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SPORTS CAR GRAPHIC

APRIL 1968

DAYTONA

The Changing Racing Scene

50¢

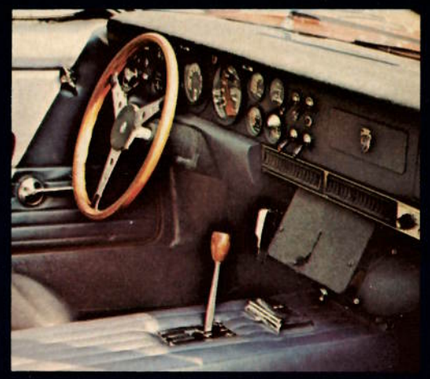
SPORTS CARS ON CAMPUS

Urban Development and the Electric Car

DE TOMASO MANGUSTA

BREAKTHROUGH

IN MOTORING



Photos — Bob D'Olivo

ROAD TEST

de tomaso mangusta

It's a breakthrough for buyers — an under $10,000 Gran Turisimo

By Bob Kovacik

IT MUST HAVE BEEN THE FIFTH TIME she pulled her car alongside ours on the freeway. Again she looked over and smiled provocatively. And again she dropped behind to follow us closely. We watched the rear-view mirror, saw her wave once, and had to bite our lower lip to keep from turning at the next off-ramp — we knew she'd follow. It had been this way for the past couple of days. Ever since we picked up the de Tomaso Mangusta. And it happened with quite an assortment of women: some beautiful, some 'run-of-the-mill', some downright ugly; some were riding with boyfriends, others with husbands. What a fickle breed! Just because of an exotic-looking, red Italian sports car.

It wasn't just the women either, although none of the men smiled or waved at us. One fellow almost 'wiped out' his Chevy on a freeway divider while looking back over his shoulder to see what in the world that wild-looking thing was.

We learned a couple of years earlier, when driving Chrysler's Turbine Car, that you've gotta watch out for the other guy when you're driving something different. He'll turn into you or into someone else while curiosity has his attention. Policemen are no different. Once we got a speeding ticket while being passed by another car because it looked like we were going fast. In fact we were clocked for going the same speed as the fellow that passed us!!!

Certainly the Mangusta deserved all the adoring glances it received, because it's the epitome of what an exotic Gran Turisimo *should* look like. It's what the $15,000 or $20,000 sports car is *expected* to look like. But the greatest part of the Mangusta is the price. Would you believe under $10,000?

The de Tomaso Mangusta *has* to be a breakthrough in motoring. It fills the $8000-to-$10,000 marketing gap that has been vacant for so many years now. Race-car builder Jim Hall had hoped to cover this market with his Chaparral GT, a street car which has been in the thinking stage for a couple of years. Bizzarini also has given considerable thought to this market, and may penetrate it even more strongly than de Tomaso. But de Tomaso has one thing going for it: the Rowan Company, an American holding corporation which recently bought out de Tomaso and Ghia.

Rowan is very serious about marketing in the United States and concerned about meeting schedules, which may not go over so big with the Italians. A lot of effort is being put into the de Tomaso-Ghia combine, and we're sure you'll find a lot more interesting things coming out of Italy now. The Mangusta is only the first step.

We were quite surprised with many aspects of the Mangusta, especially its race-car-like qualities. Then we remembered how much its builder, Alessandro de Tomaso, loved racing.

The front suspension is quite similar to that of the late Cooper racing design. It includes Standard Triumph uprights, unequal-length upper and lower A-arms, coil springs, and Koni shock absorbers. Anti-dive is built in, and there's a healthy three-quarter-inch roll bar.

The rear suspension, too, is of conventional, modern race-car design. Uprights are similar to that of the Cooper, and there are twin trailing arms, with anti-squat built into the lower arms. There's also a three-quarter-inch anti-sway bar. Rear coil springs appear to be very stiff, probably 350 pounds.

Like a race car, the suspension is highly tunable and can be altered to suit the driver's needs.

Mangustas already are being imported into the United States, but so few are available at the moment that we had to settle for a prototype to do our testing. The car had been driven hard and abused for a year or so, including 200 'hot' laps around the Monza track. It's no wonder there was a bent front A-arm and all four wheels were out of camber.

Rowan sales manager, Randy Brown, was hesitant about giving us the car because of its condition, and rightly so. But we were amazed to find how well the prototype had held up. Rattles were minimal and, other than a few worn parts, the car was in good condition. Craftsmanship was excellent, unusual for a prototype.

Now that you know a little bit about the car's history, let's look at what we found:

The first time we got behind the steering wheel, we realized we'd be lost without outside mirrors. Although the rear-view mirror inside isn't too difficult to get accustomed to, rearward vision isn't too good because of the midship-engine design.

Like all Italian cars, the steering wheel is at full arm-length from the driver — just a hair too far because we found ourselves leaning forward a bit. The large comfortable armrests, which seem to be a trademark in all Ghia-bodied cars, allowed us to rest the left arm and steer with the fingertips, giving us a semblance of comfort on long trips. Steering response was fast, but not too fast, so we didn't have to continually correct with each slight flick of the wheel.

Instruments are easily legible through the small steering wheel. Toggle switches to the right and left work the lights, windshield wipers, and other gadgets, such as the radiator fan which must be turned on while driving slowly. The firm seats absorb much of the jounce caused by the stiff suspension. We would recommend competition-type shoulder harnesses in the car, however, because one's head is only a couple of inches from the top of the windshield. Even the slightest move forward results in a bumped head.

Our car was equipped with air-conditioning, and we could see why. With all the glass area in front of the driver and passenger, the magnification of sunlight could make it hot.

We could hardly wait to get the Mangusta out to Orange County International Raceway to see what it could do. The speedometer wasn't working and we didn't have a breakdown on miles

The Mangusta cornered flatly, left, mainly because of a suspension which resembles a modern-day race car. Below left, there was plenty of power and fast acceleration with modified Ford engine. Although aerodynamic design made front end lift at high speed, below, car was stable. Bottom left, like most deTomaso products, making repairs isn't easy, as close quarters in engine compartment disclose. Bottom right, a quick check by SCG opens many doors.

de tomaso mangusta

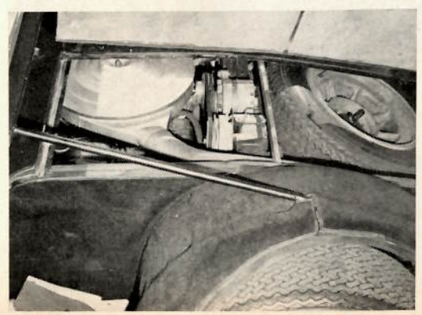
per hour versus revolutions per minute. The figures were unavailable at the time. The prototype's transmission was a five-speed ZF racing box, but the production Mangusta will have a conventional ZF. The factory-rated 418-horsepower, 289-cubic-inch de Tomaso engine (a modified Ford) was disappointing. No doubt because of its hard work during the past year. We turned the quarter-mile in 14.25 seconds and 98.36 mph. About the same as the big-engined Mustangs, Camaros, and AMXs. We're sure when the production model comes out with the 302 Ford, even with smog pump, it should do something like 110 mph in the quarter, with a well 'tuned' engine.

Our first big disappointment came at the end of the track's long straightaway, where we braked hard from 140-plus mph to 70 mph for the first turn. The car understeered badly, wanting to go straight off course. We put moderate pressure on the throttle and experienced violent oversteer. We tried this several times and couldn't seem to find a neutral area in cornering attitude. We attribute 90 per cent of this to an out-of-tune suspension and front tires which are too large. As we said earlier, this car has been through hell, so we expected things like this.

We found the brakes to be excellent. Although the power-assisted units on our prototype were competition-type, they'll be quite similar in the production model. The discs all-around were 12 inches in diameter. With Girling BR calipers in front and AR calipers in the rear, however, there was a little too much braking in front. It wasn't bad though. We could really stop in a hurry, and, after all, that's what brakes are for. We'd like to see large brakes, such as these, on all cars. If they're going to build cars that go fast, they'd better make brakes to stop them the same way. The Mangusta hit 165 mph during its testing in Italy.

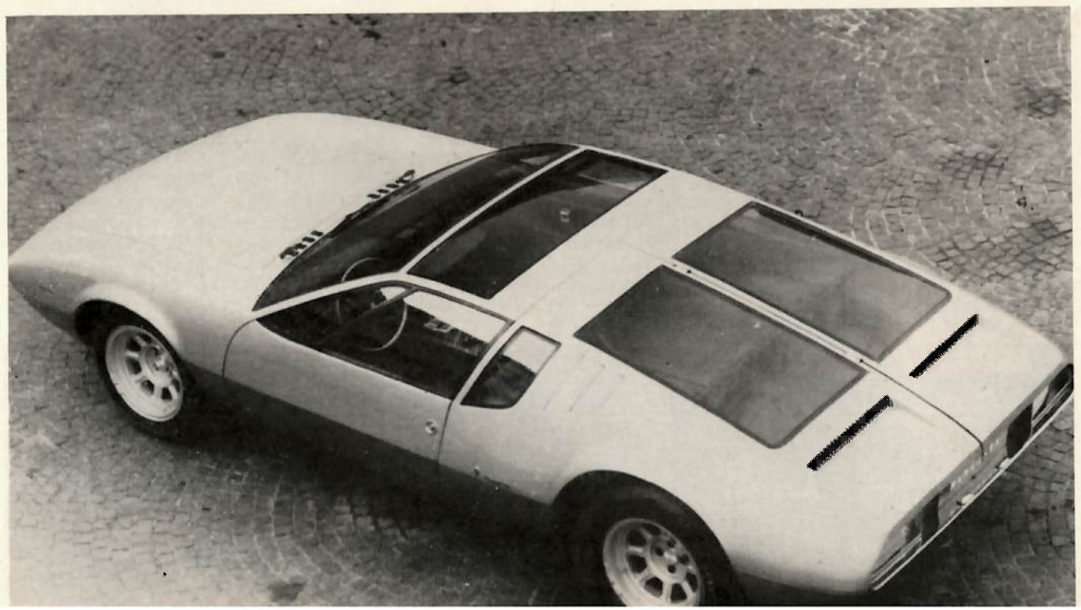
Maybe we got a little carried away with the race-car attributes of the Mangusta, and maybe we didn't seem to appreciate its street qualities. But we did. The de Tomaso Mangusta is a prime example of how good-handling, race-car techniques can be incorporated into a street car. We were most impressed, and hope to do a test on a production version in the near future. Besides, we sort of relish the idea of having pretty girls staring at us all the time.

The de Tomaso Mangusta no doubt will set a trend in under-$10,000 GT cars. That is if Rowan has anything to do with it—and they will. Presently, a nation-wide dealership network is being set up. And if you don't think the car is popular at the $8926 price (POE New York) . . . nine Mangustas were sold in Los Angeles when it was displayed for four hours.



Story/Photos: Karl Ludvigsen

Something For Your...
TWO-CAR GARAGE



Rowan comes through for the man who has everything; an electric car to satisfy Uncle Sam and the Mangusta, a rear-engined, Ford-powered. Oh-my-God sports car.

LET'S SUPPOSE YOU HAVE A GARAGE, carport, or driveway that will accommodate two cars. You don't want two of the same, do you? Cars are getting more and more specialized, and with two you can tailor each one to a particular kind of driving. One should be suitable for town use: roomy, economical, parkable, quiet, and pollution-free. The other should be for the country, open country: fast, stimulating, a feast for all the senses, a get-away-from-it-all machine.

What cars would you match to those two requirements? And how many companies can you think of that could fill *both* those garage slots from their current production? A new Italo-American combine has been formed that could do the job. It has built two prototype cars that perfectly match the job descriptions. One, the Rowan electric town car, is still in the early testing stage. The other, the de Tomaso Mangusta, is a proven automobile that's now entering production.

It's too early to tell what the prospects of these cars will be. Rowan does not now make vehicles of any kind and may or may not want to. De Tomaso is famed for his imaginative prototype cars and equally famed for his failure to put any of them into significant production. How did these two non-car-builders get together to build cars? It all began with Rafael Trujillo's almost complete ownership of Carrozzeria Ghia, the famous coachbuilding firm of Turin, Italy. It occurred early in 1967 that Trujillo was in urgent need of a large amount of money, in cash. He wanted to sell Ghia, and fast. Alejandro de Tomaso had worked closely with Ghia for several years on the development of special bodies for his one-off cars, and he became the purchaser of Ghia for a very reasonable $650,000.

Since the late Fifties, de Tomaso's modest car-building projects had been financed by his wife, the former Isabelle Haskell of the wealthy Haskell family of Red Bank, New Jersey. Isabelle's sister is married to John C. Ellis, the chairman of the board of the Rowan Controller Company and no small automobile enthusiast in his own right. Through these connections it evolved that the complete ownership of Ghia passed, in early May of 1967, to Rowan. At the same time Rowan acquired an interest of "more than 51 per cent" in de Tomaso Automobili of Modena.

Rowan is in no immediate danger of making *Fortune*'s list of the top 500 industrials, with a sales volume in 1966 of less than $10 million. It's an old firm, dating back more than 50 years, with its official headquarters and a plant in Westminster, Maryland, and another plant in Oceanport, New Jersey. Its traditional products are instruments, switches, and other controls for industrial electrical equipment.

Rowan is still formulating operational plans for its new-found subsidiaries. Ghia in recent years has been building series of complete cars under its own name, like the 450SS with Plymouth components, a habit it acquired during the Dual-Ghia heyday. This will stop, according to John Ellis: "Ghia will go back to body building only, not car building. It doesn't make sense for us to be in competition with our customers." Ghia is almost assured of success as a coachbuilder if it can retain the services of Giorgio Giugiaro, the young designer responsible for some of the finest recent efforts of Bertone, and now Ghia.

One major project now in the de Tomaso-Ghia pipeline will be continued by Rowan: the Ford-powered Mangusta sports car. 'Sports car' is the right term for this automobile, but somehow this overworked name seems far too tame for the sensational Mangusta, in an age that unquestioningly accepts the Pontiac GTO as a 'sports car.'

The Mangusta (Italian for mongoose) traces its origin to the several Group 7 sports-racing cars that de Tomaso built in 1964 and 1965, with body designs by Pete Brock. Using essentially the same backbone-type chassis and race-bred suspension, de Tomaso had Giugiaro/Ghia design and build a spectacular closed coupe, the Mangusta, which was unveiled at the Turin Show in late 1966. Since then, four more prototype Mangustas were built prior to the 1967 Turin Show, and a number of changes have been made to ready the car for production.

The most important alterations were made in the engine room. The first Mangusta was powered by a special all-aluminum V-8 engine, built by Alejandro de Tomaso as a derivation of the small Ford V-8, with new downdraft intake porting. Weber carburetors were on the first car and Tecalemit fuel injection was to have been an option. Like the racing two-seaters, the first Mangusta was also to have one of de Tomaso's special five-speed gearboxes.

Now, with serious production in mind, a standard Ford V-8 will be used. Fitted in the car we examined was a high-performance, 289-cubic-inch engine with a single four-barrel carburetor. The standard engine for 1968 will be the 302 V-8 with air pump equipment to meet the air pollution regulations. Back of the midship-mounted engine will be the well-known ZF five-speed all-synchro transaxle. With its wonderful looks and remarkable room, the Mangusta may succeed using these components where the Ford GT 40 Mark III failed. And, if it does succeed, it will probably eliminate the need for Carroll Shelby to market his ugly rear-engined Cobra.

As he has in other designs, de Tomaso uses the engine as a major structural member in the Mangusta. At its front end the block is bracketed to a deep central squared backbone which is the main chassis element. On the race cars this was used as a fuel tank, but in the Mangusta it carries controls and interior ventilation ducting. The fuel tank is placed vertically ahead of the right rear wheel. The body and its square-tube structure are also designed to add stiffness to the completed Mangusta.

Can a little company in Maryland find happiness making and selling a blazing fast two-seater and an electric city car? The new combine of Rowan-Ghia-de Tomaso hopes the answer is yes.

De Tomaso carried over almost pure race-car suspension on the Mangusta, with tubular wishbones in front and long tubular radius rods bracing the rear hubs, perhaps taking up more room than they strictly need to alongside the engine. Even so, Ghia has managed to provide a small stowage volume for tools and soft luggage ahead of the left rear wheel. Disc brakes are naturally fitted at all four wheels, inside big cast magnesium wheels of the same design used on the Group 7 car, with 6½-inch rims in front and 8½-inch rims in the rear. Fitted to Mangusta serial number DT/6003 were Dunlop HR15SP tires, with 185 section in front and 225 section at the back. It's one of the very few cars in series production with different tire sizes at front and rear.

The shape created by Giugiaro for the Mangusta is striking and totally fresh in its amazing simplicity, its use of near-flush windows and its open-ended look at both front and rear. It owes something to the Toronado in its monocoque look and flared wheel housings; its dropped belt line for the side windows is pure Giugiaro. All the body panels for the production cars will be fabricated in steel by Ghia.

During development, the front end has been changed, with the addition of a substantial scoop under the main air opening to supply more cooling air to the radiator. The production model also dispenses with the glass in front of the quad headlights that the prototype featured. Low headlight height may still provide some licensing problems, while bumper protection is completely absent at the front. A slim token bumper extends the full width of the rear.

A striking feature of this striking car is the split-down-the-middle rear deck, which seems at first a little gimmicky but which, on reflection, is very practical, as much so as the split hood of a classic Rolls-Royce. When each hefty steel panel is lifted, it carries with it the heat and sound insulation panels that rest directly atop the engine, giving reasonable access to the engine, battery, and spare tire. The right-hand side has to be lifted to reach the fuel-tank filler, though one of the prototypes, the car shown at AutoExpo in Los Angeles, had an exposed filler cap.

Giugiaro gave the Mangusta a very wide 'greenhouse,' with high frontal area, but compensated by raking the windshield rearward at an extreme 73-degree angle. In the roof the first prototype had a removable tinted plexiglass panel, equipped with a shade. DT/6003 had a panel in the same location which was steel and which might be removable somehow, but did not appear to be readily so. At the rear of the cockpit a plexiglass window seals off the passenger space from the engine room.

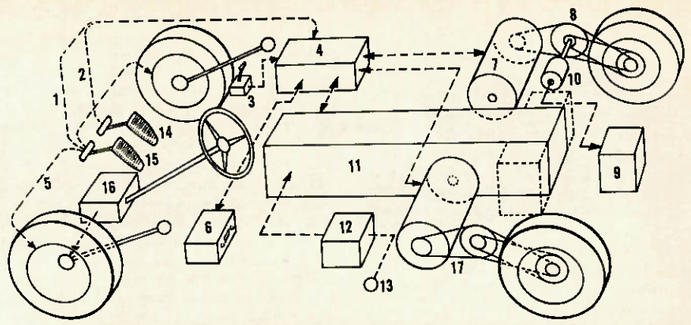
Full advantage was taken of the central backbone frame construction to roll the Mangusta's sides under drastically and to provide a low, narrow door sill. These add up to remarkably easy entry and exit for such a low car. With its remarkable width, the interior has a feeling of spaciousness, though the headroom is just barely adequate and the top of the windshield comes very close to the forehead. The seats feel a bit short under the thighs but are handsomely formed with a contour back. Upholstery of the doors and the central console – the frame, actually – is to a high standard, far better than the Lamborghini Miura, for example.

De Tomaso has given the Mangusta one of the most impressive instrument arrays of any automobile. Yet the dashboard retains an oddly non-automotive look. It may be because the curved dash line of the original car has been replaced by a straight-across, boxlike shape that does not attempt to blend in with any of the visual structure of the interior. The dials, however, are a gadgeteer's delight. In addition to the tachometer and speedometer, they include water and oil temperature, oil pressure, fuel level, manifold vacuum, ammeter, voltmeter, and ambient air temperature. Somewhere there may still be room for a clock.

Between the dash and the central tunnel are the controls for the optional air-conditioning system. The compressor was easy to mount to the Ford V-8, and the condenser was placed right at the rear, by the air outlet grille, with its own electric cooling fan. Electric windows are another welcome convenience feature of the Mangusta, though they operate with frustrating slowness.

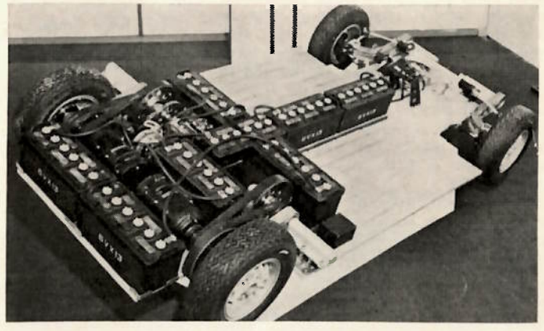
At the wheel, the Mangusta driver finds everything well placed, including the shift lever working in a long-slotted gate. Under the dash is a cheap-looking pull-type handbrake control. With the slim front pillars visibility forward is very good; the center rib at the rear produces a blind spot about the same as that on the 1963 Corvette. That this is a man's car is signaled clearly by the clutch, which requires massive pressure to operate. An automatic transmission would be an intriguing option for this sports-racing car in civilized clothing.

Rowan's de Tomaso subsidiary has some ambitious production plans for the Mangusta. The car will be built in an initial series of 500 units, quite high by specialty production standards. Rowan was working on a dealer network for de Tomaso cars in the U.S. and a parts stock or service system at the time of this writing, but no word on how the Mangusta stands *vis-a-vis* the Government Safety Regulations. Rowan surely wants to sell at least some of those 500 cars in the U.S. and it will have to come to grips with these problems to do so.



METRODYNE DRIVE** NOTES

(1) Pre-motion of brake pedal (15) signals control unit (4) to convert motors (7) into dynamic braking generators.
(2) Torque demand (accelerator) pedal (14) signals control unit (4) to give more torque to motors (7).
(3) This lever gives manual control between reverse, off, low (series) and high (parallel) motor connection.
***(4) This package includes an integrated circuit chip amplifier for servo low current field control. Low RFI.**
(5) Mechanical front wheel brakes for parking and low speed braking. Motors (7) give dynamic braking.
***(6) Contains integrating battery charge meter, locking switch, and pilot light.**
(7) Special GE long life units are wound to allow total control through field regulation.
(8) Two stage belt drives couple 1000 RPM low motor speed to 4 MPH vehicle speed.
(9) Separate 12V accessory battery prevents unbalance of drive battery (20 AMP-hours.)
(10) Alternator and full wave solid state rectifier charges accessory battery (10).
(11) Main batteries comprise 8, 6 volt, 150 Amp. HR. Lead-acid units. Total weight: 550 lbs.
(12) Built-in charger reduces mains voltage to battery level and rectifies it. 30 Amp.
(13) Retractible mains cable available.
(14) Accelerator (torque demand) pedal.
(15) Brake pedal has lost-motion variable resistance for dynamic braking as well as mechanical action.
(16) Flegible linkage accommodates front wheel spring suspension.
(17) Unique rear wheel drive suspension permits motors to be clamped to frame.
*** Patents Pending**
**** Trade Mark pending**



Electric car is still in the early testing stage.

That takes care of one side of our ideal two-car garage. In the other slot we'd like to park the electric city car that is now in the earliest stages of development at Rowan. It's smaller than the Mangusta, but in its way it's a far more ambitious, more challenging project.

In June of 1967 it occurred to Rowan executives that the abilities of the newly expanded company could be put to excellent use with the creation of an electric car. A rush project was initiated, and the results were put on display at the Turin Show in November: A fully detailed body mockup on a dummy chassis, and a display chassis with a power train which had been run under no-load conditions only, with very incomplete chassis engineering. Thus there was no 'electric car' as such on display, but all the elements were on view. And they were impressive elements.

The Rowan in concept comes the closest of anything we've yet seen to the ideal electric city car. Its heart, of course, is the electric drive system, devised by another Rowan subsidiary, the Metrodynamics Corporation. This is a small 'blue sky' development group, numbering designer C. R. Grady among its members, and their brainchild is appropriately named the 'Metrodyne Drive.'

Rowan was practical rather than exotic in its choice of batteries. Eight are used, normal lead-acid type, each with a 200-ampere-hour capacity. They weigh a total of 565 pounds, and are dispersed cannily through the rear portion of the car, three of them forming a 'console' down the center. Not apparently solved, at this early development stage, is the problem of easy access to the batteries for electrolyte checks and, eventually, replacement. Rowan has used double the number of batteries that Ford installed in its smaller 'Comuta.'

The 12-volt batteries are wired to form two 48-volt sets of four. A master control switch by the driver selects the main modes of operation: Off; Reverse; Low, in which the two 48-volt sets are linked in parallel to produce peak amps for super-maximum torque; High, the normal operating range in which the two battery sets are connected in series. In High, the relationship between the batteries and the motors is constantly adjusted by switching relays under the influence of a 'black box' analog computer, which receives inputs from the throttle position, from a motor speed sensor, and from the motors themselves.

At this point we have to take a look at the motors themselves. Most electric cars built to date have used simple series-wound DC motors. Their output is controlled by varying the input voltage either by resistors, which waste current in the resistance, or by rapid on-off current switching, which requires costly and bulky thyristors. An alternative, selected by Rowan, is the shunt-wound motor, in which the field of the stationary portion of the motor is capable of being independently varied. Many new control possibilities are opened up by this variation of the magnetic field, in what Rowan calls its 'servo-field' motors.

Jointly with General Electric, Rowan worked out the design of the two 48-volt, three horsepower motors that power its electric car. Use of the shunt-wound or "servo-field" principle made it possible to provide, with relative ease, regenerative braking. This means that, for braking, the two motors are made to work as generators, their output being delivered back to the batteries – recovering some of the car's kinetic energy.

On the Rowan car the brake pedal is arranged to switch the system to regenerative braking during the first portion of its travel. This will provide gentle but useful braking at the rear wheels only. Full pressure on the pedal brings into action the front disc brakes, the only wheel brakes with which the car is equipped. On a British electric car, a Mini converted by Associated Electrical Industries, two separate pedals were used: one for electric and one for mechanical braking. The British found that they gained about 10 per cent in range from regenerative braking, which can be considered good, since a battery is naturally not able to be recharged at the same rate at which it can produce current. A similar pedal arrangement and regenerative braking were also used on an Autobianchi car converted to electric drive by Robert Bosch in Germany. But neither of these cars used shunt-wound motors as employed by Rowan.

The 'black box' controller of the Metrodyne Drive contains five potentiometers or variable resistances which can be 'tuned' to adjust the 'shift points.' The controller's relays have a choice of three field strength levels, or engine speed ranges, in the High operating mode, as the system was set up in the display chassis.

In addition to the main power system, an alternator is belt-driven from the left-hand motor system to keep a small accessory battery charged. This is used to operate lights, horn, wipers, and other accessories, to avoid a power imbalance in the main battery system. Not yet solved in the Rowan is the knotty problem of a heating system. Ford's Comuta, for example, uses motor cooling air to warm the interior. No such solution is evident in the present Rowan design.

De Tomaso has made excellent use of the popular cogged rubber belts in the Rowan's final drive. With two separate motors, each driving one wheel, there's no need for a mechanical differential. Each wheel has a double-reduction belt drive. The intermediate pulleys are frame-mounted and the final belt system moves up and down together with the trailing-arm rear suspension.

Cast magnesium trailing arms, obtained from a British source, provide independent suspension for all four wheels. At their frame pivots are rubber suspension units of a type often used for trailers. In the completed car, telescopic shock absorbers will be fitted. Steering is by rack and pinion, one of de Tomaso's race car units, and the wheels on the first cars are cast magnesium of Mini size, 10 inches in diameter.

According to Ghia and de Tomaso, the Rowan electric cars will have aircraft-type aluminum honeycomb as a single, flat chassis plate. This may be for the future, as the chassis on show at Turin was merely two sheets of aluminum riveted to the top and bottom of a light structure of rectangular-section tubes. Either way the chassis seems impossibly light and flimsy for the job it has to do. Possibly de Tomaso is counting on added strength from an integral body structure.

Giorgio Giugiaro's design for the Rowan body matches in all respects the advanced drivetrain engineering. It deserves to go into production as a city car, even with gasoline power, whether or not the Metrodyne Drive reaches fruition. Its interior space, with front bucket seats and two rear seats over the batteries, is generally comparable to that of the Volkswagen and it feels even roomier with its generous window area.

A large door at the rear of the body swings up for easy access to a luggage/shopping area. There's also a smaller opening panel at the front of the body that allows a shopper to put small packages into the car from outside, then remove them from inside the car – or vice versa. Inside the doors and the rear body quarters are generous stowage pockets. These are made possible by fixed rear windows and front ones which slide, an arrangement that probably will not be acceptable in the U.S., where the drive-in way of life is well established.

In Europe the Rowan design was criticized for its steeply inclined windshield and its forward-opening doors. The screen is steep, angled at 63 degrees, four degrees steeper than any American production windshield. But there's no evident difficulty in seeing through it. The rear-hinged doors are very practical for city use, for easy movement to the curb, and entry to the car, and it should be possible to engineer them so that safety is not an objection.

Other useful body features include bumpers and lights of adequate height, interior ventilation inlets at the front, and air scoops ahead of the rear wheels for battery and motor cooling. At the left rear a hinged cover conceals the end of an electric cord on a spring-loaded reel attached to a built-in, 30-amp battery charger. Just plug it in at your garage and, seven hours later, your batteries are brought to full charge.

At the time of the Turin Show, several claims for the performance of the Rowan car were made, all of them founded on engineering estimates at various levels of optimism. Nobody *really* knew what the car would do. After the show the body and running chassis were to be mated, no simple chore, and the complete car evaluated.

One of the least acceptable claims for the car was the overall weight, said to be 1310 pounds, including the 565 pounds of batteries. Consider that Ford's Comuta, a much smaller car with half as many batteries, weighs 1200 pounds, and that the Westinghouse Markette weighs 1730 pounds with some 800 pounds of batter-

TWO-CAR GARAGE

ies. The Rowan *could* be that light, if the radical frame construction works.

The credibility of the Rowan effort was also thrown in doubt by some wild claims made at Turin for its operating range. Rowan's best post-show estimate was a range of just over 100 miles, with a driving schedule similar to the California air pollution control cycle. The maximum speed would be 44 miles per hour (short of the 50 mph called for at one point in the California cycle) and the average speed would be some 25 miles per hour.

Independent estimates, bearing in mind the present performances of other experimental electrics, have predicted a practical range of nearer 60 to 75 miles for the Rowan, with 100 miles possible only at a near-constant speed. If achieved in tests, even this more limited range would be better than most lead-acid electrics have done so far—and a Rowan with this range would be an acceptable proposition. Significantly, a small electric vehicle designed by inventor Leslie Perhacs is now in service in the Los Angeles area, exactly duplicating the Rowan's claimed performance with a 45 mph maximum and 100-mile range on eight lead-acid batteries linked in a 48-volt circuit controlled by 16 solenoid switches to drive two motors of a nominal two horsepower. The weight of the two-passenger Perhacs machine is probably very close to the hoped-for weight of the Rowan. So a practical precedent lends credence to the Rowan claims.

Rowan's immediate plan is the completion of the first car, validation of the engineering, and the construction of five more test prototypes for field trials. "We want to find out how the car performs, say, in the Northeast part of the country," says Rowan's John Ellis, "where you have more 'starts and stops'." Rowan also wants to see how the electric works under cold and damp weather conditions. By early this month, when Rowan expects to show both the electric car and the Mangusta at New York's International Auto Show, some firm facts about the car's performance should be available.

If it works, what then? Ellis has spoken of the possibility of raising some $3 million to finance production at the rate of 50,000 cars per year. This would require a new plant, probably in Italy, and would postpone serious production until 1969 at the earliest. Pilot production at the present Ghia facilities could begin as early as late 1968. An equal possibility, however, is the sale by Rowan of the entire project, perhaps spinning off the Metrodynamics Corporation, to a larger company which might want to manufacture the car. Rowan will certainly not select one of these alternatives until the car makes its New York debut in April.

That's Rowan, and those are the automobiles in its two-car garage. They're fascinating vehicles, strikingly handsome and imaginatively engineered. Those qualities are rare enough in new automobiles, struggling to find a place in a crowded market. But the most difficult task—efficient manufacture, sales, and service—lies uninvitingly ahead. We hope it won't prove insurmountable for the Rowan and the Mangusta.

AUTOMOBILE
Quarterly

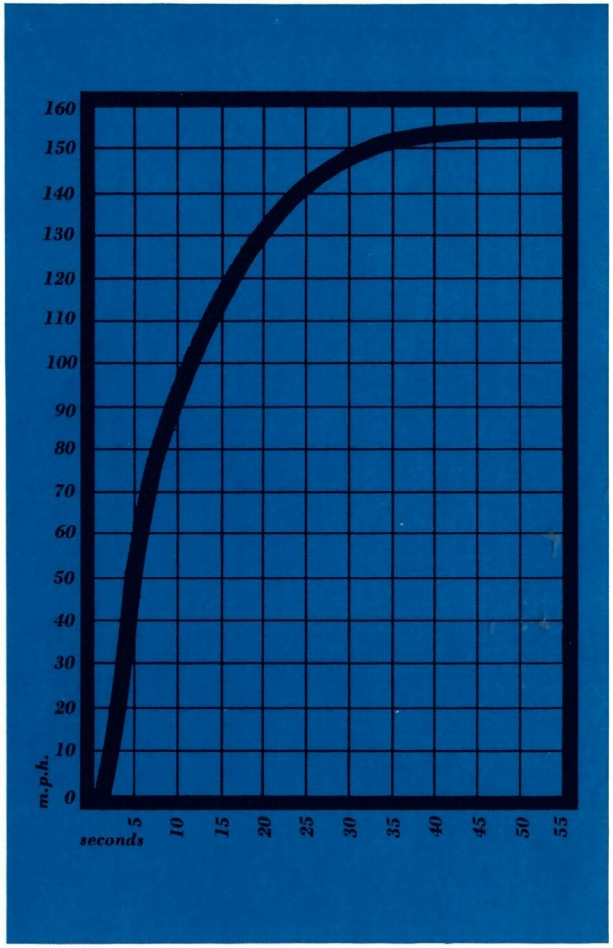
DE TOMASO
MANGUSTA

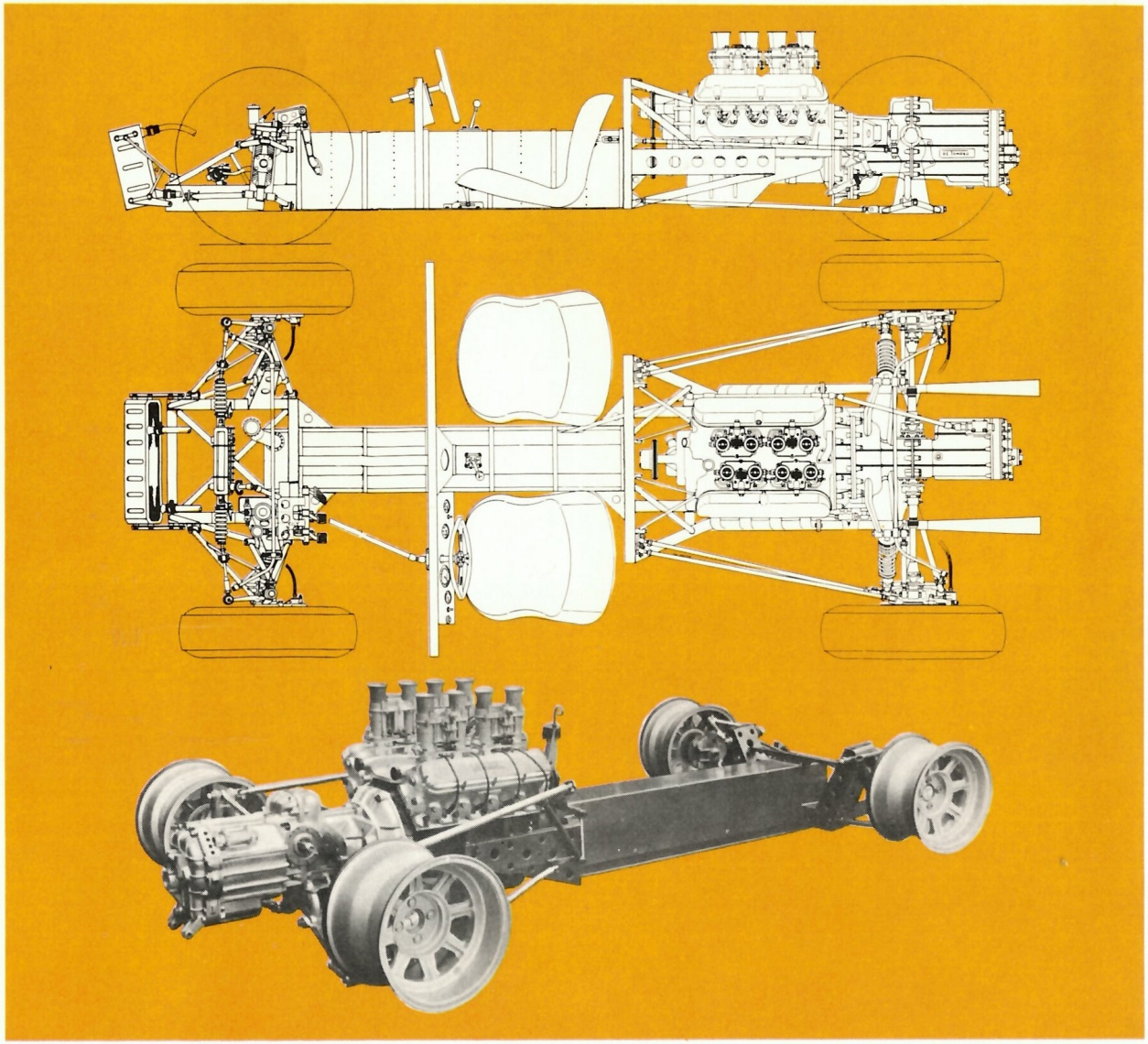
a can-am-type projectile
for the perfectionist
in a terrible hurry

usta (mon goos'tə), *n. Italian. (Eng.* = mon-
a small, ferretlike carnivore of India noted
ability to hunt and kill the Cobra.

OWNER: DON VORDERMAN

PHOTOGRAPHY: DON VORDERMAN





It's not very often these days that one gets a chance to drive a brand new road racing car that's disguised as a road car. For the major portion of the automobile's history there was hardly any difference between the two. The racing cars, if somewhat starker, were really only stripped-down hotted-up touring cars, and it was still possible in the Thirties, and even into the Forties, to buy what was virtually a gussied-up Grand Prix car that was set up for use on public roads.

Not any more. Within the last fifteen years or so the racing car has become so highly developed, so esoteric, and so *expensive*, that modern racing machinery set up for the road is almost unheard of. The mid-engine layout, which is the only way to go in a modern competition machine, is costly for more than one reason. A fully-synchronized five-speed-plus-reverse ZF transaxle alone can cost as much as a small but well-fitted-out imported sedan. Added to this, the design and construction of a suitable chassis is a highly elaborate science, and such engineering

GIORGIO GIUGIARO

talent as is required is very expensive. The same goes for the chaps who actually build it from the drawings. Then the same thing applies to the fabrication of the bodywork. When you've reached this point and are confronted with a completed car, your troubles are far from over, because now you may be faced with development and redesign costs that may well exceed what the car has cost so far.

It's easy to see then why the boulevardier's racing car is a thing of the past today—but for one altogether superlative exception: Alejandro de Tomaso's fabulous Mangusta.

Back in Volume VI, Number 4 we recounted how de Tomaso bought Carrozzeria Ghia, one of Italy's most respected and prosperous coachbuilding firms, in early 1967, and how the company was later resold to the U.S.-based Rowan Controller Corporation. The Mangusta had already made its first appearance then, having been the hit of the Turin show in late 1966. At the time the car was powered by a five-liter Weber-carburetored version of Ford's well-known 289, and though no one, it seemed, other than factory drivers, had actually driven the car, there was little argument that it would be a stunning performer when someone finally did. It was.

Since then the Mangusta has become a lot less mysterious and much more accessible, at least in Italy. As well as we can determine there are only five of these machines in the U.S.A. at this writing, but more are on the way—a shipment of fourteen units should have been delivered by the time this gets into print. The only retail outlet in the U.S. for Mangustas at present is British Motorcar Distributors, Ltd., 1601 South Anaheim Boulevard, Anaheim, California 92805. Units delivered in Europe will continue to use the trusty 289 Ford V-8, while those supplied in this country will be fitted with Ford's 302-inch V-8 with an Autolite 4-bbl and the necessary emission controls, all of which will result in around 230 bhp at 4,800 rpm. The list price of a Mangusta, F.O.B. Anaheim, is $10,950, which strikes us as an almost unbelievable bargain.

This is the only road machine in production anywhere in the world that was designed from the ground up as a racing car, and it shows. The way this machine behaves itself is utterly beyond the ken of anyone who hasn't driven a modern racing automobile. To say that the Mangusta is perfect might be pretty accurate, but not very informative, so let's see why the car does what it does so well.

Firstly, have a look at those chassis drawings over there. Keep looking and see if you can find anything missing, or anything that is there that isn't where it belongs. We couldn't.

Now consider the specifications of our test car. Engine: 305 bhp, 4.7-liter Ford (Cobra) V-8, mounted amidships behind the seats. Transmission: ZF fully-synchronized five-speed transaxle. Brakes: servo-assisted Girling twelve-inch discs front and rear. Steering: Rack and pinion, 4.5 turns lock to lock. Wheels: Campagnolo 15-inch magnesium alloy. Tires: Dunlop SP Radial 185x15 front and 225x15 rear. Cooling system: pressure-type, forward through

assis to aluminum cross-flow radiator and
gh backbone. Electrical system: twelve-
Autolite alternator. Air conditioning is
uipment. Weight: approx. 2,600 pounds.
re well aware, pretty drawings and im-
cifications do not a motorcar make. So,
l ask, how does it go?
is point that we have to watch ourselves,
is where we are most likely to be carried
better start with the figures taken from a
carried out at Monza last summer:

ation	0-60	5.9 seconds
	0-100	13.7 seconds
g ¼-mile		14.25 seconds
eed		152 mph

es were recorded by the prototype shown
ges after it had done some 200 flat-out
laps around Monza. As a result they
lessly be improved upon with a thorough
factory tells us that 250 kph (155 mph)
ained often enough with the 289 to serve
luring testing.
he superb chassis is what really makes
sta what it is, the exterior is what
ees—and to a large extent is what de-
e commercial success of any automo-
st in this country. On this count the
simply cannot be faulted. Giorgio
ho at thirty years is probably the most
ng designer in Italy today, already has a
ikingly beautiful designs behind him, in-
Maserati Ghibli, the Iso Grifo, the Alfa
e Bizzarini GT, the recent Bizzarini Man-
n AUTOMOBILE *Quarterly's* own Bertone
is envelope for the Mangusta chassis is a
fficient space utilization and restrained
e. There's no doubt that in ten years the
as striking and rakish as it is today. Sig.
definitely a young man with a future.
he many things that people have been
ach other for so long that it's now ac-
Gospel is that if an automobile manufac-
racing then the products he sells to the
be "better," which, of course, is so much
ense. The manufacturers earnestly wish
uld believe this, otherwise they have been
that money trying to get your attention.
bet your boots *they* don't believe it. The
ly of mankind is man, and the proper
e sporty-compact-family car is precisely
thing else.
an experienced manufacturer comes up
sis that looks like a racing car, one that
es, stops and handles like a racing car,
quite confident that it *is* a racing car, no
cozy and domesticated it might be.
de Tomaso Mangusta. ✠