch plate and pressure plate. Make sure the clutch plate is centered perfectly. This can be done by sight if you're very careful.

Put the push rods in their tubes, blowing through each first to see that the oil passage is clear. Install the rocker arm assemblies. Install the fan pulley, making sure the key and keyway are lined up before tapping it on. Re-install the oil cooler, using new seals (see figure 6). The seals look like pieces of rubber hose about 1/4-ins. long. Replace the generator tower and thermostat (if desired). The two sheetmetal cylinder covers go on next, with two screws in each. Then install the intake manifold using new gaskets, seam down. Tighten each pair of nuts evenly so that it seats squarely on the head. Stuff a rag in the opening.

The distributor is next. Remove the old sparkplugs and discard them. Turn the engine so that the mark on the pulley is lined up with the seam in the case (see figure 7), and look at the distributor drive pinion in the case. A slot divides the circle into two unequal parts. The slot should be parallel to the pulley and the smaller section of the circle toward the pulley. If the opposite is true, turn the crankshaft around 180 degrees and check again (see figure 8 for correct position). Drop the spring in the center of the slot. Point the rotor toward the mark on the distributor body (see figure 9). With the clamp bracket lined up with the stud in the case, the distributor should slide in. It may be necessary to twist the rotor slightly in order to get the dog to drop in its slot. Install the new points, and set to .016 ins.

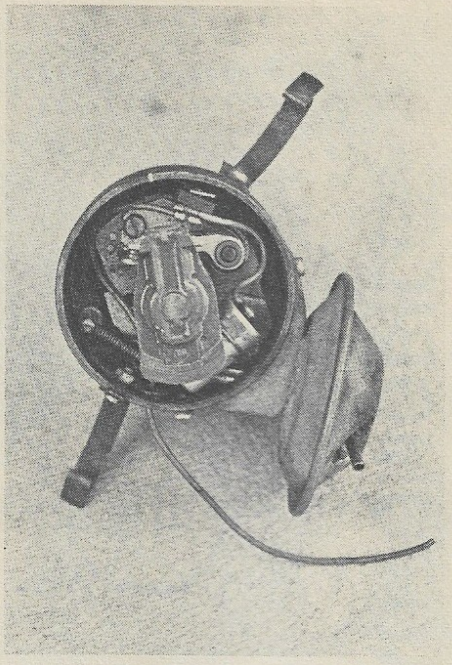
Adjust the valves next. The engine is in position to adjust the valves on number one cylinder. The clearances are set with a feeler gauge at .008 in. for intake and .012 in. for exhaust. Turn the engine 180 degrees counter-clockwise and repeat with number two, and again for each successive cylinder. Replace the valve covers, using new gaskets.

Install the fuel pump. Install the exhaust system and heater junction boxes. The rear sheetmetal splash pan goes on next. Install the steel fuel line, with the end of it through the hole in the rear splash pan. Slip the fan housing down over the oil cooler. Replace the screw at each end, and tighten the clamp around the generator. Put the throttle cable tube back through the fan housing. Install the new sparkplugs, gapped at .028 ins., replace the fan belt, and the engine is ready to go back in the car.

Re-installation

First check the throw-out bearing and if it is the old carbon type, replace it. The engine goes back in very similarly to the way it came out but to ease installation, remove the distributor temporarily, and replace it later using the same method described earlier.

With the engine back under the car, lift it up while someone places the blocks and jack under it. Jack it up slowly and maneuever it into position, with the lower mounting studs lined up to their holes in the transmission. Tilt the engine back slightly in order to see. Work the engine forward until it seats against the transmission. You may have to move it up and down and from side to side to work it all the way in. Tighten the nuts on the top of the engine, remove the jack and tighten the lower ones, then re-tighten the upper ones. Hook up the heater control wires and slip the heater hoses back on. Hook up the gas line and push the throttle cable back through its tube in the fan housing while someone holds it in place. Install the distributor and carburetor. Connect the gas and vacuum advance lines, throttle cable and all wires. Replace the distributor cap, noting which wire is just to the left of the mark the rotor is pointing to. That wire goes to the number one sparkplug, and the remaining wires are hooked to sparkplugs number 4, 3, 2, in that order, going clockwise from number one around the distributor cap. Fill the crankcase with oil. Before lowering the car, check the free play in the clutch pedal, and adjust this if necessary. It should be about one inch. The adjusting mechanism is on the left and just in front of the engine. Hook up the battery.



I. Align the rotor with the mark on the distributor body. Fig. 9

It is best to pull the car several hundred feet in gear with the switch off before trying to start it. This gets the oil circulating and fills the carburetor with gas. New engines are tight, and sometimes hard to start with the battery. Pull it or push it, and it should fire up.

Let it run at a fast idle for a few minutes before driving. It usually takes 10 miles or so of driving, sometimes longer, before an engine will run smoothly and idle well.

Break-in

Drive at moderate speeds for the first 500 miles, and never at any one constant speed. Adjust the valves again (with the engine cold) after 100 miles, change the oil after 500, and each 90 days thereafter. Driven and maintained properly, your car should now be ready to give many more satisfactory miles of economical service, and you can buy yourself a present with the money you saved.

WCG

Gremlin

(Continued from Page 32)

Both the column shift and the floor variety are easy to manage and well-placed. The ratios are nicely spaced for the 3.08 axle ratio standard on the big-engined car, but 2nd isn't quite low enough for the little engine with its 2.73 as 1st is not synchromesh. Thus in the latter car, if you're coasting up to a light that turns green for you, you either have to come to a full stop to the annoyance of those behind or judder

out in 2nd. American Motors would seem now to be the only maker in the world still not providing a fully synchronous manual transmission, or maybe the blame should be placed on Borg-Warner who build the box. If you want the little engine, order the no-extra-cost 3.08 ratio.

Another highly desirable option for the Gremlin is the variable-ratio power steering. This cuts the wheel turns from lock-to-lock from 5.7 to 3.2, which is well worth the little horsepower it steals. Power steering is another item which traditionally pays for itself at trade-in time.

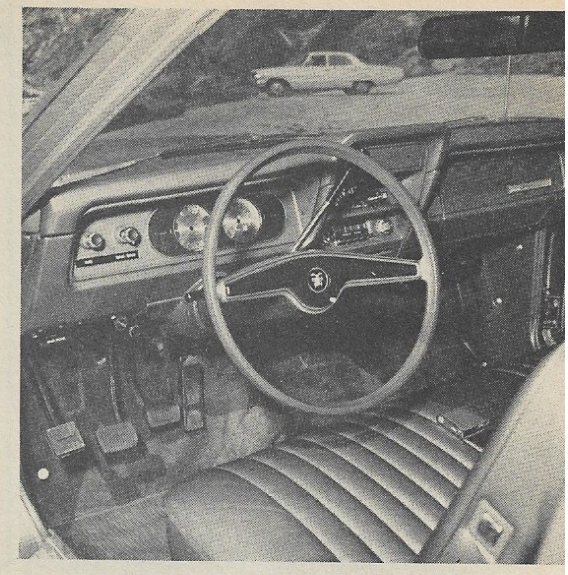
For its low price the Gremlin is quite richly trimmed with carpeting extending even into the luggage area and a dashboard that doesn't look like it was borrowed from a $7 Japanese transistor radio. There are gauges for fuel and heat, a nice round 120 mph speedometer which isn't likely to be busted against its peg and a step-on parking brake. When you order the optional air-conditioning, it's built-in rather than of the space consuming hang-on variety. The instrument cluster is held in place by only five screws and can be removed in minutes for service.

In fact, considerable attention has been paid to ease of service. Since the front end of the Gremlin is borrowed directly from the Hornet, it is designed to ultimately accept a wide V-8. This leaves the present sixes with enough space on either side for a mechanic to crawl in and lie down alongside them if he wishes. He's liable to get wet, though, if you drive off without noticing him because there is no road-splash protection whatever. Presumably, the electricals have been adequately waterproofed but we didn't have occasion to drive the car on a rainy day.

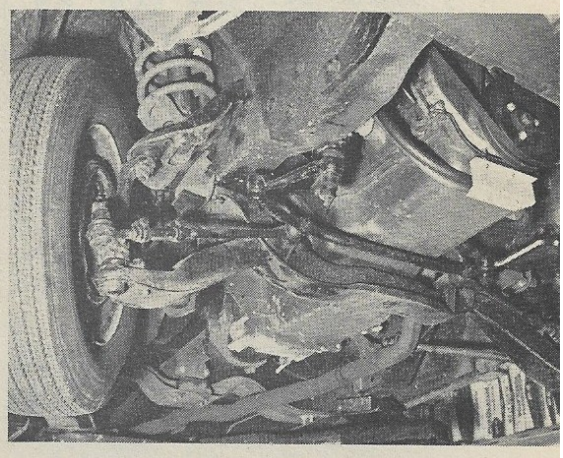
American Motor's Nash predecessor was the first to provide a built-in, full-flow ventilating system and it's still one of the best in the business. They did not have to redesign at all with the advent of ventless side glass and that the Gremlin has. If you've ever had a tendency to cheat on Smokey Bear and flick ashes out the window, you won't anymore as they'll float right back in your lap. With the driver's window full open, the blast of air is annoying and so, too, is road noise. With windows shut and the ventilating system in action, the car is very quiet at any legal speed.

But back to performance for a moment, the Gremlin reminds us very much of the late and lamented Corvair Monza coupe which was the 140-horsepower model. Both cars weigh approximately the same at 2,600 lbs. The Monza would make zero to 60 mph with an automatic in 11.9 seconds, the Gremlin with stick shift in 11.7. They both will perform the 40-60 and 50-70 mph passing manuevers in about 7.5 seconds, a performance parameter which is sadly lacking in most economy imports. We don't have Monza figures for the standing quarter-mile and they're academic anyway, but for the record the 232-CID Gremlin will do it in 18.8 seconds at 77 mph, spinning its little 13-inch rears wheels in the process. There is nothing to be ashamed about with any of these figures as they're on a par with a big American family V-8.

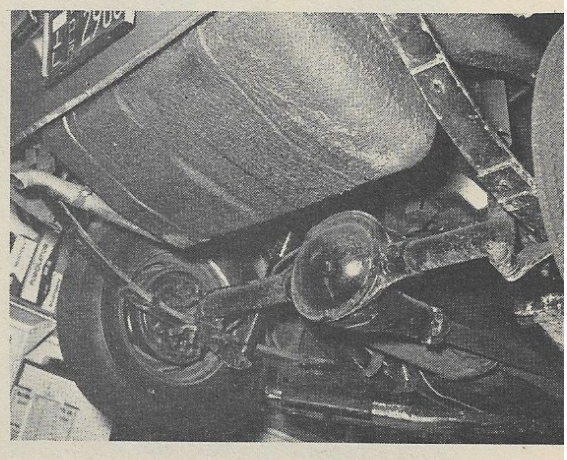
Now comes the $64 question. Will U.S. buyers who have been turning to imports at a record rate switch and take the Gremlin to heart? AMC is counting on at least 60,000 of them to do so in order for the break-even point to be reached. If 100,000 Gremlins are sold for a few years in a row, there will be a nice profit awaiting AMC stockholders. If, on the other hand, the Gremlin hadn't borrowed its running gear and front sheetmetal from the Hornet, these figures would be much higher—perhaps impossibly high. **WCG**



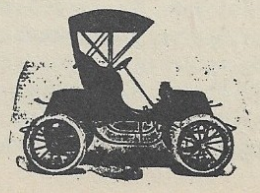
G. Gremlin instrument panel is neatly arranged and richer in appearance than most imports in its price range. This is the column shift model with bench seat.



J. Typical AMC McPherson strut and coil layout is shown here along with lack of stabilizer that comes with optional heavy-duty suspension.



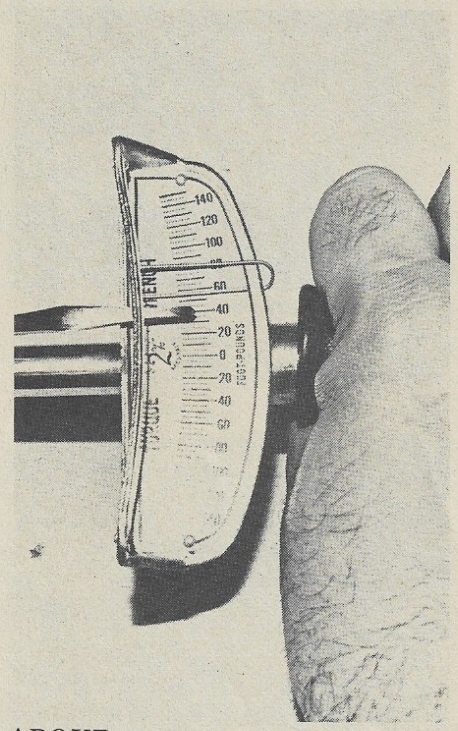
K. Rear layout is prosaic Detroit with leaf springs. Note, though, that shocks are staggered and further note the vast fuel tank.



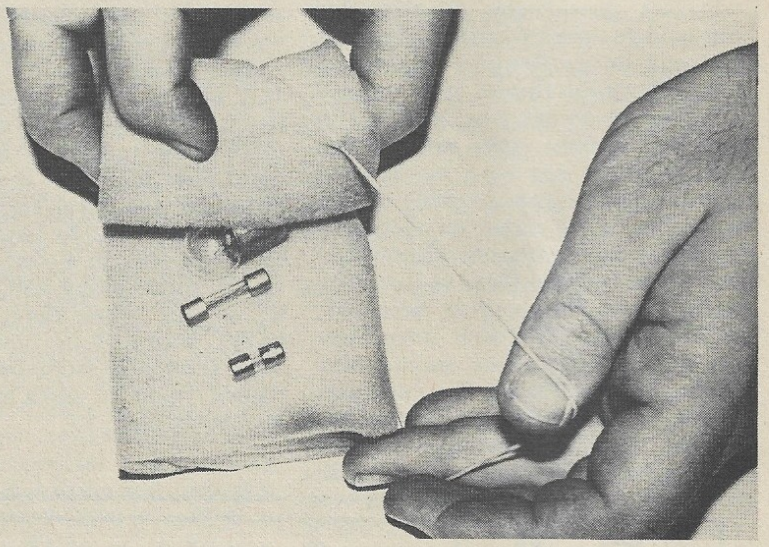
LET DAVE DO IT
LET DAVE DO IT
LET DAVE DO IT

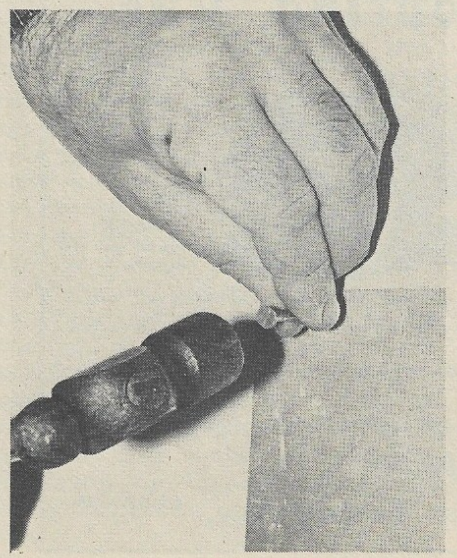
ABOVE:
FASTIDIOUS car owners cringe when somebody butts out a big, hot cigar in their freshly-cleaned ashtrays. When Junior plops his gooey wad of bubblegum in, the results are even worse. Well, here's how to keep those ash receptacles neat and bright without even getting your fingers into the mess. Next time you clean your car, line the ashtrays with household aluminum foil. Leave some excess to fold over at the top so that when you lift out the lining you can wad the whole thing into a ball for easy disposal. Helps stop litter too!

BELOW:
SPARE GLASS FUSES and light bulbs can be kept safe from accidental breakage by rolling them up in a strip of foam rubber. Place them in the roll so that they do not contact one another, and hold the roll tightly in place by looping a rubber band around it. Then, these fragile but vital replacements will be well protected whether they are carried in the trunk, glove compartment or tool box. This method of storage is good for small sharp tools too.



ABOVE:
STOP EYESTRAIN and prevent mistakes when torquing cylinder head bolts by marking the correct torque figure plainly on the wrench's scale. How? With a paper clip—what else would you expect a writer to recommend! A paperclip not only fits firmly enough so that it won't beaccidentallyknocked out of place, but can be moved around to different figures. This is especially helpful when you're making several "passes" over the bolts, each with a slightly higher torque figure. Your attention may wander but the paper clip won't.





LEFT:
IS YOUR CENTERPUNCH always on the missing persons list when it's time to drill some holes? Mine too, so here's something that will work better, last longer and cost next to nothing! Simply obtain several masonry nails of the gun-driven type from your local builders' supply. You can drop a couple of these into your bit bin, another into your tool kit and a few more into the box with the drill itself. They work as well as a centerpunch and they're cheaper, too.

WCG

HI-PERFORMANCE CORNER

by Tony Hill

Valve Float

In any gathering of automotive enthusiasts you're likely to hear the expression "I wound it out 'till the valves floated." When you do hear it, it's coming from a novice. A pro would never do that, much less talk about it. He knows what can happen if the valves float from either his own or others' experiences and long ago, he's worked over his engine to make sure that they won't float. Valve float in a competition engine invariably means a lost race and sometimes a demolished engine, the latter being the most expensive. So, let's take a look at what goes on in the valve train.

To start with we have to go right to the camshaft and explain a few fundamentals of cam design. When a cam is manufactured it has built into it a clearance or "take-up ramp" on each lobe and the degree of this is usually different for intake and exhaust valves. This, as the name implies, is that part of the cam lobe that comes around and gradually takes up the clearance that exists between the cam lobe and the lifter, a gap often called valve clearance. As the cam rotates and this play is taken up the ramp of the lobe becomes steeper and the rate of valve lift becomes progressively faster. Without getting too involved in the theory and design of camshafts, let's just say that as we get into the "wilder" types of cams, the rate of lift (speed at which the valve opens) gets much faster, as does the amount of lift or the distance which the valve is lifted off its seat.

The main function of a racing cam is to get the valves open as fast as possible, and as high as possible, and as long as possible and finally, to bring the valves back down on their seats firmly for complete sealing. Bounce or float, by definition, is a moment in this cycle when a valve or valves may be out of control.

There are a number of things that can cause valves to float, not just weak springs. But to start with, you can forget about the camshaft as the grinder has worried about this for you. He designs the cam with the proper take-up and let-down ramps, and the rate and height of the lift is custom-tailored for the usage intended for the cam.

There are two main reasons for valve float, one being the higher speeds at which performance engines are run and the other being the physical properties of the valve springs. As engine rpms go up, so does the speed at which the valve gear is moving up and down and herein lies the problem. It is the weight of the valve train—including lifters, pushrods, rocker arms, valves and retainers—that causes valve float. The laws of physics tell us that if any object which has weight is caused to move in any direction, its momentum will cause it to tend to keep going in that direction. At rest, the opposing condition of inertia is involved.

The faster the rate of speed at which the object is moved, which in this case is the valve train, the greater are the forces of inertia and momentum which must be overcome. This is the reason for the popularity of overhead cams in engines designed specifically for high performance. The ohc design eliminates the need for push-rods which are a major contributor to the weight of the valve train used in conventional, cam-in-block engines.

When the cam lobe comes around at high speed, it literally wallops the valve from full shut to wide open. The valve, then, tends to keep right on going but a spring is used which is supposed to dampen this abruptness and keep the cam follower riding on the lobe at all times. If it doesn't, the valve will be hanging out in the combustion chamber independently from the timing of the piston which changes positions with even greater rapidity. Valve meets piston and it's the end of valve and piston, and sometimes the end of the engine. Even if they didn't collide pressures within the cylinder get into the act, forcing the valve back down on the cam at a point which might not be appropriate. Severe valve float can be described as a situation where the valves are oscillating independently of engine timing. Obviously under such conditions, the engine has almost totally ceased to produce useful power, that is, if it's still together.

By now you may think that all one has to do is to install a set of heavier valve springs and cure the problem. However, depending upon what rpm you wish, your problems could either be solved or start all over again. Heavier springs will keep the cam follower in close contact with the cam lobe but keep in mind that the higher pressure will take more horsepower. If you've ever tried to hand-crank an engine with 210-lb. valve springs, you'll know what I mean.

In addition the stronger springs can cause pushrods to bend and flex which in turn will reduce your effective valve lift with a further loss of horsepower. So you install stronger pushrods plus stronger valve-spring retainers to prevent the valve from pulling through only to find that the added weight from all of this has stirred up more inertia and momentum problems.

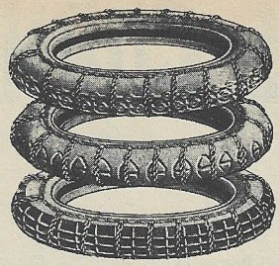
However, don't despair. There's special equipment on the market that will solve these problems in most any type of hopped-up engine from mild to full-race. All most VW engines require is a set of aluminum retainers, 125-lb. valve springs and chrome moly pushrods.

An experiment I tried on my "World Car Guide Special" was to use superlight lifters, light pushrods, lightened rocker arms, drilled valve adjusting screws and lightened stock retainers. This set-up would rev to 7,800 and it worked fine except that the lifters had to be replaced after every meet or seven runs. Finally, a cylinder head was demolished along with a piston and valves so it proves that putting everything on the ragged edge does not pay off. It is better to build some reliability into the engine.

The final problem to be mentioned is that spring surge, or oscillation, can occur. Properties in certain valve spring materials can bring on a resonance with resultant harmonic bounce. This, in turn, can cause the valve to bounce up and down on its seat when it should be closed and sealing off gases.

Since it's almost impossible for even designers to predict spring resonance in individual installations, one cure is to forestall it by installing dual valve springs which are simply a pair of springs that have different resonant frequencies so that as one spring starts to bounce, the other takes over the job of seating the valve. Another method is to use a "damper coil" or anti-surge spring which is merely a coil of steel strip that fits inside the existing spring. It's always touching the coils so that when the resonant rpm is reached, the rubbing dampens out the surges and the main spring works normally. WCG

THINGS FOR CARS



NEW PRODUCTS

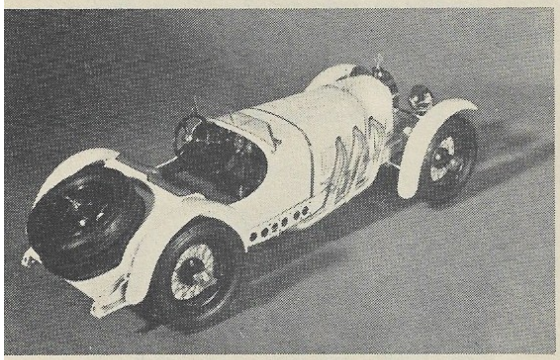
SERVICES

IDEAS

This is an editorial report and not an offer for sale on the part of the publishers. Every effort has been made to ensure accuracy, but please note that prices and availability are subject to change without notice. Manufacturers who wish their new products considered for publication in this section should send a brief description like those below and a glossy photo to: World Car Guide, 4207 Palos Verdes Drive South, Palos Verdes Peninsula, Ca. 90274.

MASTERPIECE IN MINIATURE

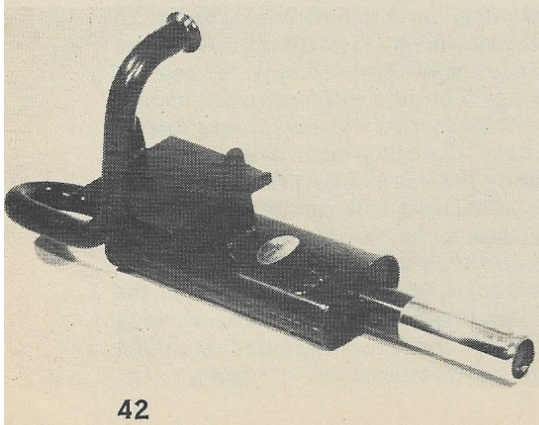
Mercedes SSK's, let alone an SSKL, will bring at least $30,000 in today's inflated collector's market. Like one in as-new condition for slightly under $500? The only catch is that you'll have to think small. The price we quote is for an exact 1/12-scale brass model made by master Swiss craftsmen. It has a working suspension and steering and is completely detailed even to instruments. The hood opens to reveal the famous "elephant" blower which once extracted 300 horsepower from the six-cylinder engine and the body may be removed to show chassis details. A



limited quantity will be available this summer so send your reservation now to Sinclair's Auto Miniatures, 3416 West Lake Road, Erie, Pa. 16505.

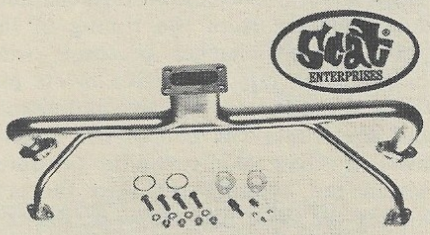
NEW SPORTS SILENCERS

An impressive range of British-made single, twin and triple pipe sports silencers may be imported by individuals directly from the makers, Desmond Cooper and Company (Motor Components) Ltd., and these people are also looking for parties interested in obtaining exclusive area distributorships in the U.S. The silencer illustrated is a single-pipe unit for a Fiat 850, priced at $13.52 at the current rate of exchange. Dual and triple units range up to $21.33 for Fiats and prices for units to fit most other British makes are equally low. Cooper silencers are also available for BMW, Renault, SAAB and Volvo but not Volkswagen as yet. The tailpipes are chromed and the rest is finished in British Racing Green. Send inquiries to the manufacturer at 705 Warwick Road, Solihull, Warwickshire.



PLENUM CHAMBER FOR VWS

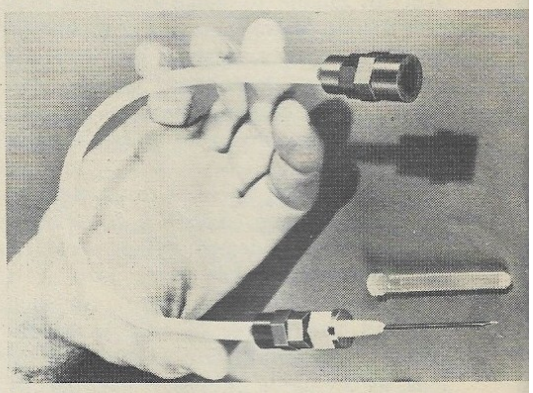
The manifold pictured has been used at Bonneville and Baja in competition as well as dynamometer tested and is claimed to give up to 12% more power than any other ram induction manifold on the market today. According to the manufacturer, the plenum principle allows a denser and more even fuel mixture to reach the cylinders. It allows the cylinders to draw the fuel from both venturis of the carburetor, thus eliminating the cycling effect of the old-type manifold where two cylinders fire one after the other while draining fuel from



the same venturi. The new unit incorporates Scat's exclusive gasket-sealing ring where the manifold meets the head and is of the latest small-tube design. The manifold comes postpaid complete with all gaskets, studs, washers and nuts for $54.95. It will accept either Zenith or Holley 2V carburetors which are also available from Scat and they have a linkage kit to allow the use of the stock VW throttle. It's not for use with Weber or Solex carburetors. Write for further information or send your order to Scat Enterprises, 121 W. Hazel St., Inglewood, Calif. 90302.

GREASE GUN EXTENSION

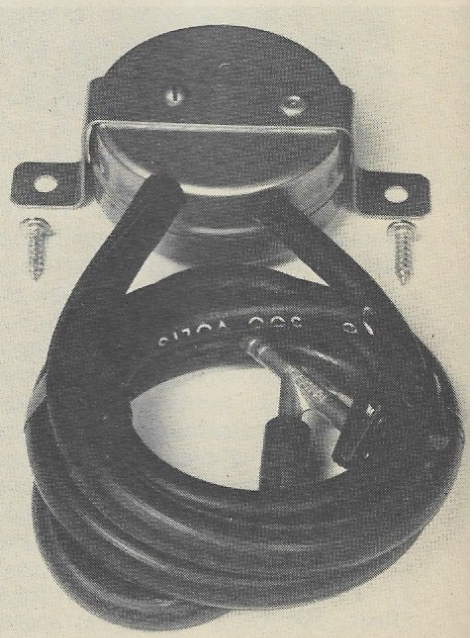
Like to do your own greasing but frustrated by the new sealed bearings on modern cars? Try this inexpensive adaptor which will fit any standard grease gun with 1/8-inch P.T. fittings. The flexible extension lets you get at



hard-to-reach spots and the stainless steel needle fits under the lip or through the punched hole in sealed bearings. The unit will withstand up to 150 psi pressure. Order it postpaid for $4 from J.C. Whitney & Co., 1917 Archer Ave., Dept. 418, Chicago, Ill. 60616.

AIR-CONDITIONER CUT-OUT SWITCH

When you air-condition a Volks-



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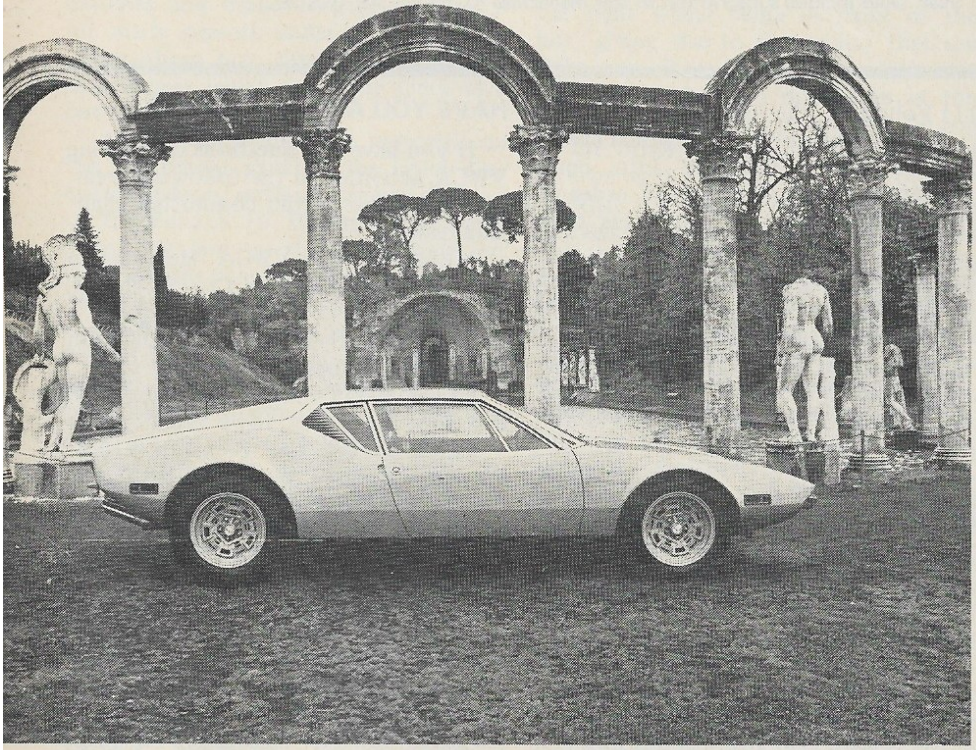
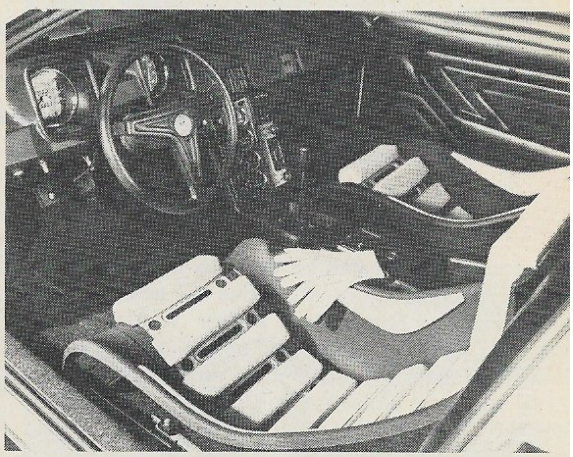
de TOMASO PANTERA





The de Tomaso Pantera, an Italian car with a Ford V-8 engine positioned amidships, made its long-expected debut at the New York International Auto Show. The car is a product of de Tomaso Automobili, S.p.A. of Modena, Italy, and was designed at the Ghia Studios in Turin. Ford Motor Company's 351-cubic-inch, four-barrel engine powers the car.

The Pantera will be offered for sale in the United States later this year. The car will be imported by de Tomaso of America and sold primarily through specially selected Lincoln-Mercury dealers. Price will be announced later, but will be under $10,000.

The Pantera (Italian for Panther) is a two-passenger coupe with a 98-inch wheelbase and curb weight of 2,860 pounds. It features a monocoque chassis (which eliminates the conventional frame) and an all-steel body. The car is only 43 inches high and together with a weight distribution of 42 per cent on the front wheels and 58 per cent, handling and maneuverability should be superior. The car has 15-inch cast magnesium wheels and low-profile radial tires.

Ford's Cleveland 351 4V engine, which was introduced at the start of the 1970 model year, is used. It features lighweight casting techniques and has canted valves to improve the free-breathing characteristics of the engine. De Tomaso designed exhaust manifolds are used. The engine is coupled to a five-speed transaxle manufactured in Germany. The Pantera comes equipped with a 4.22:1 rear axle ratio. The power-assisted brakes feature dual master cylinders.

The unique, aluminum-shell seats place the driver in a semi-reclining position. Seat cushions are not solid but consist of 11 individual polyurethane pads apiece. A racing-type, padded steering wheel is featured. A large tachometer and a speedometer are positioned directly in front of the driver. A complete set of additional instruments and an optional AM/FM stereo radio are placed vertically on a panel in front of the gear shift lever. The Pantera will come equipped with optional air conditioning.

The Alejandro de Tomaso name is a familiar one to sports car enthusiasts, internationally, and a variety of sport and grand touring cars have been produced and sold by him. De Tomaso also has designed and built a number of race cars. The latest is a new Formula One machine that is Ford-powered and that is being driven on this year's Grand Prix circuit by Piers Courage. Last September Ford Motor Company entered into an agreement with de Tomaso Automobili and Ghia Studios for an exchange of technical and marketing services.

Engine
Ford 351 4V
310 horsepower at 5,400 rpm
380 lbs. ft. at 3,400 rpm

Clutch
single dry plate

Brakes
power assisted disc - dual master cylinder
11.1" diameter front - ventilated
11.2" diameter rear - ventilated
464 sq. in. effective swept area

Gearbox
ZF 5-speed and reverse
1 - 2.23:1
2 - 1.47:1
3 - 1.04:1
4 - 0.846:1
5 - 0.705:1
R - 2.2865:1
Axle ratio—4.22:1

Chassis
de Tomaso monocoque

Wheels
Front—15x7 magnesium cast
Rear—15x8 1/2 magnesium cast

Tires
Front—185-70 low profile/radial
Rear—215-70 low profile/radial

Independent front and rear suspension

Curb weight (with gas, oil and water) 2,860 lbs.

Wheelbase—98.4 inches
Track front—57
Track rear—58
o/a length—167
o/a width—67
o/a height—43.4

Weight distribution
front/rear 42/58

NEWS FROM THE

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.

LOCAL CLUBS, ARISE!

What can be done to make our local clubs more attractive to new and old members alike? Walter Kuntze of St. Louis has the following comments on the rise and fall of our local clubs. A local club should:

1) Have a regular meeting at least once a month at a public place. Always hold it at the same place, same day and same time to avoid confusion.
2) Hold the business portion of the meeting short and interesting, and refer controversial issues to a committee for a report at the next meeting.
3) Procure a good speaker or program to entertain or educate the membership at each monthly meeting.
4) Sponsor at least one automotive or social event each month. The emphasis here should be on automotive since we are a car club but a few social events such as parties, picnics, dances or progressive dinners will help everybody get better acquainted and possibly raise money for the club.
5) Vary the automotive events by having different people run them every month; especially try to get new members and novices involved in this.
6) Besides the standard Time-Speed-Distance rallies offer gimmick or photo rallies, hare and hound or novice rallies, autocrosses, caravans, camping trips, etc. For more ideas read Hebb & Beck's "Rallies, Trials, & Gymkhanas," or "Guide to Rallying" by Larry Reid, or "Let's Go On a Rallye" available from the Lincoln-Mercury Division.
7) At least once a year run a Rally School and also a VW Maintenance Clinic.
8) Occasionally set up a tour of such interesting places as automobile plants, breweries, VW distributor's warehouse, etc.
9) Learn something about and get involved with Formula VEE racing and dune buggies.
10) Diversify your programs by implementing ideas and suggestions offered by the VWCA Activities Director and VWCA Safety Director.
11) Volunteer the club to host a national convention or a regional event.
12) Get newer members into committees and club offices in order to take advantage of fresh ideas they might have to help the club.
13) Try to persuade local dealers and supply houses to offer a special discount to club members.
14) Send a representative to all VWCA Trustees' Meetings to help formulate VWCA policies and bring back new ideas and enthusiasm. Be sure he reports all the Trustees' Meeting news to the club.
15) Have your newsletters, windshield cards, club information sheets and other material broadcast all the advantages of belonging to your local club:

a) Subscription to *World Car Guide*
b) Subscription to the *VW Autoist,* VWCA's monthly publication
c) Subscription to *Small World,* VWoA's interesting magazine.
d) Subscription to your own local newsletter, the best one around!
e) "Volkswagen" Tips booklet and continuous technical information.
f) Discount on items from various companies.
g) Rally schools and maintenance clinics.
h) Automotive contests such as rallies, autocrosses, etc.
i) Monthly meetings with interesting programs.
j) Social events such as dinners, parties, dances, picnics.
k) Chance to meet and talk to other VW owners.
l) Weekend camping trips.
m) Big annual National Convention and several regional get-togethers.
n) Local, national and international guided caravans.
o) Annual Club Tour to Europe with visit to VW factory.
p) Friendly club hosts from coast to coast to help you while traveling.
q) Beautiful national and local badges for your car.

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—Don Frus, 1808 55th Street, Des Moines, Iowa 50310.

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

CLUB TOUR—Carl Ziemann, 910 S. Stewart, Lombard, Illinois 60148.

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

NATIONAL CONVENTION—Frank Caruso, Apt. D, 118 East 24th St., Paterson, N.J. 07505.

DATES TO REMEMBER

April 25 – Trustees Mtg., Dayton, Ohio.

May – Maifest, Hawkeye VWCA, Cedar Rapids, Iowa.

June 13-14 – Bug-In II, Mid-Michigan VW Club.

June 14 – Departure for Mexican Tour.

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

July 19 – Flight No. 1 to Europe; returns August 16.

Aug. 27 – Flight No. 2, returns Sept. 20.

Aug. 30 – Flight No. 3, returns Sept. 27.

WCG

(Continued from Page 17)

Renault

tures so low even under extreme conditions that no outside source of liquid cooling is needed. Oil pressure is regulated by engine vacuum as well as gear selection and as this, in the Renault design, controls the speed at which the clutches and brakes engage, shifting is unusually smooth under any load, even under those rare situations when you skip a gear which jars your teeth in a conventional automatic.

Aside from a quadrant indicator on the instrument panel in the latest American fashion, nothing else has changed on the Renault 16. Headrests have been added by law to the front seats but these are the same fully reclining lounge chairs that are almost soporific in their comfort. Most testers have rated them second only to those provided by Rolls Royce, and Renault 16 owners have been known to remove them (which is easy) for use in their living rooms.

The five-door body style and the completely convertible seating– with seven possibilities including a conventional five-passenger sedan, 26.5 cu. ft. of luggage space with the rear seat back and cushion stowed, a full-length bed and with all but the driver's seat removed completely, a full-size truck–make the Renault 16 an extremely versatile vehicle. In fact, the idea of the design was to give the average Frenchman who only owns one vehicle a weekend car for travel and camping that could be converted to a van for use in his business during the week.

While it has no gauges other than for speed and gasoline, the instrument panel is nicely trimmed and padded. The new type of U.S.-made "slim-line" air-conditioner which is optional is a distinct improvement over the old kind which was housed in a box on the tunnel and precluded the driver entering the car from the curb side. That's still pretty difficult with the high but comfortable center armrest which also forms the lid for a large storage compartment. Still another complaint, that of narrowly spaced and small pedals, has been eliminated by the automatic which, of course, requires only the brake pedal.

The Renault 16's odd, angular shape provides a bonus in the form of almost total visibility. There is so much glass, in fact, that the tinted option is desirable even if you don't order air-conditioning. You sit high in those big buckets and the rearmost pillar is almost as thin as the front. This accounts for the ridges along the edges of the roof that have been questioned by so many writers. They're for structural strength, not for stability in crosswinds or the base upon which to mount a luggage rack as has been suggested by some.

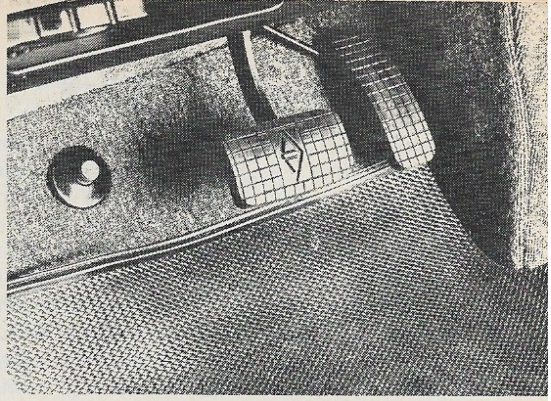
Stability in crosswinds is no problem, anyway. The four-cylinder, liquid-cooled, 70-horsepower engine with automatic (or four-speed manual) transmission in front of it drives through a transaxle to the front wheels. The weight is almost exactly centered over the axis of these wheels which are suspended by longitudinal torsion bars. The rear wheels have individual transverse torsion bar suspension, that for the right wheel being in front of the left, giving rise to the oddity that the right wheelbase is 2.7 inches shorter than the 107.0-inch dimension at the left. If the bars were placed one on top of the other, the rear of the car would sit even higher than it is.

With a 57.3-inch overall height, the Renault 16 is rather high by modern standards and in relation to its 52.8/50.9-inch treads, it might at first glance be suspected of top-heaviness. It does, indeed, lean mightily when cornered hard, particularly to the shorter right side, but you don't notice this inside. It will get around a corner as fast as most so-called sports cars even though onlookers at a gymkhana understandably tend to back away when a 16 is in action.

The ride is an uncanny combination of stability and softness, two attributes not mated by any other car except a Citroen. With the latter, this is achieved by an extremely complex hydro-pneumatic suspension in which the front set of wheels signals to the rear what is being encountered. The Renault 16 seems to signal too, but there is no mechanical explanation for this. If you hit a dip hard, the rear suspension seems to tense itself for its turn. We never once were able to bottom the rear suspension, even when taking our 40-mph test dips at 70!

Steering, by rack and pinion, is a little on the slow side with four turns being required from lock-to-lock, but that is about the one penalty you pay for the other advantages of front-wheel drive in any car so equipped. Renault might be advised to think of offering power assist at least as an option but this would be only to quicken the ratio. Don't interpret the suggestion as implying that the car is heavy to steer. Turning diameter between curbs is 32 feet, nine inches.

Though it takes a while to get there, the engine is unobtrusive right up to a genuine 90 mph maximum. Zero to 60 mph acceleration when letting the transmission shift by itself can be consistently achieved in 17 seconds with a shift point at 34 mph. There is a slight advantage to be gained by going through the gears manually as the transmission is set for full throttle shifts into 3rd at 59 mph, and of course if that setting is on the nose, it raises havoc with zero to 60. Zero to 75 mph is a 28.8 second proposition whichever way you do it. For passing, the automatic will downshift to 2nd of itself at any speed below 41 mph, giving a 40-60 time of 8.0



Pedals are large and well spaced. Button to left is for dimming light.

C. Entire back end above the taillights swings up to form a fifth door. Ridges in roof are for structural strength, not to improve aerodynamics.

B. Rubber bumper guards are standard equipment front and rear, as is the nerf bar in front. Wide doors offer very easy entrance and exit and there's plenty of headroom.

D. As the Renault 16 enters a turn on its short wheelbase side, lean soon becomes evident but surprisingly, it is not uncomfortable for driver or passengers.

(Continued on Page 48)

(Continued from Page 42)

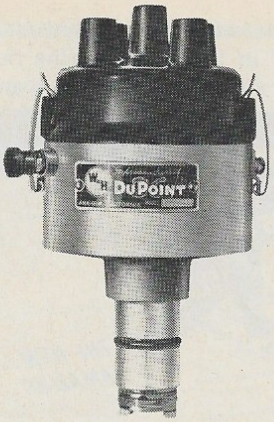
Things For Cars

wagen or other small import, or even six-cylinder American cars, it feels sometimes that more horses are used to drive the compressor than reach the wheels. This new device solves that problem and still lets you keep your cool, except maybe on a 10-mile desert grade. Pass Master is a switch actuated by engine vacuum that automatically de-clutches the air-conditioning compressor when vacuum falls below 4 inches of mercury, as it will when you're accelerating hard or climbing. It also keeps the compressor out while you're starting and idling. Installation is easy with no special tools or talent being required. You can get the switch postpaid for $9.95 from Pass Master, Inc., Dept. WCG, 802 Thompson Building, Tulsa, Okla. 74103. Dealer inquiries are also invited.

HOT VW DISTRIBUTOR

At long last a distributor for Volkswagens has been added to the famous W&H line of ignition components. The new unit fits all VWs and a high-performance curve is built-in at the factory so you can bolt-in the unit right out of the box. Tests on modified and stock VW engines have shown that the new distributor will increase horsepower as much

as 5 to 7 per cent. Many husky components from W&H's regular line of V-8 distributors are used to eliminate point bounce and to provide a strong spark at higher rpms. It is claimed that the mechanical advance curve in this unit is far superior to early 36-hp distributors that are so popular with VW engine builders. Both the distributor and replacement rotors, points and condensers are available through W&H dealers everywhere, the distributor retailing for less than $30. For more information, contact DuCoil Ignition Systems, Box 408, Fullerton, Calif. 92632.



EMBARASS THAT THIEF

On page *29* of this issue of WCG a professional tells us that most car thieves won't fuss too long with a car equipped with a theft protection device. This one, called "Steal N' Stall" lets him get to the first traffic light or other spot where he has to slow down and then the car will stall. Only you, the owner, can re-start the car. Hopefully by that time

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WORLD CAR GUIDE, 319 Miller Ave., Mill Valley, Calif. 94941

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	☐July	☐Aug.	☐Sept.	☐Oct.	☐Nov.	☐Dec.
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the police will have arrived and catch the thief in the act of raising the hood or tieing a handkerchief on the antenna.

The unit attaches with just one wire in minutes and it can be used with either 6 or 12 volt electrical systems. Send your check for $4.95 plus 50 cents postage to Mar-Lo Products, 8150 Roselawn, Detroit, Mich. 48204 and your "Steal N' Stall" will be shipped with a money-back guarantee. Let's hope you'll never have to claim the latter.

WCG

(Continued from Page 45)

Renault

seconds. Only by braking against the engine can you get a chirp from the standard Michelin radials, but neither is there a tendency to torque stall.

The road portion of our test consisted of driving the 180 miles from Miami to Key West and even more back again to Ft. Lauderdale at the height of Florida's tourist season. Once you're south of Homestead, it's a two lane road carrying a 55 mph limit for cars and a 45 mph limit for campers and trailers, the latter two types of vehicles predominating the traffic. Graduated speed limits like this are ill-advised and unsafe, but at least they proved that the 16 automatic was fairly adept at darting around slow-moving vehicles. A quarter mile is adequate clearance for getting around another car moving at 50 mph, although you have to touch 65-70 momentarily to do this.

The Renault 16 is equipped with power assisted brakes, utilizing discs in front and drums at the rear. Using our own approximation of the now standard 150 lbs. pedal pressure, the car would stop from 60 mph in 160 feet. Using pedal pressure just short of locking the wheels, this distance could be cut to 145 feet and five repetitions produced no signs of fade or grabbing.

There is more economy to a 16 than just its 30 mpg cruising capability. There are no grease points to worry about and the cooling system is sealed for life. The warranty is generous by import standards, covering the first 12 months with no mileage limitation. That latter clause plus the exceptional luggage capacity makes the car an ideal choice for salesmen. It's also an ideal choice for single-car families because of its seating versatility. Depreciation averages out to about $500 the first year and $300 the second which is about median among imports. Present West Coast POE price for a Renault 16 automatic is about $2,700.

E. At the peak of the turn it would almost seem to the onlooker that you're going to roll but it doesn't happen. By this time, though, you notice the slow steering.

F. Viewed from the opposite side, lean is not so apparent. The left wheelbase is 2.7-inches longer so that the transverse rear torsion bars may be fitted side by side.

RENAULT 16 AUTOMATIC SEDAN/WAGON

Specifications from the Manufacturer

ENGINE:

Type: Front-mounted, front-drive, 4-cylinder, ohv four, in-line
Bore and stroke: 3.03 x 3.31 ins.
Displacement: 96.5 cu. ins. (1,565 cc)
Horsepower: 70 @ 5,200 rpm
Torque: 86 ft. lbs. @ 2,500 rpm.
Compression ratio: 8.6 to 1

TRANSMISSION:

Type: 3-speed automatic with column shift (on test car), 4-speed manual std.
Gear ratios: 1st-2.33, 2nd-1.44, 3rd-1.00, R-2.00.
Rear axle ratio: 3.77

SUSPENSION:

Front: Independent logitudinal torsion bars, unequal control arms with stabilizer
Rear: Independent transverse torsion bars with trailing arms and stabilizer

STEERING: Rack and pinion, curb-to-curb 32.8 ft.

WHEELS AND TIRES: Bolt-on steel disc with 155x15 radial tires

BRAKES: Dual circuit, power-boosted hydraulic, disc front, drum rear.

CAPACITIES:

Fuel: 13.2 U.S. gals.
Oil: 4.5 U.S. qts.
Transmission and differential (automatic): 6.25 U.S. qts.

BODY AND FRAME: All-steel unitized construction.

DIMENSIONS: Wheelbase 104.3 (107.0) ins., overall length 168.4 ins., width 64.9 ins., height 57.3 ins., weight 2,271 lbs.

(Continued from Page 14)

Gremlin

GREMLIN

Specifications from the Manufacturer

ENGINE:

Type: Front-mounted, 6-cylinder, ohv in-line.
Bore and stroke: 3.75 x 3.50 ins.
Displacement: 232 cu. ins.
Horsepower: 145 @ 4,300 rpm.
Torque: 215 lbs. ft. @ 1,600 rpm.
Compression ratio: 8.5 to 1.

TRANSMISSION:

Type: 3-speed manual, floor-shifted; 3-speed automatic optional.
Gear ratios: 1st-2.61, 2nd-1.63, 3rd-1.00, R-3.54.
Rear axle ratio: 3.08.

SUSPENSION:

Front: McPherson strut with coil springs.
Rear: Semi-elliptic leaf.

STEERING:

Variable ratio power, 32.7 ft. curb-to-curb.

WHEELS AND TIRES:

Bolt-on steel disc with 6.00 x 13 bias-ply tires.

BRAKES:

Dual-circuit hydraulic drum, vacuum boost opt.

CAPACITIES:

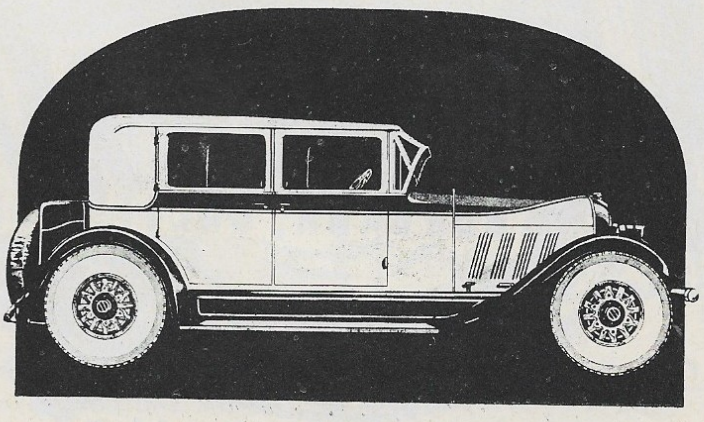
Fuel: 21 gals.
Oil: 5 qts. (w/filter).
Transmission (manual): 1.5 pts.
Coolant: 10.5 qts.

BODY AND FRAME:

Unitized, monocoque.

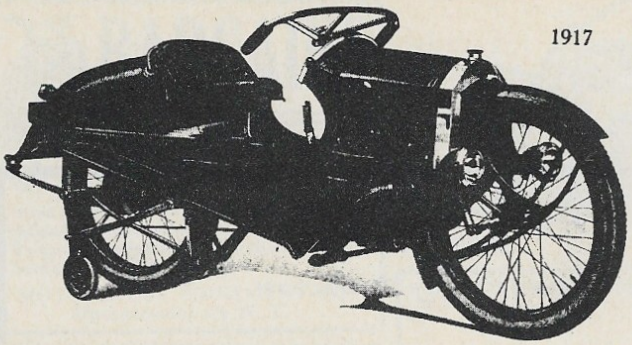
DIMENSIONS:

Wheelbase 90.0 ins., overall length 161.3 ins., width 70.5 ins., height 51.8 ins., weight 2,633.



8-77 BROUGHAM $1495

1927



1917

A Few of the Features

Two-cylinder, internal air-cooled, twenty-two horse-power motor, high tension magneto, with separate generator. Three-speed selective gear transmissions and unit power plant, automobile type. Shaft drive with spiral bevel at rear. 36-inch half elliptic spring suspension.

Two full and comfortably upholstered bucket seats, the rear seat folds in when not in use. Illustration shows how neatly this works.

Wheel base, 61½ inches.

28 x 3-inch tires.

Comfortable foot boards, 5 x 48 inches.

Pressed steel chassis, automobile structure throughout.

19-inch steering head at center of loads.

Speed, 3 to 90 miles an hour.

The Moore car is a sensation wherever it is seen. If you live in the vicinity of Indianapolis we shall be glad to arrange a demonstration for you in your town.

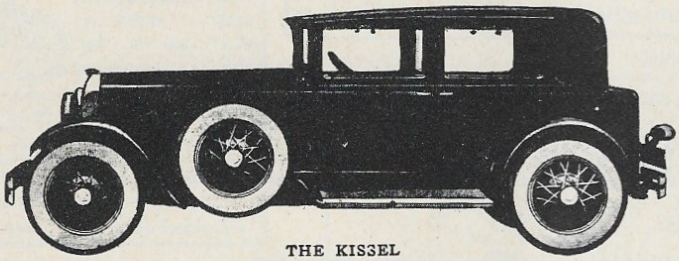
Speeding To Unprecedented Success

The newest triumph in motordom is the Moore car. The most economical car ever made, both as to initial cost and upkeep, is the Moore car. For style, for convenience, for pleasure, for business—the Moore car is the most ingenious design of all engineering efforts.

Is the Moore car a motor cycle? If it is it has all the elegancies—all the refinements and all the comforts so conspicuously missing in any other motor cycle. But—*the Moore car is not a motor cycle.* It is a two passenger, high-class sport car, built on a stream line double frame automobile chassis. And again, it is a commercial car with unusual facilities for small package delivery service.

The Moore Car Is the Car for All Classes

Its the car for every man, and for every woman, too—the man of limited means who does not like a motor cycle and cannot afford an automobile.



THE KISSEL

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: Can you tell me where I can get maintenance manuals on the Campmobile and automatic beetle?

Robert V. Gott
APO New York 09109

ANSWER: The owner's maintenance manual for Campmobiles is part No. 79999951. The number for the semi-automatic beetle is 79999950. The price of each is $9.95 and they are available only through authorized VW dealers. Actually, these two books cover all Type IIs and Type Is, respectively, from '66 through '70. They are generally hard to find and as VW dealers are not set up for mail order, we suggest you have a friend or relative in this country procure them for you. Also, these official VW publications that are sold to owners cover only maintenance and repairs that can be accomplished without the use of special VW tools.

QUESTION: My '60 VW is leaking oil at the rate of a quart every 250 miles. It doesn't seem to be coming from the valves. It only has 85,000 miles on it, so is there a way to repair this without a major overhaul?

R. Gray
Verdun 204, Quebec

ANSWER: There are four areas where oil leaks will often be found on high-mileage VW engines. A chronic spot is from the generator mount, directly under the generator itself. The generator and mount are separated by a simple gasket, but for some reason VW dealers don't carry this part. You have to make it yourself, using the traditional method of tapping the gasket material against the mounting flange and cutting to the resulting pattern. Just have someone hold the generator high enough off the mount so you can reach in with the hammer. A second spot is the rear main seal, which is located towards the front of the car as you view it from the rear. Replacement of this should be made by a dealer who will charge you about $30 for the job. A third spot is the oil cooler. Access to this is difficult. You have a choice of removing first the deck lid and then the fan housing, or removing the entire engine. The latter is actually easier and a dealer can do it in 20 minutes. If you want to do it yourself, complete instructions will be found elsewhere in this issue. In any case, check the oil cooler itself for leaks and replace it if necessary. If the oil cooler is in good condition, the leak is probably coming from the "O" rings underneath it. The last common area of leakage is the pushrod tubes, but you say that your leak "doesn't seem to be coming from the valves."

QUESTION: I own a '67 beetle which I like very much. I have had no big problems after 38,000 miles but one I can't figure out is why I can't get very much hot air from the left heater and defroster. Everything has been checked including the rear ducts and controls. The right side puts out plenty of hot air at the window corner and at the right side of the center defroster. A couple of people I know that own '67 beetles have had the same problem and our dealer has not been able to help us.

Howard Owings III
Highland, Md.

ANSWER: Has your dealer checked the air flaps inside the heater box? There are two, one for each side, and it could be that the linkage is out of adjustment on the left side in your car, not allowing the flap or valve to open fully. Actually, it's more common for one or the other of these valves not to shut fully, causing heat to enter the passenger compartment at all times. In any case, the design (if it can be called that) of the VW heating system is such that the flow of hot air to each side must be perfectly balanced or the air will tend to flow to the easiest exit.

QUESTION: I have a '66 VW Squareback with air-conditioning. In December of 1968 the heads became loose due to eight head bolts having stripped their threads in the block or case. This was repaired by having the block tapped and inserts installed for the bolts. Prior to this the engine had never been out or the head bolts touched. All maintenance has been done by VW dealers. The only reasons the VW dealers gave was that this was caused by overheating or running at high speed for long periods of time. I am not a high-speed driver, but it does get very hot in Arizona. The heads have now pulled loose again and the dealer says I will need a new block. He won't, however, give a guarantee that this won't happen again with the new block. They seem to be at a loss as to how to correct this problem, saying that it's chronic with the Squareback in Arizona. Can you help me, or should I just get rid of the car? This is my sixth VW and the only troublesome one I've had.

Frank Strunk
Phoenix, Ariz.

ANSWER: Apparently your problem is chronic in very hot climates and for this reason VW is switching from magnesium to aluminum blocks with their '71 models. However, when it happens it can usually be traced to a slipping fan belt or something obstructing the flow of cooling air. Carrying luggage on a roof rack can upset the air flow, especially the built-up type of rack. But back to your problem. In the first place, your dealer should have made the initial repair using oversize studs, not inserts. This would have permitted a second and last repair using inserts. So, unfortunately, you've played out your options and face the purchase of a new block.

QUESTION: I recently purchased a '70 VW bus. I enjoy it very much except for the Mickey Mouse exhaust system. Is there a dual exhaust available to fit this bus? Can any of the big-bore dune buggy systems be adapted to fit? I would appreciate any information you might be able to give me.

N. G. Coleman
Ft. Worth, Tex.

ANSWER: Systems designed for dune buggies with their open engine compartments are not likely to fit within the sheetmetal of your bus, but there are extractor systems built expecially for the bus. One such is EMPI's kit No. XEMT 119T which has been approved by California (and thus, federal) air pollution control authorities. It has dual tailpipes very similar to the beetle and will fit without any body alterations needed. Price is $51.31 postpaid from Engineered Motor Products, Inc., Box 1120, Riverside, Ca. 92502. If you install this, you also should replace the existing air correction jet in the carburetor with 125Z jet and the main jet

with a 127.5 jet. These are available for about 85¢ each from any dealer.

Opel

QUESTION: I have a '66 Opel Kadett Sport Coupe with the "S" engine. In the winter the engine never warms up enough for the heater to perform efficiently. The thermostat has been tested and starts to open as it should at 190 degrees. The heat gauge appears to be functioning perfectly and it barely moves off the peg unless the weather is warm. The clamp that holds the thermostat down is in place but is located (factory design) about ¼-inches above the thermostat. The thermostat is not installed upside down. Could there be enough circulation by-passing the thermostat to cause the engine to run too cool? This model is equipped with a two-blade fan. I understand that Opel has gone to a five-blade plastic fan.

George J. Noll
Ransom, Kans.

ANSWER: This is an unusual complaint to hear from an Opel owner and should be corrected immediately as lack of heat inside is not as serious as the sludging that could occur in the cold-running engine. Assuming that you're absolutely sure of the thermostat operation, we suggest you have your radiator cap checked. The Opel has a pressurized system and if the cap won't hold the approximately 7 psi pressure, the coolant won't reach its design operating temperature. Most service stations and all dealers have a device for testing caps. If this doesn't work, all we can suggest is to cut a piece of cardboard to cover about one-third the radiator area, fitted at the bottom, for use in cold-weather driving. Accessory stores also carry a device that works like a window shade upside down. It fits over the radiator and can be controlled from the driver's seat to cover as much of the radiator as needed.

Volvo

QUESTION: Could you please send me an edition of "Performance Tuning B-18 Series Volvos." Also please advise me regarding availability or price changes on Volvo parts shipped from the U.S. to Canada.

H. Vandelinde
Woodstock, Ontario

ANSWER: Through the courtesy of Dave Bennett, service manager for Volvo Western Distributors, Inc., of Torrance, Calif., a leftover copy of this old informative booklet is being sent to you. It is no longer issued in the U.S. because most of the suggestions contained in it would cause the engine to be in non-compliance with emission regulations. That is not a problem yet in Canada, so yours is on its way. As to purchasing parts in the U.S., there is neither a need to do so nor an advantage. Volvo has a factory in Canada, distributors on both Coasts and dealers in practically every major city. By the time you paid duty on the imported parts they would cost more than the price you'd pay locally.

Singer

QUESTION: I own a 1961 Singer Gazelle. Would you please tell me where I could get parts for this car in my area? Also, where may I obtain a shop manual for it?

George A. Dunnigan
Flushing, N. Y.

ANSWER: Singers built since the Rootes Group takeover in 1956 were mechanically based on similarly-sized Hillman cars and in a majority of instances, Hillman mechanical parts will fit without modification. This interchangability also includes major body parts but not trim such as grille and instruments. To further complicate matters, Hillmans exported to the U.S. currently bear the Sunbeam label but that was not true in 1961. Thus, you must seek out a Sunbeam dealer, preferably one that has been around a long time. Another alternative is to write to the Simca-Rootes Parts Manager, Chrysler-Plymouth Division, Box 1658, Detroit, Mich. 48231 and hope for the best. Theoretically, Chrysler Corp. became responsible for Singers when it purchased the Rootes Group a few years back. In 1961 the Hillman Minx was the equivalent of your Gazelle. Good luck! The Hillman name was withdrawn from this market because of a reputation for poor reliability achieved by models of a decade ago and your Singer is a Hillman.

wcg

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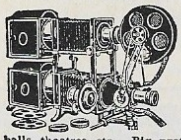
SAVE AS MUCH AS $1000 on a new JAGUAR, MERCEDES, PORSCHE. All makes, including Volkswagen, shipped directly to you. Details upon request. AUTOPORT, P.O. BOX 4071, Frankfurt/Main, West Germany.

IT PAYS BIG To amuse the Public With Motion Pictures



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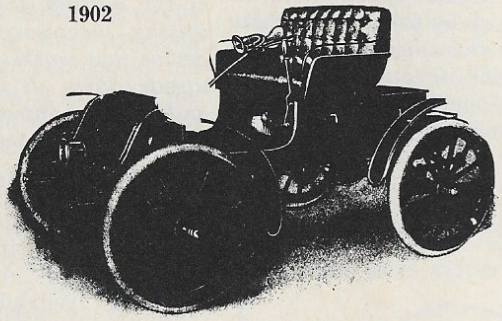
Friedman Road Wagon

IS EQUAL TO THE SEVEREST TEST
TRY IT AND YOU WILL BUY IT

1902

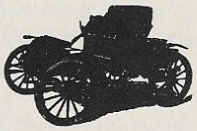


NO Complicated Machinery Machinist Required **NO** Noise Odor **NO** Road too Rough Hill too Steep

They will climb any grade up to 30%, and develop any speed up to 30 miles per hour. Absolute and instantaneous control. Every engine guaranteed to develop six horse-power.

Hung on platform springs front and rear.

Our price this year, $750.00.



Friedman Automobile Co.

3 EAST VAN BUREN STREET

CHICAGO, Illinois, U. S. A.

See Floyd Clymer's Motor Scrapbook

NOTE:

All ads appearing in this Scrapbook are of course void, having appeared years ago. They are reproduced not for the purpose of selling any merchandise. The ads do, however, show the great progress made by both the automotive industry and the advertising firms of this country.

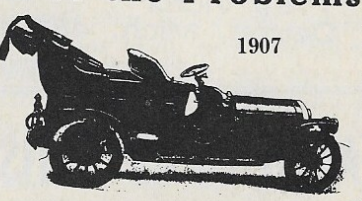
The PAYNE MODERN CAR

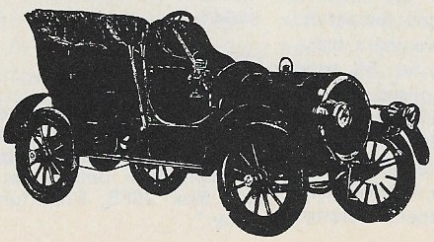
The Solution of the Problems

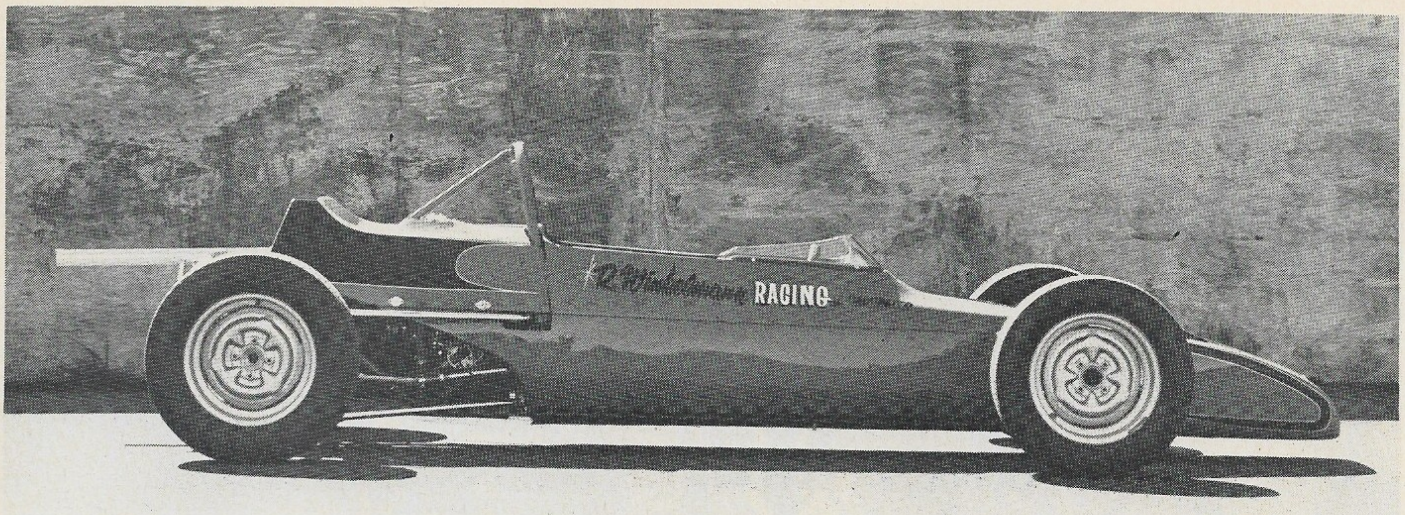
Years of testing have proved it so. An air-cooled motor that keeps cool with eighty pounds of compression, THAT MEANS POWER. A transmission gear with four speeds forward. Gears always in mesh. No stripping of teeth. On direct drive every gear as well as the lay shaft stands absolutely still and only one non-adjustable clutch used. Many other features just as valuable can be learned from our booklet. Write for it.

MODERN TOOL CO.
ERIE, PA.

1907

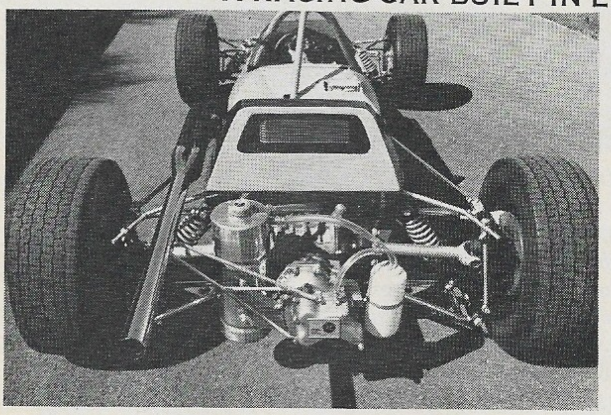






WDF 2 - PALLISER - WINKELMANN FORMULA FORD

A RACING CAR BUILT IN ENGLAND. FOR DRIVERS IN AMERICA!



We could say . . .

Our wind tunnel tested 890 lb. WDF. 2. Wedge configuration Formula Ford, under actual racing conditions has proved to generate the smallest draft envelope . . .

But what we really mean is, our car, the WDF.2. Formula Ford, a refinement on our very successful WDF.1. model, is designed not for the 'wedge style', but for the actual use of the 'Wedge Design' that produces the lowest drag factor available to get you over the finish line first. And, by the way, if you happen to be 6'5" in height, we can fit you in nicely at $4195. P.O.E.

For more information write . . . .

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Chequered Flag Racing Cars, Inc.
200 Caledonia Street, Sausalito, California 94965
(415) 332-2302

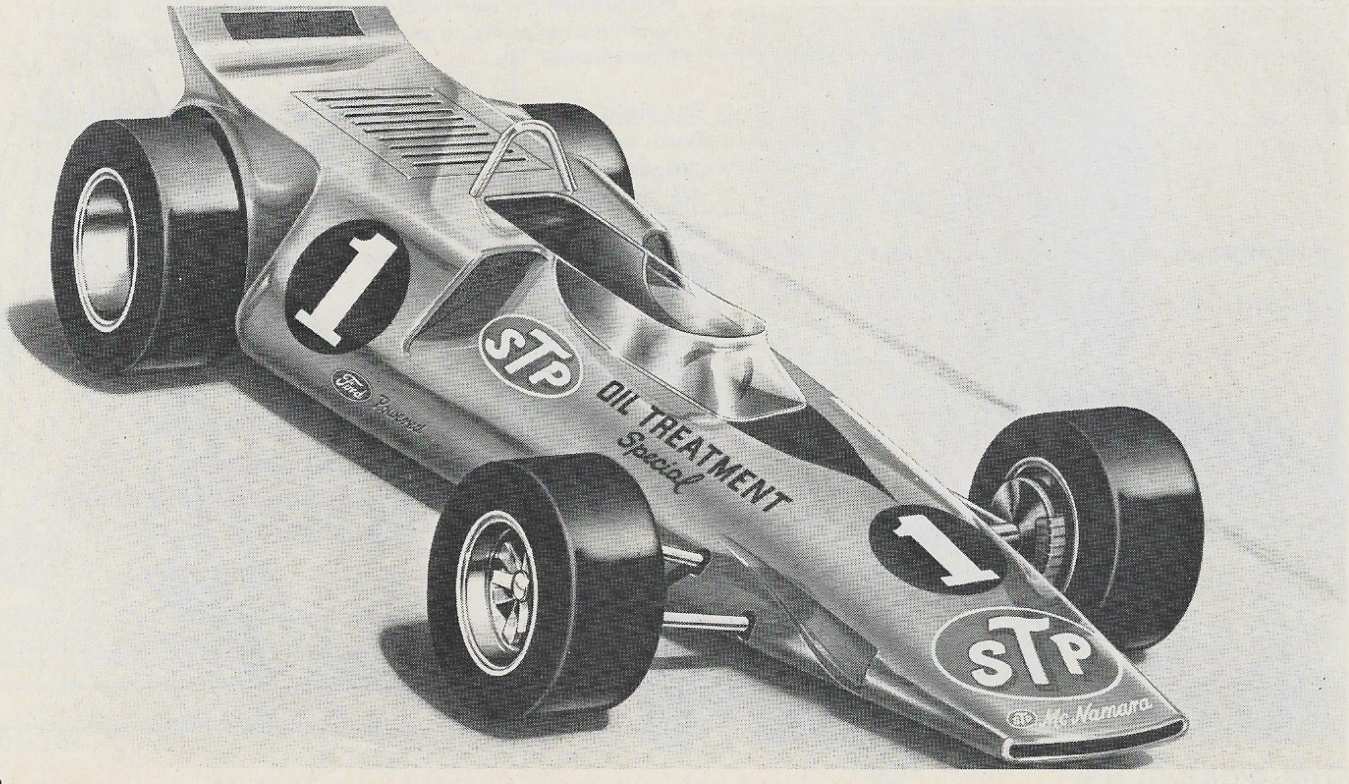
Name _____
Address _____
City _____
State _____ Zip Code _____

WCG 670

(Continued from Page 28)

I. And finally back to reality, for the first time in most of our memories the Germans are building a major Indianapolis 500 entry. This is a team of McNamara-STP cars with Ford power, each being built for a specific racing purpose. Mario Andretti has signed to drive the Indy car which is powered by a dohc, turbocharged Ford rated in excess of 700 hp. He is shown here trying on the half-finished car for size, flanked (L to R) by designer Joseph Karasek formerly of Lola, builder and ex-Green Beret captain Francis McNamara, crew chief Vince Granatelli and owner, Andy Granatelli. The car is German only in the sense that it's being built at McNamara's facility,well-known to WCG readers, in Lenggries high in the Alps near the Austrian border. McNamara himself actually hails from Galesburg, Illinois and got into the business of building race cars two years ago when he found that no one could set up a Formula Vee to suit him.

WCG



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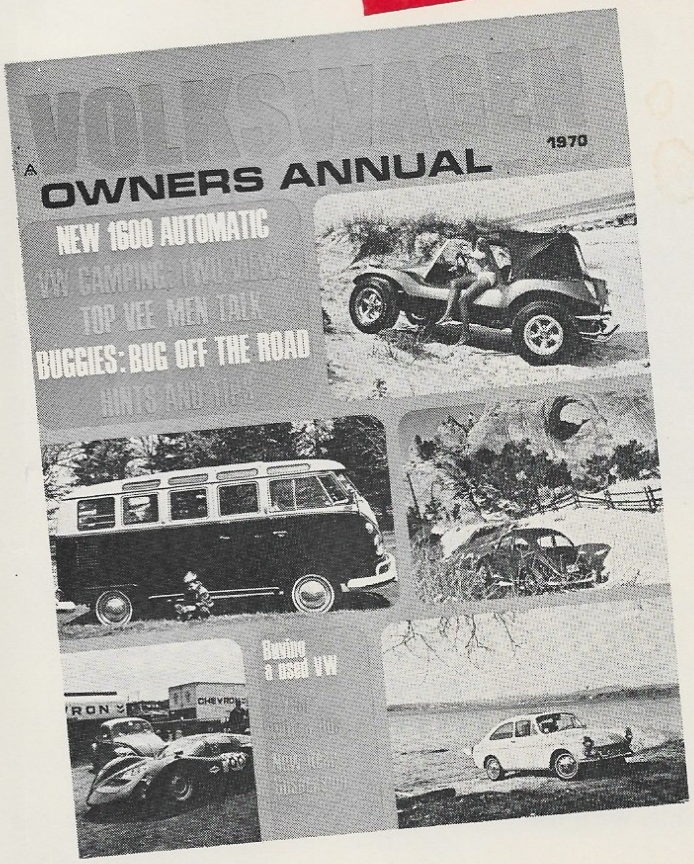

if you own a VW or plan to- you can't afford to be without it

This year's VOA issue will feature the VW dune buggies, Formula Vees, road tests, comprehensive reports on all VW's plus an array of how-to-tips and newsy items. Specials will discuss trailer towing with Volkswagens, handling VW's in snow and in hot weather, camping with a VW and other in-depth articles about which readers want to know.

You'll want to put this highly informative 100 page issue right in your glove compartment for handy reference and keep it there all year.

To make doubly sure you don't miss it, here's a convenient way to order your copy now. Just fill out the coupon below, enclose your check or money order for only one dollar ($1.00), and mail it today. We'll send your copy postpaid.

Here are just a few of the leading features you'll enjoy:

- NEW 1600 AUTOMATIC
- VW CAMPING: TWO VIEWS
- TOP VEE MEN TALK
- BUGGIES: BUG OFF THE ROAD
- HINTS AND TIPS
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- NEW REAR SUSPENSION
- A YEAR WITH A BUG

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Rajo Publications Inc.
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Mill Valley, Calif. 94941

Yes, rush me a copy of the new 1970 VOLKSWAGEN OWNERS ANNUAL. I enclose $1.00.

Name _____

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The only thing standing between you and a Renault 16 is a little information.

It has been written that the ride you experience in the Renault 16 "can be compared only to that of the Mercedes, Rolls, or Citroën."*

Colin Chapman chose the engine of the Renault 16 for his Lotus Europa.

And the quietness of the Renault 16 (which goes for a mere $2,395†) comes only in cars costing thousands more.*

Someone is sleeping in Detroit.

Road Test is an impartial magazine. At the time of this writing, it did not even take advertising. After exhaustive tests on the Renault 16, Road Test wound up suggesting that "all the automotive designers in Detroit be ordered to spend two weeks behind the wheel of this car in the hopes that their dormant imaginations might be sparked to life." Thank you, Road Test.

A textbook for Britain.

Stirling Moss has written: "There is no doubt that the Renault 16 is the most intelligently engineered automobile I have ever encountered and I think that each British motorcar manufacturer would do well to purchase one just to see how it is put together."

The Renault 16 happily consents to offering a course in Renault 16.

Where we made our points.

Needless to say, our car has impressed a lot of people. We'd like to tell you why.

Before our car was a car, it was a project. It was designed and built from scratch. Like the factory that makes it. So we didn't build a new car around old parts.

For better traction and superior road handling, the Renault 16 has front wheel drive with engine weight over the drive wheels.

Its engine gets a miserly 30 miles per gallon. But it does an honorable 93 mph, top speed.

Its unique 4-wheel independent suspension system has already put the 16's ride in a league with the Rolls Royce's.

The seats in the 16 were designed by a doctor and will challenge the comfort of any easy chair. They too have been compared with the Rolls'.

Even more points.

Disc brakes resist fade. Our front wheel disc brakes will stop you in a straight line instead of the next lane.

Seven different seating arrangements give the Renault 16 perhaps the most versatile interior you can drive. It can be a plush sedan, a roomy wagon, or anything in between.

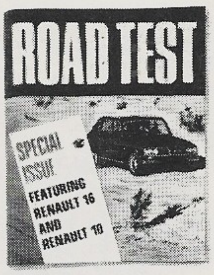
It's got a sealed cooling system that doesn't overheat and virtually eliminates adding antifreeze.

And finally, the sound of a Renault 16 running is very close to silence.

Extracurricular reading.

If any information still stands between you and a Renault 16, you can have Road Test's full report on it by sending in the coupon below.

But if you've read this far, we suspect you're at least ready for a test drive.



Renault, Inc., Box 1970, Port Washington, N.Y. 11050

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RENAULT 16

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