

**FIRST
REPORT**

'63 Corvette Sting Ray

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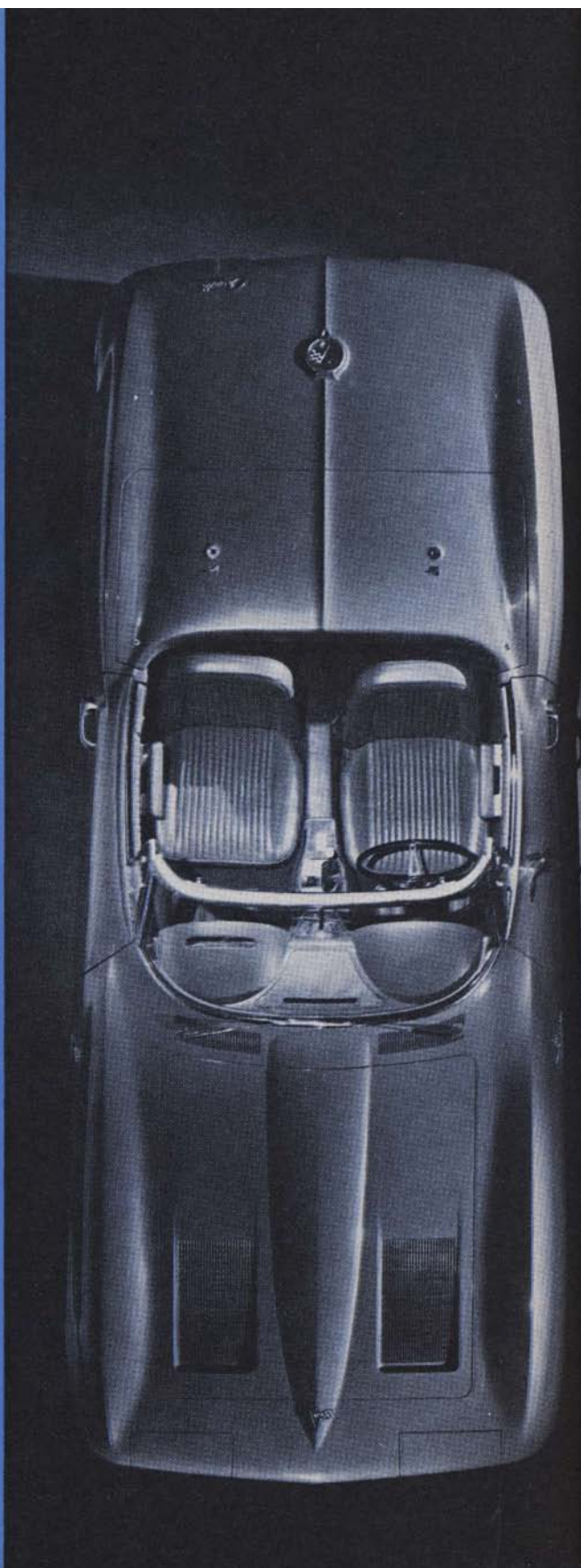
Bob Urquhart's
T-DE SOTO

sting ray...corvette for '63

*Aerodynamic design,
a fastback coupe, new pas-
senger comfort and new
independent suspension both
front and rear. These are just
a few of the exciting
features found in Chevrolet's*

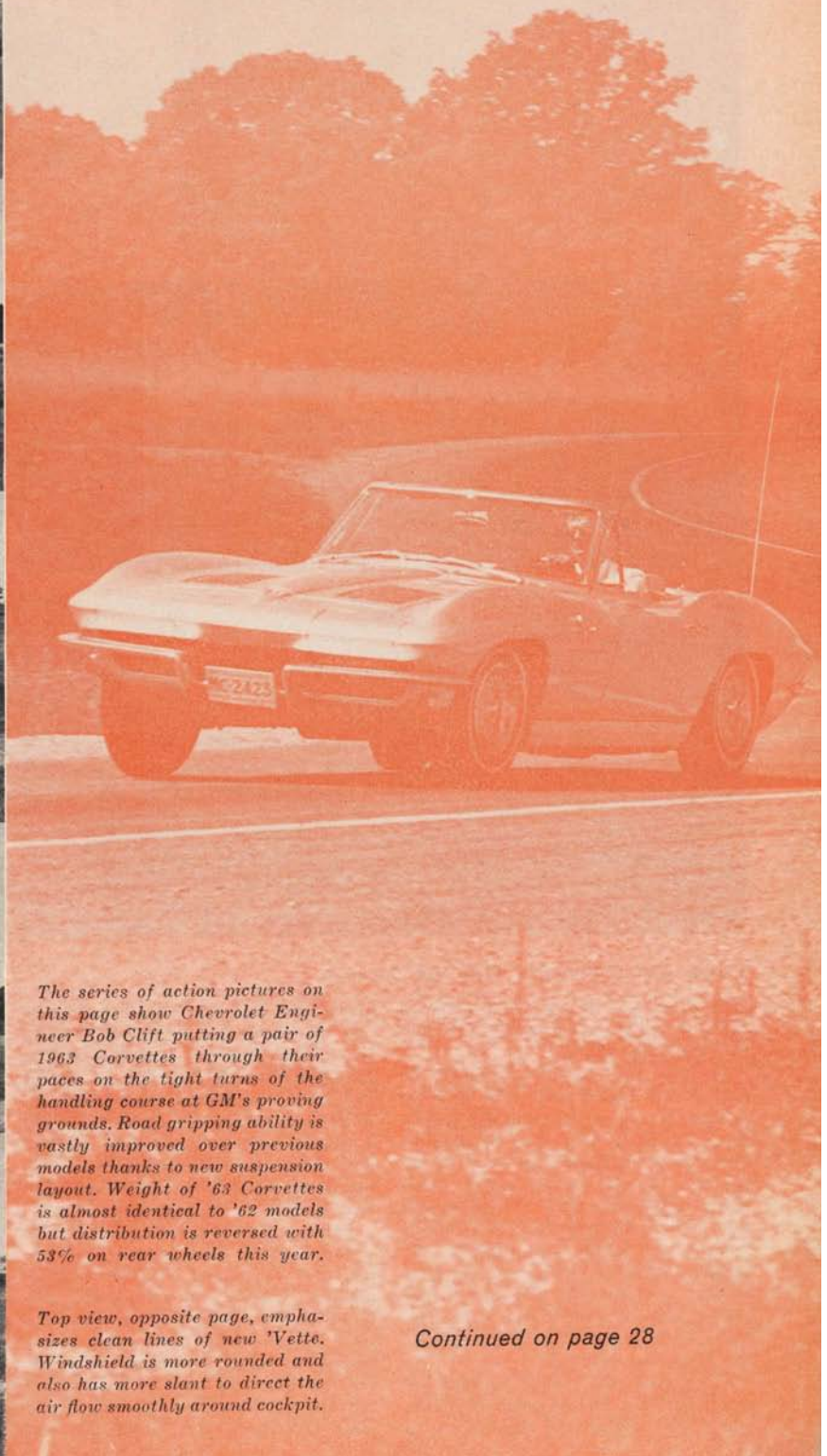
1963 Corvette. Get ready everybody, the line forms on the right! Right in front of your Chevy dealer's showroom that is. The 1963 Corvette is now ready for viewing and it's the wildest thing to come out of Detroit in years. There are so many new features—styling, suspension, comfort—that it's hard to know just where to start so we'll reflect a moment back to the original Corvette before we get into all the new features.

The first Corvettes were sold late in 1953 and although almost immediately assigned the title of a "sports car" by their owners, they were far removed from this category. The powerplant was a six-cylindrical engine like that used in the standard passenger car except for three side-draft carburetors and other minor changes. The only transmission offered with this first Corvette was the Powerglide automatic. Suspension was strictly boulevard variety. No sports car, true, but it did





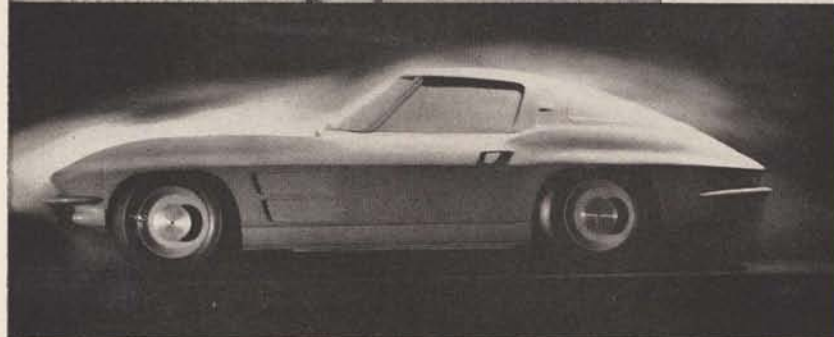
by **RAY BROCK** Photos by Chevrolet Division, Ray Brock



The series of action pictures on this page show Chevrolet Engineer Bob Clift putting a pair of 1963 Corvettes through their paces on the tight turns of the handling course at GM's proving grounds. Road gripping ability is vastly improved over previous models thanks to new suspension layout. Weight of '63 Corvettes is almost identical to '62 models but distribution is reversed with 53% on rear wheels this year.

Top view, opposite page, emphasizes clean lines of new 'Vette. Windshield is more rounded and also has more slant to direct the air flow smoothly around cockpit.

Continued on page 28



ABOVE—Phantom drawing reveals the stamped steel reinforcing members that cage the passenger compartment. Convertible is similar but lacks top braces.

UPPER LEFT—Cockpit interior is designed for maximum comfort and ease of reading instruments. 3-spoke wheel can be moved fore and aft three inches.

LEFT—During early design of the '63 Corvette, $\frac{3}{4}$ ths scale fastback was tested in wind tunnel to prove aerodynamic styling. Smoke shows air flow over car.

RIGHT—Cutaway drawing of '63 'Vette shows perimeter frame which permits lower floor pans and provides increased strength without the center X-member.

LEFT—Except for top line of fastback coupe, the two Corvettes are identical. The gas filler neck is located beneath the medallion in the center of the deck.

RIGHT—Rear view of fully independent suspension shows multi-leaf spring bracketed to differential carrier. Rubber bushed links connect spring, radius arm.

FAR RIGHT—Differential brackets to frame at three points. Fixed length axle and the tubular link act as the control arms to control the rear wheel travel.

STING RAY CORVETTE FOR '63 continued

have a certain appeal as a personal car with bucket seats, smaller size and fair maneuverability.

In 1955, the then-new 265-inch V8 engine was added and with a floor-shifted three-speed transmission to give more flexibility than the Powerglide, Corvette performance did start to resemble a sports car somewhat. Some hardy souls even tried a little sports car racing with these early V8 Corvettes and did fairly well although the problems of downshifting into low gear without synchromesh, and fast-fading brakes, often left the driver in the embarrassing position of plucking bales of hay from his radiator.

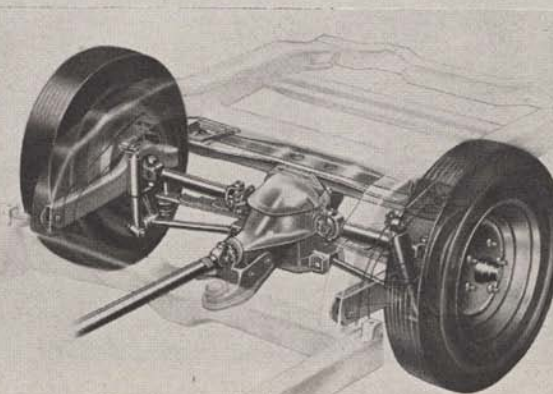
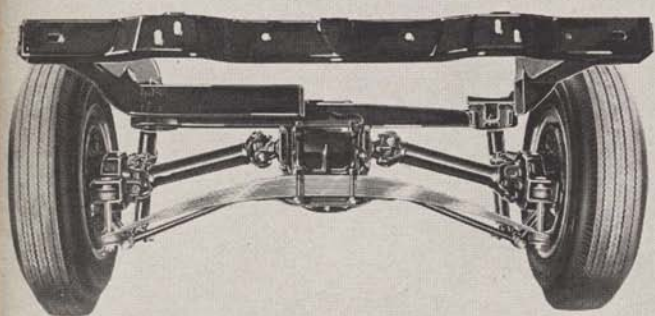
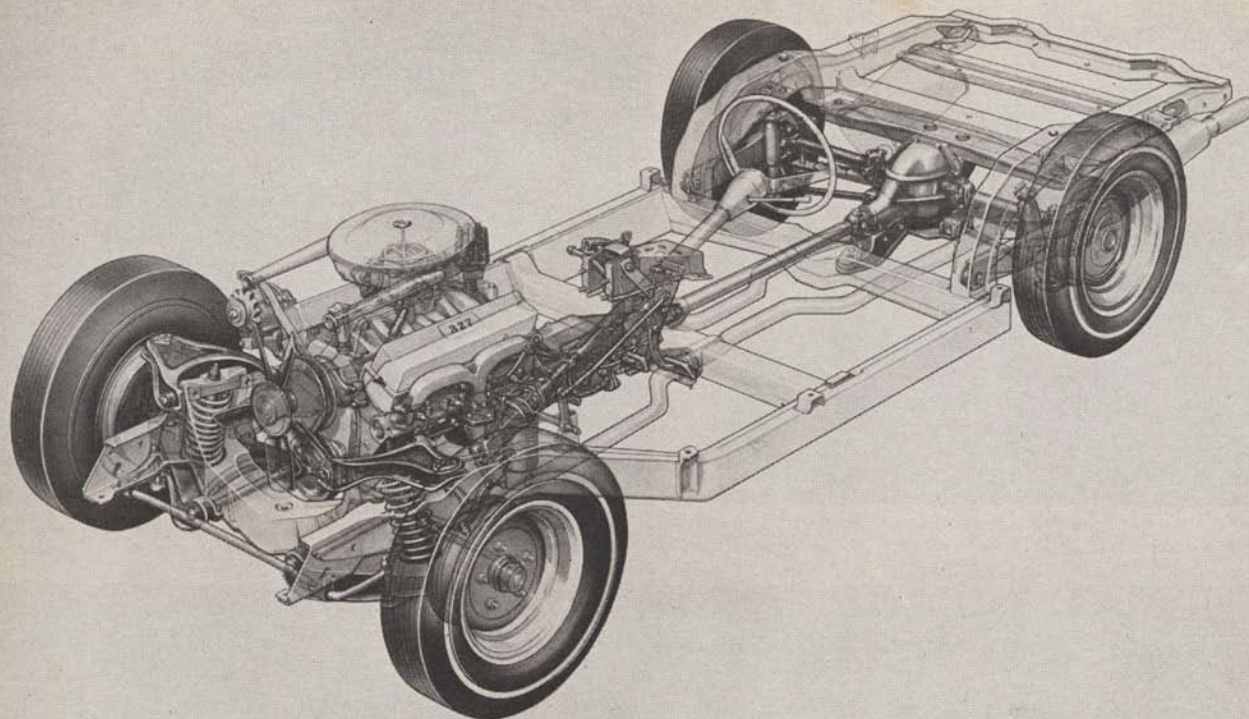
Along about this time, Chevrolet decided that if a certain segment of the public was buying the Corvette as a

sports car, then they should be able to buy something that resembled same in more ways than just appearance. The job of making the Corvette go, handle and stop was turned over to an engineer named Zora Arkus-Duntov. With a lengthy background as both engineer and driver in European Grand Prix and sports car racing, Duntov soon had the Corvette on the road to greatness.

Between 1956 and 1962, the Corvette received added improvements of fuel-injection, four-speed close-ratio transmission, Positraction limited-slip differential, heavy-duty suspension, sintered metal brakes and many other items. During the last couple of years, the Corvette has been a true sports car, the only American car that could make this claim. But all of this was

done with the same basic Corvette that first rolled off the production line in 1953. From 1953 to 1962, the wheelbase remained the same, 102 inches; front and rear treads were unchanged, 57 and 59 inches; suspension design was unaltered although spring rates and shock absorbers varied; the frame was the same and although styling changes were incorporated yearly, most were of a minor nature and some of the original '53 body curves could still be identified in 1962.

As early as 1958, some of Duntov's "idea" cars started making appearances as new suspension systems, body shapes and engines were tried. The space-frame SS Corvette made trial runs at Sebring and other noted sports car tracks to test ideas that might be



incorporated in future Corvettes. Later, CERV-I, an open wheeled creation, was tested and used for demonstration runs around the country. The latest and immediate forerunner to the '63 Corvette was the "Sting Ray," which was very successful in major Eastern races with Dr. Dick Thompson at the wheel.

So that brings us up to the present, and what a package Chevrolet's styling and engineering divisions have to offer in the 1963 Corvette! Everything is changed and there's nothing left over from the '62 model, let alone the '53 model.

Starting at the bottom and working up, the frame is mostly box-section with side rails spread wide to the extreme width of the body between the wheels for lower floor pans and in-

creased passenger protection from side blows. Five crossmembers tie the side rails together into a rigid unit. The front crossmember is an integral part of the frame assembly instead of a bolt-on portion as used on previous Corvettes. This front member is a husky stamping designed to anchor all front suspension components and at the same time dip low enough to give ample engine clearance.

Number two crossmember is located near the center of the car beneath the tailhousing of the transmission. The rear transmission support extends forward from this member. An interesting feature here is a pair of tubes welded longitudinally on either side of the rear mount bracket. These tubes are to provide passage for the dual exhaust pipes.

By routing the pipes through the crossmember rather than below, road clearance in the middle of the car is improved over earlier models and pipe damage on sharp driveways should be eliminated.

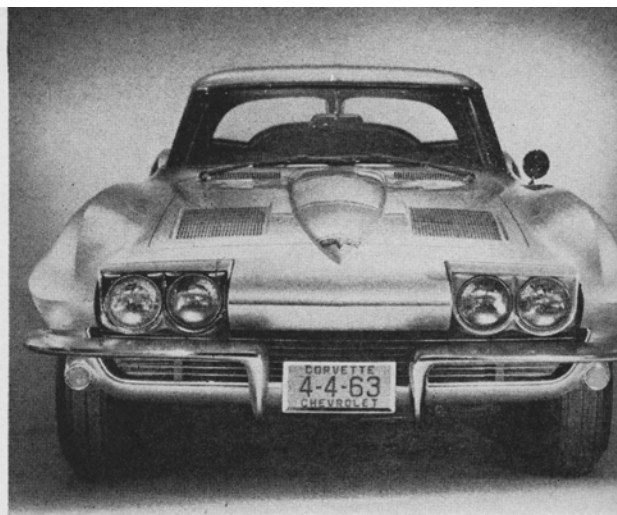
Number three crossmember ties the side rails together, anchors the "kick-up" section of the frame which passes over the rear axle and also is fitted with a bracket to help support the frame-mounted differential unit. The last two welded crossmembers support the rear of the differential and tie the side rail ends together. This new frame design is much stronger than that used in pre-'63 models, yet the X-member formerly used beneath the passenger compartment has been eliminated.

(Continued on following page)

STING RAY CORVETTE FOR '63 continued



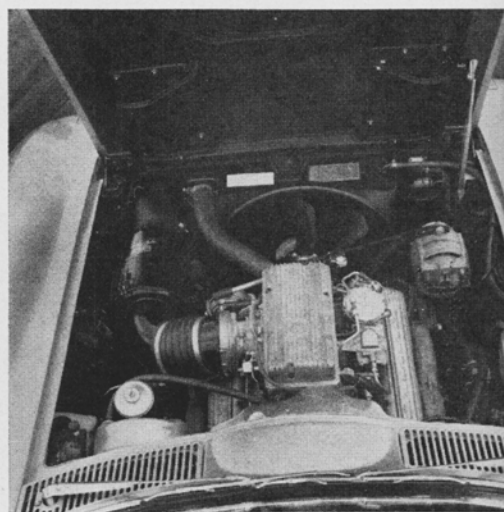
1.



2.



3.



4.

1. HRM Technical Editor Ray Brock prepares to demonstrate ease of entry in fastback with doors cut high into top.

2. Fold-away headlights are electrically operated from a dash switch. Lights can be turned on regardless of positioning.

3. High speed tests at GM proving ground during development showed fastback to be 5 mph faster than hardtop.

4. Four engines are offered for '63 and they retain same ratings as '62. Only major change is fuel injection plenum.

5. Light shaded area shows usable room inside fastback, small recess behind the seat. Note fuel tank and spare location.

6. Roadster model is available with a convertible top, a removable plastic hardtop, or both. Note large rear glass.

The front suspension, although not revolutionary in design, is all new for the Corvette. Unequal length A-arms, coil springs and spindle assembly are quite similar to that used on the '63 Chevy passenger cars and in fact, many parts are interchangeable between the two cars. This use of standard Chevy parts gives the '63 Corvette ball joint suspension at both top and bottom pivot points on the spindle. The coils springs angle inward sharply from their pad in the lower control arm to the upper seat in the frame rail. A tubular shock absorber mounts inside the coil spring on each front wheel and a link type stabilizer bar bracketed between lower A-arms controls body roll.

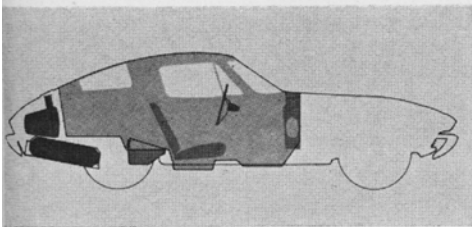
A radical departure from previous years is employed in the '63 Corvette rear suspension. It's fully independent, first time ever used in a late model

American production automobile. Chevy calls it a three-link independent suspension. The differential unit brackets directly to the frame with one point at the lower front and two points at the upper rear of the housing. Rubber insulators isolate running gear noise from the passengers.

The three links between car and each rear wheel are the axle shaft, a control rod and a radius arm. The axle shaft is of fixed length with universal joints on either end. The control rod also is fixed length and mounts between the differential bracket and an extension off the bottom of the wheel carrier. The radius arm is a stamped steel item which carries the wheel spindle support and brake backing plate. An extension behind the wheel provides a mount for the link attachment to a transverse leaf spring.

The axle shaft and lower control rod act as unequal length A-arms do at the front of the car to control rear wheel camber through full travel. The radius rod's function is to provide fore and aft wheel location and absorb braking torque. Acceleration torque is transmitted through the differential housing to the frame. The rubber mounted front pivot of the radius arm permits slight twisting as well as up and down movement. Design of axle and control rod lengths plus pivot point positioning keeps the rear wheels in a nearly vertical position throughout their travel.

The multi-leaf transverse rear spring clamps securely to the differential bracket in the center with the ends attached to each radius arm through rubber biscuits and bolted links. This arrangement isolates the spring com-



5.



6.

pletely from the wheel locating function so that springing is completely free at all times and unaffected by car attitude. The final part of the rear suspension system, the tubular shock absorber, brackets between the lower spindle support and the frame.

The advantages of this independent suspension are many. First of all, the considerable weight of differential unit and cases is attached to the car frame, so becomes "sprung" weight instead of "unsprung" like that of all straight axle cars. Thus the lighter remaining sprung components (wheels, brakes, etc.), are easier to control with springs and shocks so that they maintain good road contact over all types of terrain. Secondly, one rear wheel can move up or down to meet road conditions without the other rear wheel being affected. A much smoother ride is the natural

result. A third advantage to the fully independent rear suspension is that the linkage arrangement can be tailored to engineering demands so that wheel camber can be designed to improve "side bite" for high speed cornering. Another feature of the independent suspension is the lack of need for a large driveshaft tunnel through the passenger compartment. The driveshaft needs only minimal clearances with body or frame since it runs in the same plane at all times.

Steering has been changed too for the new Corvette; a Saginaw recirculating ball gear is used with a relay rod connected between the pitman arm and an idler arm mounted on the right frame rail. Additional tie-rod links connect between the relay rod and each front wheel steering arm. This steering design is quite similar to that used on regular full-sized Chevy passenger cars except that all linkage is behind the front wheels instead of in front as passenger cars have theirs.

The ratio of the Saginaw gear is 16:1, but due to linkage multiplication has a final ratio of either 19.6:1 or 17:1. Pre-'63 Corvettes used a center-type steering arrangement and a bolt-on adaptor could be fitted to "quicken" steering ratio but it's not necessary for the new steering setup. Steering arms at the wheels have two sets of tapered holes. When the tie-rods are fastened into the holes farthest from the spindle, the ratio is 19.6:1 but if the set of holes closest to the spindle are used, the "quick" ratio of 17:1 is engaged. Very ingenious and with so many front suspension and steering components interchangeable between the '63 Corvette and passenger cars, we would make a quick guess that these two-position steering arms could be used on the larger cars if they were swapped side to side to match the front linkage location on the passenger cars.

Just under 3 full turns are needed to swing the three-spoke brushed aluminum wheel from lock to lock with the "quick" ratio. A hydraulic "shimmy" damper is bracketed between the left frame rail and the relay rod to dampen any vibrations through the steering linkage. Also, for the first time in their ten year history, power steering will be optional on '63 Corvettes. It is a power assist type and the power cylinder takes the place of the damper between frame and relay rod when it is installed. This power steering should help immeasurably in increasing sales (as if they need it this year) because we've often heard ladies of all ages express a liking for Corvette styling and size but a dislike for the steering effort required to drive one daily.

The ladies, and men too, are going to like another Corvette first in the brake

department; optional power brakes. Drum size has been increased for '63 with 18% more lining area available on the standard production brakes. Front drums are 11 inches inside diameter and 2.75 inches wide. Rear drums are the same diameter but 2 inches wide. Total effective area, 185.2 square inches. A single master cylinder is used and, with optional power brakes, the cylinder is integral with the Delco-Moraine vacuum power unit. The lining material used both with and without power is molded asbestos composition for standard brakes. Automatic adjusters maintain constant clearance and operate when the brakes are applied as the car is in reverse.

Two brake options are offered in addition to the power assist. One option uses the standard drums but sintered iron metallic lining segments in place of the conventional organic material. The sintered metal segments are molded in small blocks and welded to the shoes. They offer better fade resistance than the standard lining material and make an ideal option for the driver who is abusive to brakes. Power assist is also available with this option.

For extreme abuse, such as all-out road racing, a special performance brake option is offered by Chevrolet. Drums are cast iron like the standard drums but have fins cast around their outer diameter to aid cooling. The drums are also .200 larger in inside diameter to permit thicker lining segments. The sintered metal segments are welded to the shoes and the extra thickness is designed to prevent complete exhaustion of lining in a long race. Automatic adjusters maintain the proper clearance as lining wears but instead of operating when the brakes are applied while traveling in reverse, they adjust when the brakes are applied while traveling forward. This feature allows a constant clearance and pedal height even in a long event such as the Sebring 12-hour race.

Power assist is mandatory with these special performance brakes and a dual master cylinder is used with separate brake lines to front and rear wheels. Should one set develop trouble in a race, the other set will give ample stopping ability. Air scoops and vented backing plates are also standard for the special performance brakes. With increased braking area, more weight percentage on the rear wheels for '63 and better road-gripping through independent rear wheels, the competition Corvette for 1963 should be vastly improved in stopping ability.

Engines for the '63 Corvette are the same size and have the same horsepower ratings as they did in 1962 but there is one significant change in the

(Continued on page 98)

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CHEV. Pass. Cars.	598	w/OD	608	or w/OD	
49-54 Std. Tr.	599	56-62 HD Tr. w/	609	OLDSMOBILE	
55-62 Std. Tr.	600	or w/OD	609	49-50 Std. Tr.	597
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STING RAY CORVETTE FOR '63 continued

highest horsepower model. The standard engine and three optional powerplants all have 327 cubic inches but variations in carburetion, camshaft, compression and other items account for horsepower variances from 250 to 360. The standard 250 hp V8 has 10.5:1 compression, uses passenger car cylinder heads, a mild cam with hydraulic lifters and a single four-barrel.

An optional 300 hp version has 10.5:1 compression and the same hydraulic camshaft but heads with larger intake valves and a larger four-barrel carburetor. Next in line is a 340 hp option which has 11.25:1 compression, a high performance mechanical lifter camshaft, large four-barrel carburetor and the heads with large intake valves. The final option is the 360 hp model which is just like the 340 hp version above except that fuel injection replaces the four-barrel carburetor.

The fuel injection unit has been modified and this is the only change for '63, but the change is noticeable both in appearance and in driving feel. The '63 fuel injection plenum casting has a removable top for the first time and this will delight the performance enthusiast who might want to get inside the aluminum housing to do some port matching or enlarging of ram tubes. Area within the new plenum and the area of the tapered ram tubes to each port have been increased substantially over 1962 and the 327-inch engine is much stronger in the higher rpm range than it was last year. Horsepower and torque values are still the same as 1962 though. Additional injector changes improve hot starting and warmup. An automatic choke controlled by engine heat replaces the early choke.

Clutch and transmission are the same proven units that were used last year. Ten-inch Borg and Beck units with coil springs and centrifugal assist are used with 1800-2050 pounds of pressure for the standard and 300 hp engines, 2020-2300 pounds pressure for the 340 and 360 high performance engines.

A three-speed transmission is standard for the Corvette with gear ratios of 2.47, 1.53 and 1:1. A pair of four-speeds are optional with one using gear ratios of 2.54, 1.89, 1.51 and 1:1 and the other 2.20, 1.64, 1.31 and 1:1. The transmission with 2.54 first gear is used with the 250 and 300 hp engines while the transmission with 2.20 first gear is for the 340 and 360 engines.

Chevrolet's Powerglide is also optional but only with the two milder engines of 250 and 300 hp rating. This powerglide is a beefed unit and will perform very well, especially with the larger available engine.

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Progressing upward in our analysis of the '63 Corvette, the next logical step is in the body department. Like all prior Corvettes, the '63 body is made from glass fibers. Unlike all prior Corvettes, the '63 body has a stamped steel cage section laminated into the body for increased rigidity and passenger safety. The steel sections completely encircle each door opening on the fast-back coupe models, plus there are cross tie sections across the cowl and the top of the coupe both fore and aft of the door. The cagework could be very effective as a safety roll bar should the need unfortunately arise. The convertible model also has the steel framework around the doors and at cowl and upper windshield frame areas.

Styling is of course a major feature of the '63 Corvette, and we think that a large percentage of the public will agree that it is fantastic, whether they are sports car devotees or not. The new Corvette is called the "Sting Ray" and those who may have seen the experimental Sting Ray in action the past couple of years will immediately note a strong resemblance.

Chevrolet entered an extensive test program with the Corvette Sting Ray and the shape of the body is not entirely due to Styling's whims. The new body model introduced for '63, the fastback coupe, was tested both in model and full-scale to see just how aerodynamically "clean" the Sting Ray could be made. With swing-away headlights folded closed, a sharp leading edge results, deflecting air down from the sharp edge into the grill opening. Air split over the top of the edge flows over a lowered hood to the "flatter" inclined windshield. The fastback top means just what the name implies — fast. It curves gently to the tail. The sides also curve in to meet at the tail. The result is a very sleek top which flows air smoothly to the rear.

The underside of the '63 Corvette is also much "cleaner" than previous models. We mentioned earlier that exhaust pipes were routed through the crossmember rather than below and this helps air flow. Also, the spare tire mounts below the tail of the car with a hinged hatch covering the bottom side of the spare. This hatch serves a two-fold purpose; it encloses the spare and provides a "belly pan" effect to direct underbody air flow to the tapered tail.

Aerodynamics of the convertible and removable hardtop Sting Rays are much better than previous models but the fastback coupe adds another 5-plus mph to top speed over the roadster model fitted with removable hardtop.

Driving the Corvette Sting Ray gives a whole new sensation when compared

(Continued on following page)

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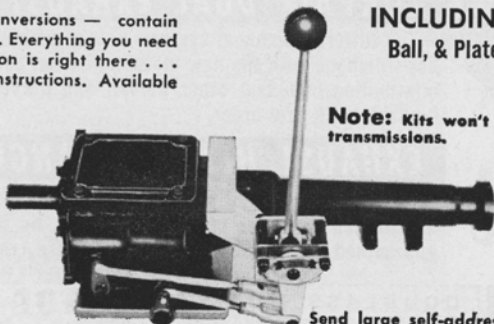
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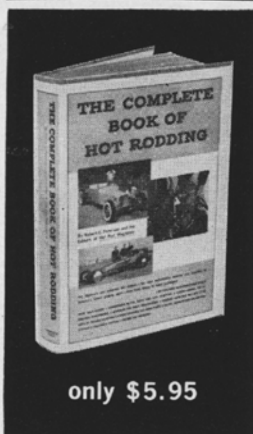
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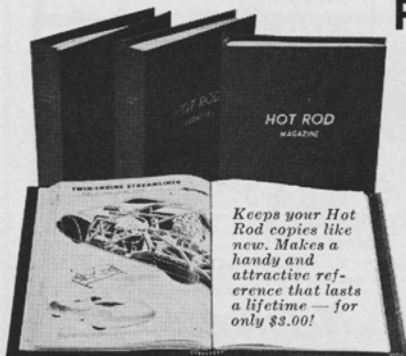
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STING RAY CORVETTE FOR '63 continued

to the 1962 Corvette. Room in the passenger compartment is much improved. There is enough leg room for Wilt the Stilt and if you don't like the steering wheel location, it can be moved. The wheel is not adjustable from the driver's seat but a couple of seconds with an end wrench beneath the hood permits the wheel to be moved in or out 1½ inches from factory location. Total travel is three inches.

There is more room for elbow swinging in the Sting Ray and vision over the sloping hood is great. Two more welcome items for '63 are the cowl ventilation system and crank-operated side vent windows. The side vents can be adjusted to deflect air in or out of the cockpit and the cowl ventilation provides an abundance of air around the feet to keep cool on hot days. Even with the top down on the convertible model, the air flow around passengers is not of the buffeting variety at even moderately fast speeds.

The interior has been completely restyled for '63 and large, ideally located instruments can be read at a glance. The shift lever on the console between bucket seats continues to be perfectly positioned.

The light switch is located on the lower left side of the instrument panel and another two-way switch just below controls the opening or closing of the headlight panels. Adjustable stops position the lights correctly for night driving and should there ever be a failure to the electrical rotating mechanism, a pair of star wheels under the hood front can be used to open the doors.

Lights can be turned on while they are folded in and probably an unplanned benefit would be the possibility of using the reflection from the headlights to work on the engine in the dark should the necessity arise. The lights don't shine on the engine but enough light should filter through the radiator opening to brighten the engine compartment.

The first thing we noticed about the '63 Corvette was that you feel at home the minute you slip behind the wheel. Our former Corvette tests always required a "break-in" period to get accustomed to the seating and steering. Not so this one—you feel at ease immediately. A few sharp turns later and you know you've found a friend. Chevrolet shortened the wheelbase 4 inches to 98 inches for '63 and also narrowed tread slightly to 56.3 (front) and 57 inches (rear). The shorter wheelbase plus relocation of passenger position and major components results in a complete reversal of weight per-

centages for '63. Instead of the major portion being located on the front wheels as in the past, 53% of the total car weight is concentrated on the rear wheels this year.

This car has traction on a grand scale and when you start through twisting curves, a whole new world of driving pleasure appears. The car is softly sprung and rides like a dream, yet high speed turns on rough roads cannot shake the wheels loose from their grip on the pavement. Balance is perfect when you "stand on it" through a long sweeping curve and as speed increases and the corner gets sharper, the rear of the car drifts out just the proper amounts to compensate. It is not necessary to "toss" the rear of the car to set up a high speed corner — just turn the wheel and the Sting Ray sets itself.

When we visited the General Motors proving ground for our first look at the new Corvette last July, we tried our hand behind the wheel and really got excited about the handling of the car. But, since our visit had to be limited and we knew that we could never learn the Sting Ray well enough in a short time to really wring it out, we asked Corvette's chief test driver, Bob Clift, to give us a demonstration of just what the car would do. Bob took us for a ride that left no doubt this has to be one of the best handling production sports cars in the world. Regardless of road condition, reverse camber turns, railroad crossings, dips, or what have you, the Corvette takes them all in stride. Bob is without peer as a Corvette driver since he spends all twelve months of the year testing them, and he gave us a real ride.

We've tried to give you a technical rundown on the '63 Corvette Sting Ray, but even if we devoted this entire issue to the project, we would have a hard time describing everything. This car is sensational in every way. Styling acceptance is a matter of personal taste but we know it will be a hit. Handling is superb. Brakes are great. You can order just as much power as you want. The gals of all ages can also enjoy a Corvette thanks to power steering, power brakes and other accessories.

Everything we ever liked about a Corvette has been vastly improved and the little things we didn't like have been eliminated. A few years ago we talked to Zora Arkus-Duntov and complained about the uncomfortable driving position for someone as large as us. Mr. Duntov said that future plans would take care of that problem. We said that when the day arrived, we might just buy a Corvette. The day arrived but we don't have the money. Say, now, that '63 Corvette would make a terrific getaway car from a bank robbery. Maybe it could pay for itself!



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CHRYSLER	39-56 Selector-type Trans. w/o OD	508
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	39-56 Selector-type Trans. w/OD	513
OLDSMOBILE	51-62 All Selector-type Trans.	507
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