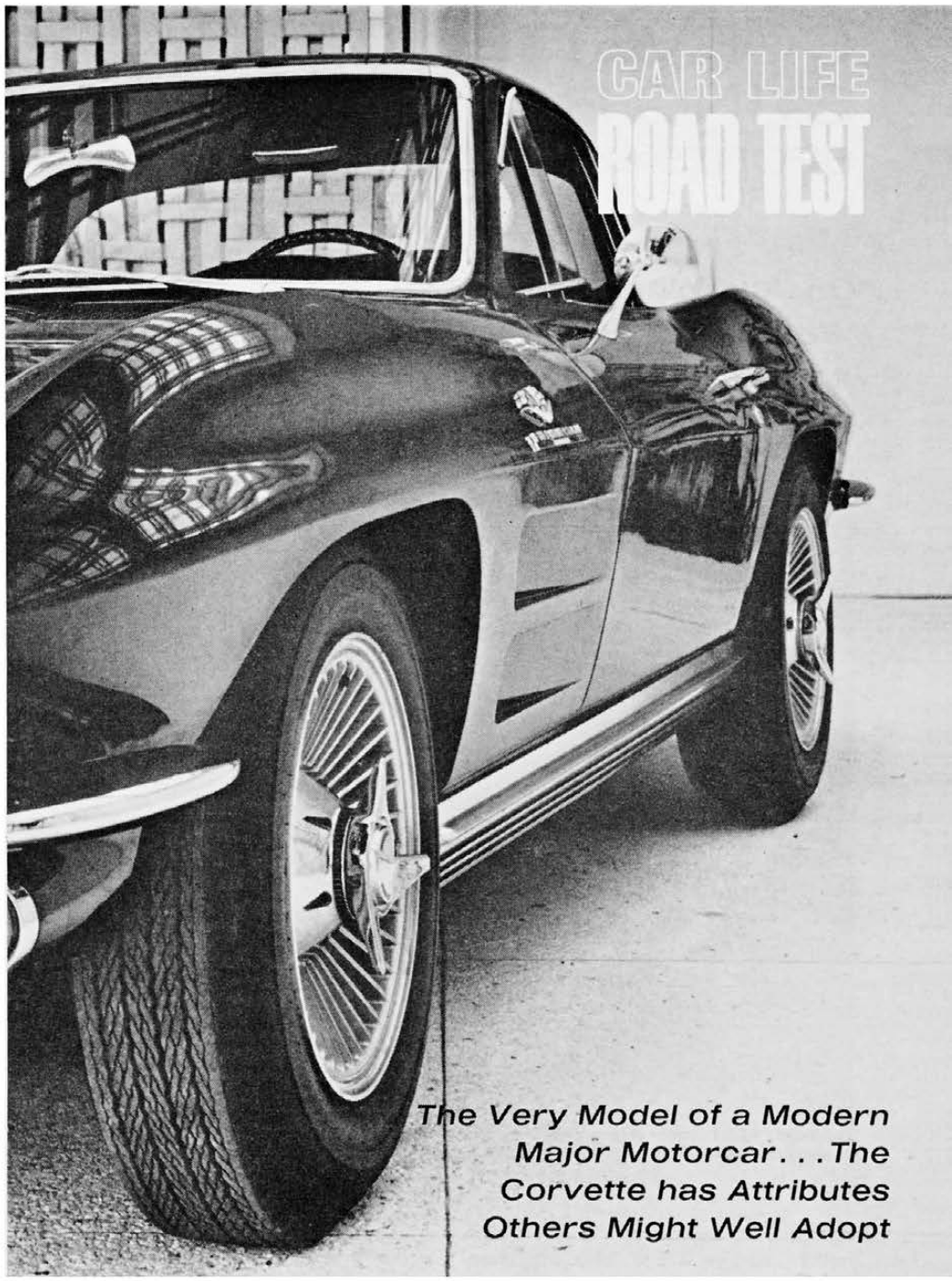


CORVETTE STING RAY SPORTS COUPE

By all odds, the Corvette Sting Ray Sports coupe should be the one domestically produced automobile to scoop up the enthusiastic and unanimous praise of the *Car Life* staff. It is, even on the surface of it, representative of those attributes which we continually have sought—most often in vain—from the mass-producers of American automobiles.

Aside from its true Grand Sports capabilities, the Sting Ray should have a far more extensive effect on domestic manufacturers. All of them, of course, are fiddling around with the fastback fad which this car has rekindled on these shores. But so long as copying is a fact of Detroit life, many other more important aspects of this car literally scream for imitation throughout the industry. There is no more go-able, roadable, steerable, adjustable, comfortable, respondable, or stoppable car mass-produced in this country today. Nor should any be more salable.

The breast-beating cry that engineering and production costs for a car with such attributes would add too much to the price loses most of its impact if production runs are 200,000 or 2,000,000 instead of the Sting Ray's 20,000. Though listing for $4200, and delivered for anything on up to $7000, nothing in the basic Sting Ray design concept (overlooking the fiberglass bodywork) dictates such a price if applied to all the 4-door sedans and hardtops which this country produces.

A demonstration drive in such a 4-door sedan, even one with a price premium of $100 or so, would make the more commonplace cars a drug on the market. Perhaps, then, it is just as well, in view of its anti-trust worries, that GM has concentrated on the much less desirable perimeter frame 4-link non-independent rear suspension layout for inter-divisional interchangeability and product integration.

The Corvette 327-cu. in. engine comes in one of four rated outputs (although, since all are the same displacement, there is no "big" engine) of 250, 300, 365 and 375 bhp. The first two have 4-barrel carburetors, hydraulic lifters, and 10.5:1 compression ratios and are thoroughly reliable and unobtrusive powerplants capable of taking the Sting Ray anywhere except racing. The latter two have 11.0:1 compression, special camshafts, larger valves and (nasty thought at GM) mechanical lifters—the 365 using a Holley WCFB 4-barrel carburetor with 1.56-in. venturis and the 375 fitted with the only production fuel injection system in this country.

We specified the f.i. engine for the test car for two reasons; the uniqueness of this Rochester setup among domestic induction systems and the desire to come as close as possible to the performance of the street Cobra. This installation re-

CORVETTE STING RAY
SPORTS COUPE

Oh Joy! What Brakes! We've Finally Found A Car that will STOP! As Well as GO!

SCOTT MALCOLM PHOTOS

FLARING FRONT fender ridges give Sting Ray distinctive style but help little in parallel parking. Concealed headlights swing up at night, via electric motor.

sults in 1.15 bhp per cu. in. (the Cobra is 0.94) and an 8.9 lb./bhp, highly respectable figures from anywhere in the industry. Actually more complicated in appearance than in action, this injection unit dumps a constant flow of fuel into the intake tubes well upstream of the 2.02-in. valves, where it mixes with a rammed charge of outside air.

A bypass provision, connected to the ignition switch, is supposed to assure proper fuel supply for hot and cold starts but was the only area of reservation which we had about the unit. This feature allows fuel to be re-routed past the metering system, directly from the diaphragm pump to the fuel distributing spider and into the intake passages. However, an overly warmed engine still suffers from a touchiness about restarting that is almost as maddening as its tendency to stall at stop lights before fully warming up.

Once underway, the engine exhibits a smoothness that was akin to turbines, with a fantastically sensitive throttle response that is unmatched by anything else produced in this country. This is particularly true in the more normal operating ranges below 3500 rpm, since thrashing about in the higher performance ranges between 4000–6000 rpm produces enough reciprocating throb to somewhat obscure that smoothness. Moreover, throttle response is instantaneous; there are no ragged spots while the rev counter swings hurriedly around the dial as the accelerator pedal is mashed to the floorboard.

Aside from the injection/induction equipment, there is no difference between the two most powerful engines. Both have gained an increase in rated output for 1964 (up 15 bhp for the 375, 25 for the 365) through better volumetric efficiency. Valves are larger and the heads have been correspondingly machined to accommodate them. The special camshaft has an even longer duration and overlap, to put to use the increased fuel charge flow and to improve exhaust scavenging at the higher engine speeds. A dual exhaust system (which incidentally has the tail pipes running through the transmission support crossmember for higher positioning) takes care of the spent gas extraction.

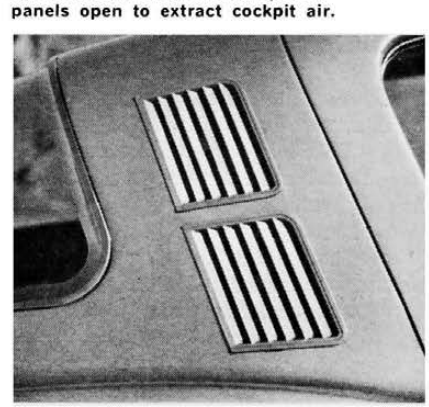
The engine is extremely exhilarating, fully flexible and tightly tractable when its full range of performance attributes are explored. It idles with a lope at about 1100 rpm; the lope tends to get more persistent at lower rpm after a period of more pedestrian use but quickly returns to normal once the powerplant is called upon to clear its throat, so to speak, during a more strenuous session.

There is a $538 premium for the fuel-injected engine, a factor which has effectively limited its proliferation. Yet, for that tariff one receives a much more efficient engine than would be the case with just about any multi-carburetor setup which comes to mind (not to mention the unmatched bhp/cu. in. ratio). Total overall fuel mileage was 12.7 mpg; extreme thrashing about lowered it to 12.2 and highway cruising resulted in 13.5 mpg. Such minute variation can hardly be matched by a comparable dual 4-barrel Super Stock engine.

In common with other Chevrolets using the 327- and 409-cu. in. engines, a 10.4-in. clutch with "bent finger" diaphragm spring is fitted to insure, the company says, "positive action when shifting at high engine speeds." It may be only that a finger was crooked out of shape on our test car, but the action was positive only in its absence at high engine speeds in this case. When shifting gears at 6000 rpm, the clutch refused to re-engage until engine speed slowed to somewhere around 4500—when it would slam closed with a vengeance. In consequence, our acceleration runs had to be made to a rev limit of 5800 and times are slightly off the ultimate. Compounding this was a tendency for the throttle to stick open, sending engine rpm screaming on up to 7000 before becoming unstuck.

Maximum advantage of this engine is taken by the new Chevrolet-built "Muncie" 4-speed transmission, fitted with the close-ratio gearset as standard. A close copy of the Warner Gear T-10 which was developed for the original Corvette (and subsequently fitted to everything which American manufacturers want to give a "youth image"), it has larger synchronizers and wider-faced gears to better handle high torque engines. It is a faultless gearbox, capable of being operated without the clutch—as indeed our testers did for a couple of acceleration runs when the clutch hang-up problem seemed insurmountable—but

LOUVERED VENTS on rear quarter panels open to extract cockpit air.

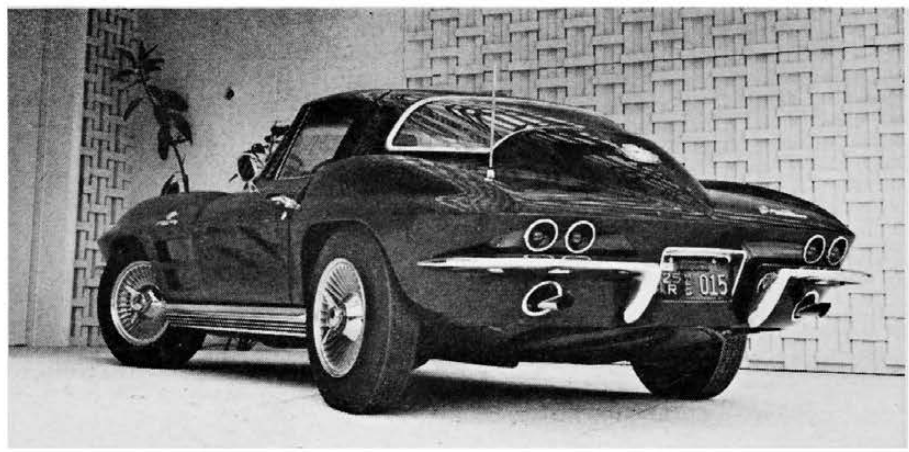


the shift-lever linkage had an occasional annoying balkiness, particularly in neutral after reverse had been used.

Driving power is directed to independently sprung rear wheels through a frame-mounted differential and exposed fully articulated half-shafts. This unique (for domestic cars) rear end results in exceptional traction, ride quality and road holding. Suspension geometry is a 3-link layout with trailing arms from the frame kickup serving to locate hub spindles and to take up drive and torque forces. The differential, mounted with a slight flexibility to the top crossmember and a yoke attachment under the nose, carries a 9-leaf transverse spring on the underside, reducing the unsprung weight to that of hubs and wheels. Lateral forces are taken by locating arms which pivot from the lower sides of the differential to the hub assemblies, where the pivots serve as lower shock absorber mountings.

This design limits the spring's function to controlling vertical jounce and rebound. The leaf spring, with tips resting in rubber-bushed struts from the radius arms, saves both weight and space and is made progressive in action by the simple expedient of making each successively smaller leaf with slightly lessened camber. Thus, more spring force is exerted as wheel deflection increases. The rear spring rate, a nominal 116 lb./in. at the wheel, was increased for the '64 model, in proportion to the front rate (100 lb./in.), which makes the roll couple distribution more nearly neutral than was the case in earlier Sting Rays. Rear wheels have a static decamber of 5/6°, further adding to the cornering power of the design.

The job this arrangement does is exceptional. Full-throttle acceleration from rest causes the rear to hunker down and leap off, with only minimum wheelspin. Each rear wheel easily follows contour variations in the roadway, eliminating the wheel hop and "walking" which caused the pre-'63 Corvettes to snake wildly with full-power application. Moreover, the progressive springing insures a smooth, joltless ride on the better road surfaces, and yet stiffens up at increased roadway roughness. During tight fast cornering this helps to maintain a high degree of road contact. Unlike the more widespread swing-axle i.r.s., Sting Ray wheels remain more constantly perpendicular to the road, taking optimum advantage of tire resistance to high polar and centrifugal movements without penalty of excessive tire scrub. The combination of such a high degree of road-holding and cornering power with such a smooth and soft ride which this rear suspension imparts is sure to surprise those who haven't tried it.



WHAT THEY'RE all copying: The fastback that rekindled the interest in such rear styling during recent months, which in turn was adapted from Jaguar.

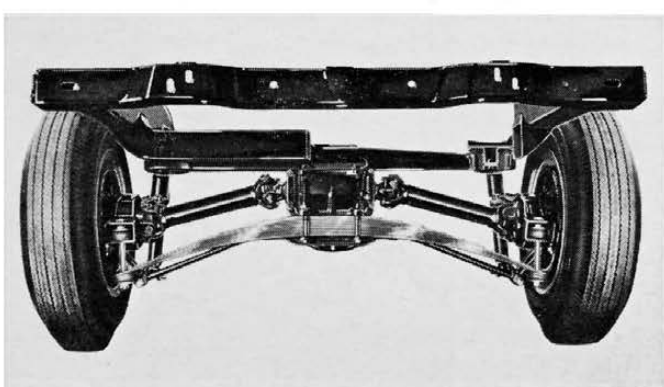
At the front, things are more in keeping with common practice. The unequal length A-arms, sandwiching concentric variable-rate coil springs and shock absorbers, are virtually identical to Chevrolet sedan production parts, but there is a significant difference: Pivot points at the frame crossmember for the arms have been relocated to raise the roll center 3.25 in. above ground level (where it is figured in conventional geometry). This keeps front wheels more nearly perpendicular to the ground, for maximum cornering power, with much less effect from body lean.

A front roll center at that height, combined with the Sting Ray's rear roll center of 7.56 in., gives a roll axis more parallel to the ground than the usual speared-down angle of, for instance, the Chevelle which has its roll center at virtually ground level in front and almost 18-in. rear roll centers. Combined with the other factors of wheelbase, tread, weight distribution and center of gravity, all of which the Sting Ray design has in its favor (as could Chevelle), the result is proportionally flat cornering and accurate, neutral steering.

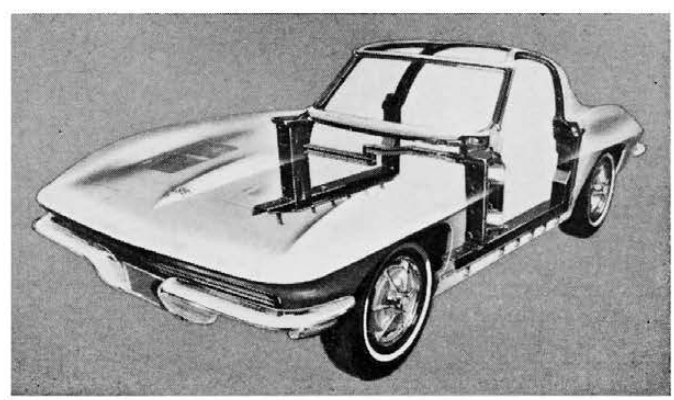
By using relatively soft (for sports cars) springing and firm damping, the Sting Ray also avoids the choppiness of ride which is to be expected from such a short wheelbase. Undulating surfaces, to be sure, can be felt by the passengers, but with neither the bottom-spanking of other roadsters nor the porpoising of our softly sprung domestic sedans.

The Corvette steering has two features which might well be adopted elsewhere in the industry, so desirable and so minimal in excess cost are they. One is the dual mounting holes in the steering arms, permitting a change from 20.2:1 to 17.6:1 in overall ratio and wheel turns, lock to lock, from 3.4 to 2.9. All power-assisted units have the faster setup, which results in steering quickness of a nature most cars should have. The second is provision to slide the steering column in or out a total of 3 in. by loosening a collar nut just above the damper joint. This lets a driver have the ▶

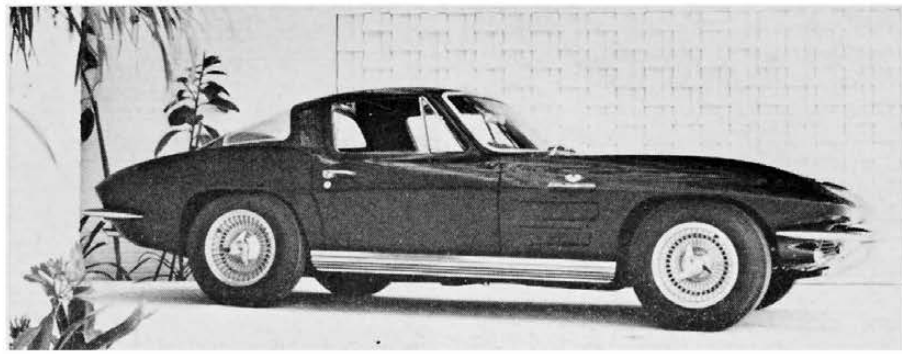
NINE-LEAF spring attaches transversely to frame-mounted differential; wheel hubs are located by trailing arms.



STEEL STRUCTURE is used as reinforcement for fiberglass body around cockpit area. Rubber body mounts have been changed.



CORVETTE STING RAY
SPORTS COUPE



SPECIAL OPTION is radially-finned, cast aluminum wheels with genuine knock-off hub spinners for quick change. Racing tires weren't included.

wheel moved to the most controllable distance from his chest, yet avoids the cost of an adjusting mechanism in the cockpit.

Two of the most expensive accessories with which the test car was fitted call for some comment. Cast aluminum wheels, which are optional (and finally available) for an extra $323 the set, are just about the strongest and handsomest we have yet seen. They have 6 in. rims (standard are 5.5 in.), integral ribs fanning out radially like turbine blades, and actual center lock knock-off spinners. But, with wheels so obviously designed for racing and a car capable of speeds of 130 mph, it is impossible to understand why Chevrolet installs run-of-the-production-line tires that are hard-pressed to withstand sustained speeds over 80 mph.

The test car brakes—Oh, Joy! What brakes!—so eclipsed the puny performance of all other Detroit products, regardless of hairy-chestedness, that they nearly justify the purchase of a Sting Ray. But the extra cost for this item alone was enough for a down payment on many a lesser car: $629.

These are the full-race stoppers, vacuum-assisted with integral dual-circuit master cylinder and using radially finned drums, backing-plate airscoops and sintered metallic linings. (For much less money the buyer can get just the metallic linings in the standard brake system.) The indicator on the CL decelerometer moved into virgin territory with the tested system, registering 0.9 G of stopping power at 29 ft./sec./sec.

The harder these brakes have to work, the better they are. Dispensing with our normal crash stops from 80 mph, we called on them to halt the Sting Ray from 100 and 110 mph in quick succession. Then, as a matter of curiosity, the 0–100–0 test was tried and returned a 20.6 sec., better by far than anything we have ever tested.

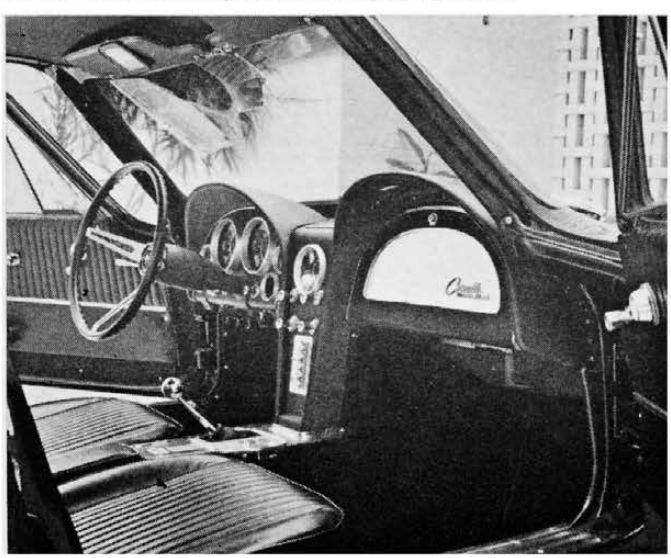
Dissipation of the rapidly built-up heat in these brakes is, of course, hastened by the special drums, but there is no reason to suspect that the stock drums with metallic linings wouldn't do substantially as well in less severe service. The lining area is 134.9 sq. in. and line pressure at 100 lb. pedal load is a nominal 750 psi. Another major difference between the racing brakes and standard units is the self-adjusting feature, which operates during forward motion with the former and with reversing in the latter. Though production run brakes (with organic linings) have been as prone to fade as any other on Detroit cars, opting for the metallic linings will let the Sting Ray buyer avoid this problem.

The Sting Ray's appearance is certainly striking, though it has been said to resemble a Jaguar XK-E with hiccups. The stylists have softened those objectionable phony scoops and vents on hood and sides for '64 so that this is an improvement. Replacing the dual rear windows with a single one also is a giant step forward in rearward visibility. Still, the closely placed blank side behind the driver's window does cause a blind spot. No gymnastics are required to enter or leave the car, with the door cutouts extending into the roof. Although only a matter of a few inches, these extra openings make for surprising ease in entrance.

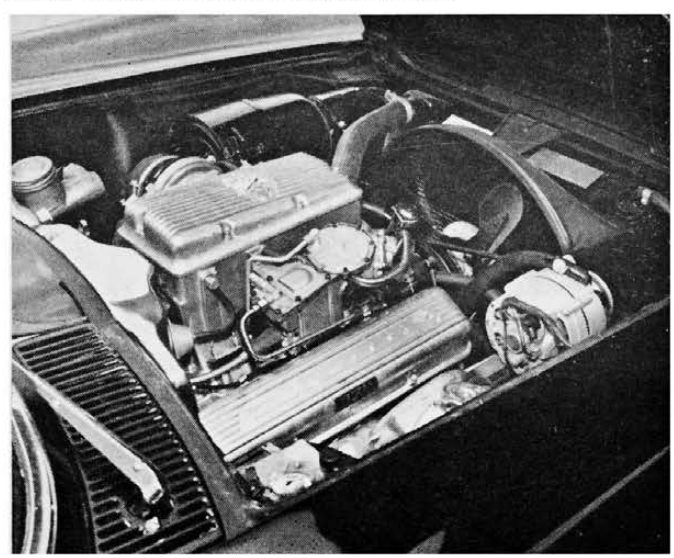
A pair of giant 6-in. dials, styled to look for all the world like the snuggly side of Jayne Mansfield's Maidenform, dominates the instrument cluster and registers (quite accurately, too) speed and rpm. Other instruments, scattered about like a meteorite-pocked moonscape, continue this inverted cone motif.

Esthetics aside, the interior of the car can be faulted only in the seating. The seat back has a roll of padding running up each side, which helps in lateral support, but another roll running across the top of the back digs into passengers' shoulder blades somewhat uncomfortably. Other than that, it is not only a comfortable riding car but also a comfortable car to ride in. Adequate stretch

DUAL COWLS soar up from transmission console. Entrance is easy into adequately roomy cockpit.



LARGE AIR-collector box dominates top of only fuel-injected engine in an American car.



and squirm room is available to help relieve the monotony of long trips.

It goes without saying that the Corvette Sting Ray was the outstanding car our testers sampled in many months, but not because of its sports car nature. We could never shake off the thought that this was what all domestic sedans should be like. Not in the steel-reinforced fiberglass bodywork, necessarily, but in basic engineering and design. Try as we might, we were unable to fathom the thinking of various Detroit hierarchies which insist on stamping out more prosaic automobiles.

For all of its sophistication—and the Sting Ray is easily America's most sophisticated car—there really isn't a lot that should add that much to the cost of bread-and-butter models. The independent rear suspension, of course, is immediately pinpointed but is it actually that much more expensive to produce than the 4-link live axle layout which Chevelle uses?

When *Car Life* selected the Sting Ray as its third recipient of the Award for Engineering Excellence (Jan. '63), staff members had an easy choice. Among 1964 cars, there were none from any maker which approached Sting Ray engineering sophistication and in consequence no award was made (Feb. '64). We can hope, however, that more American manufacturers will follow the Corvette lead and present a tough decision for us in making the 1965 Award, thereby more nearly fulfilling their debt to the driving public. ■

CAR LIFE ROAD TEST

1964 CORVETTE
Sting Ray Sport Coupe

SPECIFICATIONS

List price	$4252
Price, as tested	6100
Curb weight, lb	3100
Test weight	3430
distribution, %	49/51
Tire size	6.70-15
Tire capacity, lb @ 24 psi	4270
Brake swept area	328
Engine type	V-8, ohv
Bore & stroke	4.00 x 3.25
Displacement, cu. in	327
Compression ratio	11.0
Carburetion	f.i.
Bhp @ rpm	375 @ 6200
equivalent mph	119
Torque, lb-ft	360 @ 4000
equivalent mph	77

DIMENSIONS

Wheelbase, in.	98.0
Tread, f & r	56.3/57
Overall length, in.	175.3
width	69.6
height	49.8
equivalent vol, cu. ft	351
Frontal area, sq. ft.	19.3
Ground clearance, in.	5.0
Steering ratio, o/a	17.6
turns, lock to lock	2.92
turning circle, ft.	41.3
Hip room, front	2 x 20.8
Hip room, rear	n.a.
Pedal to seat back, max.	44.0
Floor to ground	8.0
Luggage vol, cu. ft	10.5
Fuel tank capacity, gal.	20.0

EXTRA-COST OPTIONS

Special metallic brakes and drums, knock-off alum. wheels, f.i. engine and 4-speed trans., am/fm radio, power steering, power windows.

GEAR RATIOS

4th (1.00) overall	4.11
3rd (1.28)	5.26
2nd (1.64)	6.73
1st (2.20)	9.04

CALCULATED DATA

Lb/bhp (test wt)	9.15
Cu. ft/ton mile	172
Mph/1000 rpm	19.25
Engine revs/mile	3120
Piston travel, ft/mile	1690
Car Life wear index	53.2

SPEEDOMETER ERROR

30 mph, actual	28.2
60 mph	59.0
90 mph	89.0

FUEL CONSUMPTION

Normal range, mpg	12-15

PERFORMANCE

Top speed (6800), mph	133
Shifts, @ mph (manual)	
3rd (6200)	93
2nd (6200)	73
1st (6200)	54
Total drag at 60 mph, lb	140

ACCELERATION

0-30 mph, sec.	2.8
0-40	3.8
0-50	5.1
0-60	6.3
0-70	7.9
0-80	10.2
0-100	15.0
Standing ¼ mile, sec.	14.6
speed at end, mph	98