

# CORVETTE

Vol. 8  
No. 2

# NEWS

FOR CORVETTE ENTHUSIASTS



# CORVETTE NEWS



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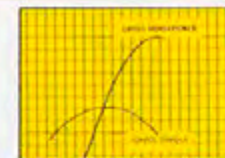
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COVER—Cover painting by Gene Szfran



## THE CORVETTE CLUB TROPHY

It's trophy time! And that means Chevrolet will soon be sending the popular Corvette Club Trophy to every registered Corvette Club on the roster. This tribute to the individual clubs is traditional with Chevrolet, dating back to 1957. This year Chevrolet expects to send out at least 169 trophies. The trophy is newly designed and features a silver-plated bowl and a Sebring Silver Sting Ray on an ebony base. A 1" x 3" blank plate on the front can be appropriately inscribed by the local clubs.

These trophies are given to all clubs at the end of the year to be presented as they wish. Usually the trophy is awarded to the club's outstanding member on the basis of points awarded in club competitions. Other criteria for this award include driving skill, service and overall contribution to the club and its activities.



# WHUMP WHUMP WHUMP

**Fiendish test schedules on '65 Corvettes are work-a-day at the General Motors Proving Ground.**

"Course ready!" barks a two-way radio speaker in a Corvette. The driver accelerates briskly to 100 mph, then brakes swiftly to a dead stop, re-accelerates to 100, repeats the braking maneuver. Over and over again goes this strenuous cycle until the test is over. "Test schedule complete!" calls the driver over his radio to the standby crew.

Such tests are spectacular; others could be considered routine among the multitude of tests conducted in a regular Corvette test schedule. These tests are a part of Chevrolet's total development program. Regular full-time engineering work involves many individual departments working together, utilizing the talents of a corps of engineers. Clearly, then, the Corvette is far more than a specialized project handled by a few persons. The entire engineering facilities at Chevrolet are put to work on Corvette, just as they





are for any of the other passenger or truck lines. Whole groups of engineers work out details on body, suspension, electrical, accessory, styling, engine and chassis designs. Many of the engineering designs thus put forth are thoroughly tested at P. M. Proving Ground facilities throughout the country.

The *Corvette News* staff decided to investigate one facet of this continuing operation—the road-testing work done at the 4,011-acre Proving Ground at Milford, Michigan. Arrangements were made for us through the Chevrolet Engineering Center to tour the Proving Ground. What ensued was a red-carpet demonstration of some of the most interesting tests performed there.

*Corvette News* made a trip to the Proving Ground one blustery Friday to see firsthand some of the operations and tests to which '65 Corvettes are subjected.

Bob Clift, head of Chevrolet's Special Vehicle Testing and Development Group, met us at the Proving Ground and his assistant, Bill Kane, drove us to the garage area in an innocent-enough looking 1965 Impala SS Coupe. But the busy sounds emanating from beneath the hood led us to believe that something experimental lurked there.

In the immaculately clean garage were several cars including the now-retired original Sting Ray; but the "working" cars were instrumented almost beyond belief. Of particular interest was the brake test car with its huge circular gauge and instrumentation that allowed the driver to switch up a brake temperature from any wheel and read it directly at a glance. The other cars were instrumented with heat-sensing thermocouples for reading engine, transmission and rear axle component temperatures.

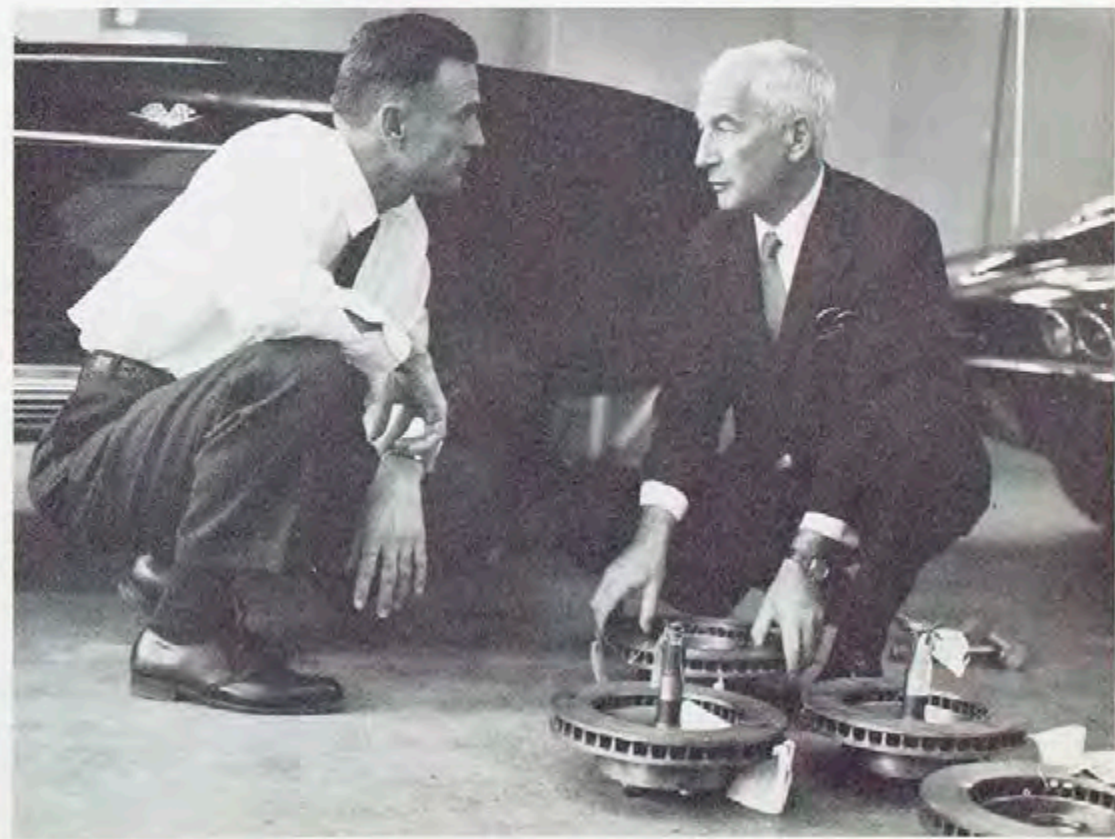
Bob Clift told us that the group's prime responsibility was to test the many designs that come from



Above left/ Bill Kane straps himself into a test Corvette with special shoulder harness in addition to the regular seat belt. Above right/ Instrumented brake test car with huge dial for easy reading. Below/ Brake test car going through its paces.



Below/ Bob Clift (left) and Zora Arkus-Duntov discuss disc brakes with new metal mixtures.



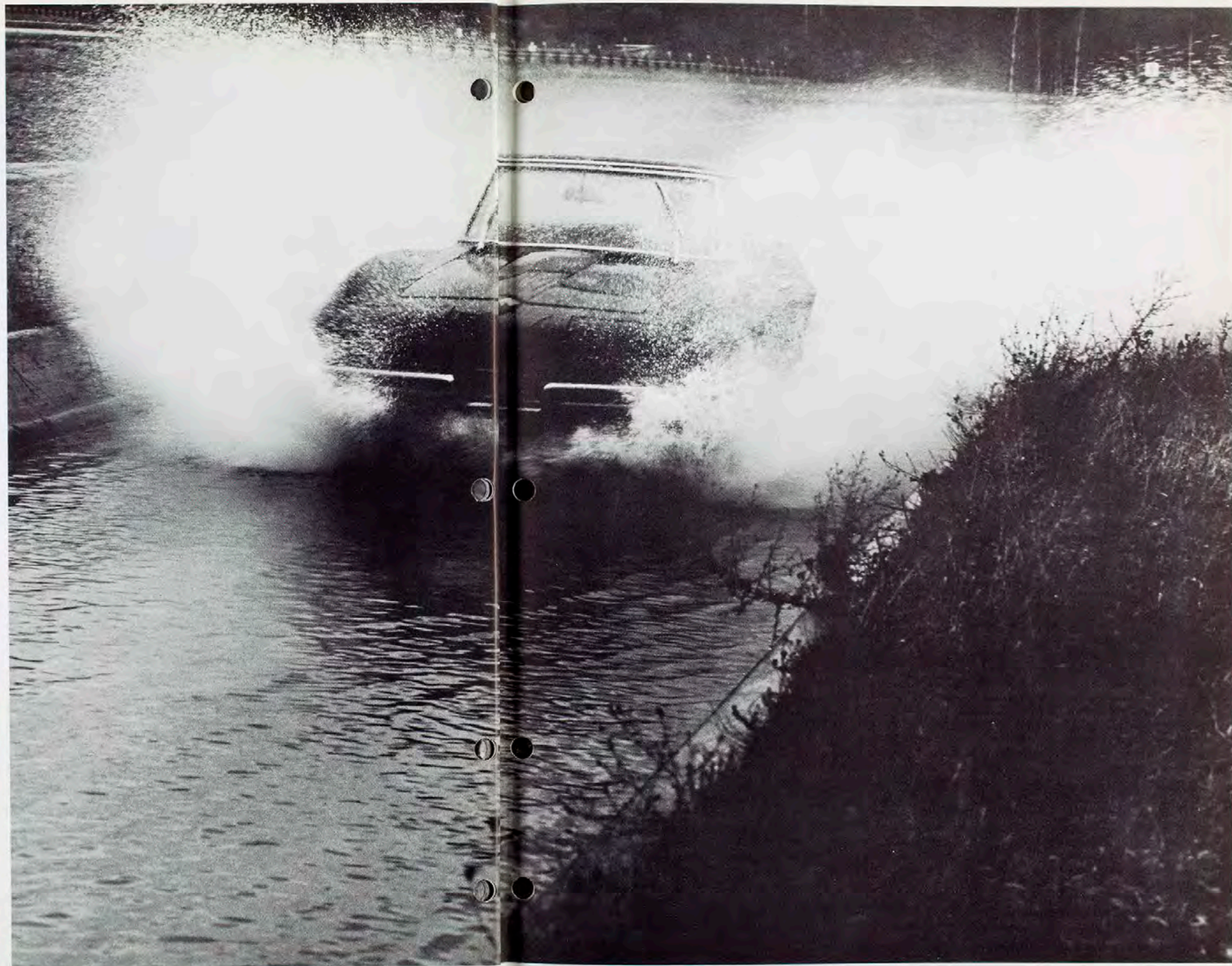
the Engineering Center groups, or to initiate special tests themselves, if the occasion demands. Taking a blue '64 Coupe as an example, we asked Bob what could be learned from the type of instrumentation that was in it.

"In one test, we learn how drive-line and rear suspension hold up under extreme conditions. On other tests, we can drive the car and read directly the horsepower required at the rear wheels to maintain given road speeds. We get wind resistance and rolling resistance at the speeds we are going; in other words, we can read the horsepower required at loads throughout the speed range."

With this as an introduction, Bob went on to describe some of their procedures. Every product-line team within Chevrolet's organization puts special test requirements in the group's hopper. Included are unusual engine installations in regular passenger cars ("An experimental V8 in a Chevelle, for instance," said Bob)—just about any engineering idea that might improve Chevrolet's cars.

One of the tests that had been going on was a new knock-off hub wheel retention design. "As a part of the test, we run the vehicle until the tires wear out," says Bob. When asked if a wheel had ever come off during a test, Bob indicated that so far none had. "Of course, we regularly check the index marks on the wheel before, during and at the end of a test schedule."

Bob, also as an illustration, told about taking a Corvette to the truck test loop for a run. In his own words, "We usually take a normal road like the truck loop and set it up for a high-speed test. We close the road, have only one test car on it and simulate a competition-type operation. We'll run 500 miles, for example. And we go to great extremes for safety. We have ambulances and tow trucks standing by as well as

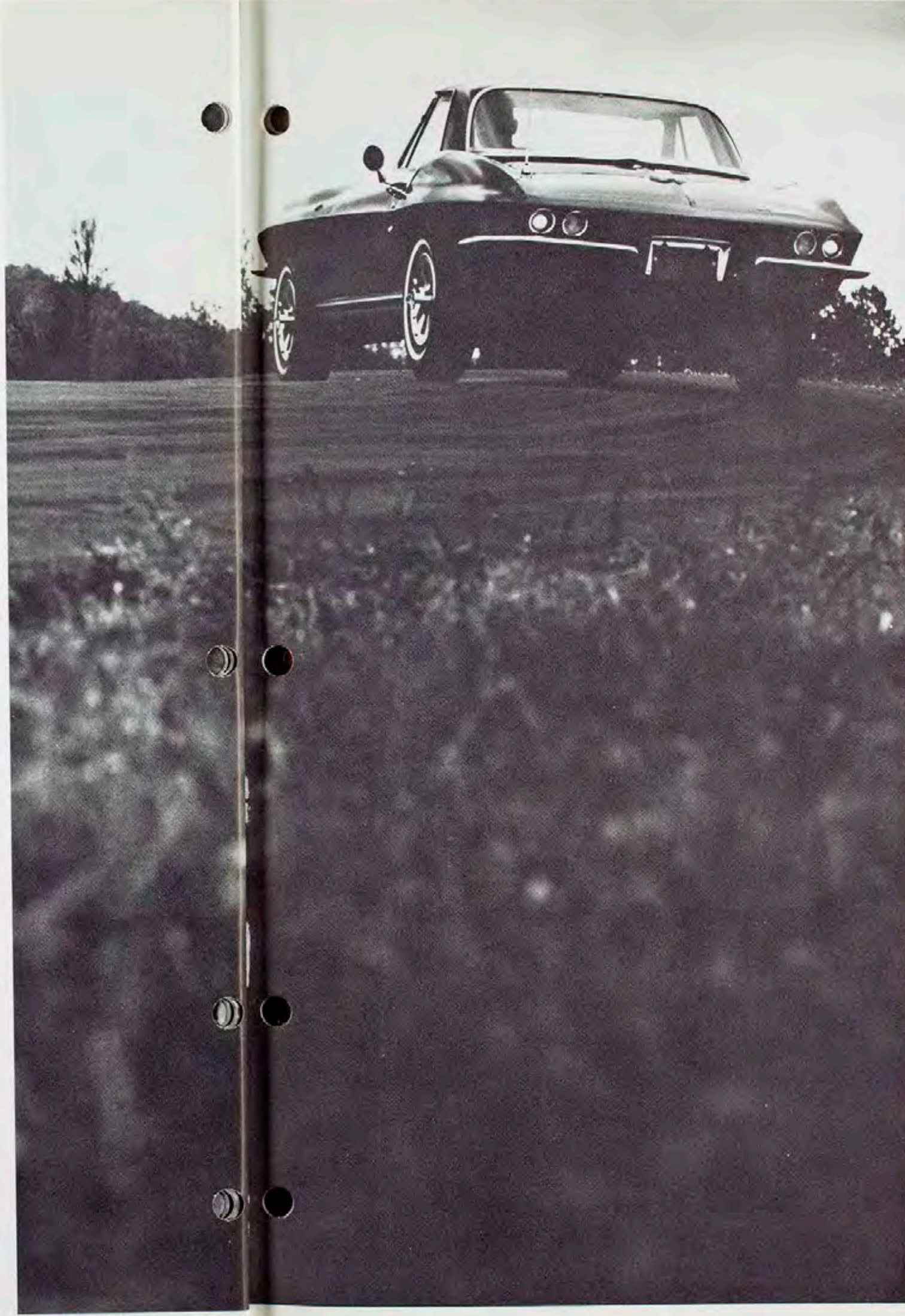


plant protection personnel with two-way radios to keep track of everything on the course. They also keep other people off the course and watch the car, just in case it might get into some kind of trouble. The test car has a two-way radio in it, too. With radio, we can get a tow truck to the car in a hurry if something unexpected should happen."

A brake-and-water demonstration had been scheduled for the day the News was there. Bob also obligingly agreed to run a '65 Corvette Convertible around the skid pad, over the Belgian block road and the ride and handling loop. A '64 Sting Ray Coupe was readied for a trip around the new 4½-mile high-speed loop, as well. A special truck went along with the cars, as it does on every test. In the back of the truck were a virtually complete mobile machine shop, bins full of spare parts, an air compressor, mobile 110-volt AC power, stands and hoists. Seat belts, standard in the cars, had been installed in the truck, too. "It's as much for self-preservation as safety," quipped Bill Kane, the other engineer. "We run over such rough terrain that the belts hold us in our seats and keep us from bashing our heads on the cab roof."

Bill Kane hopped into the brake evaluation car (a '64 Corvette Coupe), Cliff into the '65 Sting Ray Convertible, the News staff into a Chevelle, and mechanic Lloyd Drayton in the truck. The skid pad was the first stop. "It's a large round asphalt area," said Bob, "with a 108-ft.-diameter circle painted on it. We straddle that circle when we run and measure the speed around the circle to calculate G acceleration on the car. In good round numbers, a 'G' is 32 feet per second acceleration every second.

"The skid pad is very valuable for doing development work on car handling. It gives us an excellent opportunity to examine the



effects of cornering G acceleration on tires as well as suspensions. An interesting effect of a 1-G acceleration turn is that the engine oil and gas tank levels are forced 45° from the horizontal."

"Do you have problems starving the engine for oil?" we asked.

"We have to check for that, and for fuel starvation, as well."

The ride and handling road simulates the kind of conditions Corvette drivers would encounter on most road circuits, according to Bob. "Only here it's more severe, because it's a tighter course than say, Elkhart Lake or Sebring." Bob pointed out that a sports car has to handle well in both directions, not in just one direction like an Indianapolis car. We were treated to a demonstration of expert maneuvers as Bob put the car through its paces.

From there, the group moved to the splash demonstration held in a long sunken single lane that could be flooded to varying depths. Bill Kane was driving the '65 Corvette Convertible now, and he made like a PT boat in the tank, time after time. A big benefit of the '65's disc brakes was evident after the test. "See? No problems stopping the car," mused Kane. It seemed apparent to the Corvette News staff that the self-cleaning action of the discs kept the pads clean and effective in spite of the vigorous aquatic activities.

After lunch, we met with Zora Arkus-Duntov, driver-designer, and discussed disc brake development with him. "We had a comparatively heavy car with a high performance level, to which there was no counterpart in Europe," commented Zora. "They had fast cars that were considerably lighter . . . or heavier cars that were considerably slower. We started disc brake development on a Corvette in 1956. At that time, we could make a disc that would stop the car normally on the street, but not one that

would stop a car that a customer decided to take to Sebring. Although the 1956 disc brake was shelved, we kept experimenting.

"The solution, today, is the vented disc. Now we didn't invent the vented disc. As a matter of fact, there were vented discs even 10 years ago. But these were not adequate for Corvette. The main problem was in the vent holes. They were too small. We tried the solid disc approach, but it got too hot and faded. However, we came up with a disc brake with surfaces heavy enough and sufficient venting to carry off the heat. Now our disc brake is a nicer brake . . . no question about it. And we wanted our customer to have the benefit from it."

One of the interesting feelings about driving a '65 is the brake "feel." We asked Zora to explain what made the disc better.

"The major benefit is 'modulation.' The car retardation is directly proportional to pedal pressure so that the driver can modulate his retardation very precisely. So the degree of braking control is much greater with discs than with self-energizing drum brakes."

The scene shifted to the Ground's new 4½-mile circular high-speed track. Bob explained that this new track permitted sustained test speeds higher than present day cars were capable of going. It's designed both for present day vehicle tests and the future. Indicative of the kind of speeds, the outer loop is posted for speeds in excess of 140 mph only. Bill Kane drove a lead Corvette with Bob Clift in the brake test car. The photographer rode with Kane, with the top down, in a 38° rainy atmosphere. Round they went until the pictures were taken and Kane and the photographer were fairly numb from the cold. It was all in the interest of accurate journalism.

Discussion returned to brakes and wind resistance. Bob indi-

cated that certain brake tests incorporate a number of stops from 130 mph to 30, 40 or 50 mph, acceleration back to 130 mph, braking back down, and so on. Another procedure, "mild" by comparison, calls for a 20-foot per second, per second deceleration. During a "severe" test, the retardation rate climbs to 30 or 32 feet per second, per second—the latter figure equal to a full G deceleration. Such testing shows that the disc brake gives the '65 Corvette a vast braking reserve.

In the study of wind resistance, Bob added that this area is something the group is really into currently. Bob added, "At high speeds, the coupe is more streamlined and offers less resistance. At lower speeds, it doesn't mean much. The convertible, if we could cut the windshield off, would be lower. But we can't do that and stay within present competition regulations."

Other demonstrations that day included a ride over the Belgian block road, probably one of the most tortuous tests to which a car and driver can be subjected. One ride around this road, even at slow speeds, did much to convince the passenger that the U.S. was fortunate not to have surfaces like it in the country. What this test seems to do is to try to wrench the suspension off the car. In the process, the entire car gets a brutal shaking. So does the driver. This schedule, according to Bill Kane, "is only done at short stretches. The drivers can't take much of that."

The Corvette News staff came away from this day with a new appreciation of the thorough approach to Corvette testing. We had our collective heads filled with visions of spectacular demonstrations put on for our benefit. It was easy to conclude that Chevrolet clearly puts as much effort into product research and development for Corvette as it does for any other product line.





# 1965 TUNE-UP SPECIFICATIONS

The 1965 Corvette Engine tune-up specifications shown here include those for the new 350-hp Corvette V8. The procedures for engine tune-up are spelled out in detail in the **1963 Corvette Shop Manual**, with additional information in 1964 and 1965 editions of the **Corvette Shop Manual Supplement**. Periodic maintenance recommendations are spelled out in the **1965 Corvette Owners Guide**.



## Notes regarding tune-up specifications of Corvette engines:

**RECOMMENDED IDLE:** Normalize the engine by running it at fast idle in neutral for 15-20 minutes to bring oil, water and all metal parts to full operating temperature. Selector lever for 3- and 4-Speed should be in neutral when adjusting idle speed. With automatic transmission, set initial idle speed while selector is in neutral. (Idle speed rpm should be set slightly higher to avoid stalling when selector is moved to "Drive.") To make final adjustment, set parking brake firmly and move selector to "Drive." Caution: **Never open throttle suddenly while adjusting idle, because the car may move forward.** **VALVE ADJUSTMENT:** Engine should be at full operating temperature. To obtain zero clearance with hydraulic lifters (with engine running), back off adjusting nut until a light click is heard. Then tighten adjusting nut 1/4 turn, pause 10 seconds to allow lifter to adjust. Repeat 1/4 turn at a time, until nut has been tightened one full turn.

See **1965 Corvette Shop Manual** for tune-up specifications when car is equipped with transistor ignition system (RPO K66).



	RECOMMENDED IDLE (RPM) (See Notes)	DISTRIBUTOR PART NUMBER	BREAKER POINTS	ADVANCE SYSTEM	BREAKER ARM SPRING TENSION (OZ.)	POINT GAP CAM ANGLE	SPARK ADVANCE— INITIAL SETTING & RECOMMENDED IDLE (Vacuum line disconnected— hole plugged)	CENTRIFUGAL ADVANCE (Note: all ratings in engine degrees.)				VACUUM ADVANCE		VALVE LIFTER TYPE	VALVE ADJUSTMENT (Clearance) (See Notes)				SPARK PLUGS	
								START (Deg. @ RPM)	INTERMEDIATE (Deg. @ RPM)	MAXIMUM (Deg. @ RPM)	START (Deg. @ inches HG.)	MAXIMUM (Deg. @ inches HG.)	INTAKE (HOT)		EXHAUST (HOT)	NORMAL RANGE (City and highway driving)	HOTTER RANGE (City driving)	COLDER RANGE (Highway driving)	GAP	
<b>250</b> <small>Standard engine, 4-barrel carburetion, regular camshaft</small>	450-500	1111076	SINGLE	VACUUM & CENTRIFUGAL	19-23	NEW .01°-32° USED .01°	4° NOMINAL 4°-10° RANGE	0 @ 750	15 @ 1500	26 @ 4100	0 @ 6	24 @ 13	HYDRAULIC	ZERO (See Notes)	ZERO (See Notes)	AC 44	AC 45	AC 43	.035"	
<b>300</b> <small>Extra-cost optional engine, AFB 4-barrel carburetion, regular camshaft</small>	450-500	1111076	SINGLE	VACUUM & CENTRIFUGAL	19-23	NEW .01°-32° USED .01°	8° NOMINAL 6°-12° RANGE	0 @ 750	15 @ 1500	26 @ 4100	0 @ 6	24 @ 13	HYDRAULIC	ZERO (See Notes)	ZERO (See Notes)	AC 44	AC 45	AC 43	.035"	
<b>350</b> <small>Extra-cost optional engine, special 4-barrel carburetion, regular camshaft</small>	650-750	1111087	SINGLE	VACUUM & CENTRIFUGAL	19-23	NEW .01°-32° USED .01°	10° NOMINAL 8°-12° RANGE	0 @ 750	15 @ 1500	30 @ 5100	0 @ 4	16 @ 7	HYDRAULIC	ZERO (See Notes)	ZERO (See Notes)	AC 44	AC 45	AC 43	.035"	
<b>365</b> <small>Extra-cost optional engine, special 4-barrel carburetion, special camshaft</small>	750-850	1111069 1111062*	SINGLE	VACUUM & CENTRIFUGAL	19-23	NEW .01°-32° USED .01°	12° NOMINAL 10°-14° RANGE	0 @ 800 0 @ 700*	6 @ 1200 11 @ 1600*	24 @ 2350 24 @ 4600*	0 @ 4	16 @ 7	MECHANICAL	.030" (ENGINE NORMALIZED)	.030" (ENGINE NORMALIZED)	AC 44	AC 45	AC 43	.035"	
<b>375</b> <small>Extra-cost optional engine, Ramjet</small>	850 (Min)	1111070 1111063*	SINGLE	VACUUM & CENTRIFUGAL	19-23	NEW .01°-32° USED .01°	12° NOMINAL 10°-14° RANGE	0 @ 800 0 @ 700*	6 @ 1200 11 @ 1600*	24 @ 2350 24 @ 4600*	0 @ 4	16 @ 7	MECHANICAL	.030" (ENGINE NORMALIZED)	.030" (ENGINE NORMALIZED)	AC 44	AC 45	AC 43	.035"	

# Fine Points of the Corvette 4-Speed

While it was introduced with little or no fanfare during the 1964 model year, the newest Corvette 4-Speed transmission has since received wide acclaim. And though it is similar in appearance and operation to the former 4-Speed introduced in 1957, it is Chevrolet's own design and features an aluminum case. The new transmission has a number of significant improvements. In construction, it has a larger mainshaft, mainshaft bearings and blocker rings (synchronizers). All forward and reverse gears are wider faced, as are gears on the countershaft. Specifically, the larger mainshaft and mainshaft bearings were incorporated to prevent deflection resulting from gear loading. The larger synchronizers are more rugged and have added capacity for accommodating faster, more positive gear engagement. Normally, larger synchronizers would mean greater shift effort, but they have been designed with an 8-12-lb. "breakaway" point, resulting in an actual reduction of shift effort.

The combination of larger synchronizers and stronger gears was to eliminate the occasional complaints of third gear failure or gear-clashing when shifting (especially to second gear) after extended use. Another improvement incorporated in the new design is a third-gear spline lock to avoid hop-out in that gear. Also, tapered shafts are now used for control levers to eliminate false movement.

The new and former 4-Speeds are practically identical in arrangement and operation of gears, synchronizers, countershaft and power flow. Reverse and reverse idler gears in the new unit are now of the helical type instead of spur type. Helical design gives greater gear face area without increasing overall width and also gives a more positive engagement. The main operational difference between the two 4-Speed units is in the way they feel while shifting. The new unit has fine-machinery feel accompanying each shift. There's a positive click at engagement and practically no false movement in the shift lever itself.

One more important feature of the new unit is the provision for a shorter shift lever "throw." As shown in the illustration below (lower left), each shift lever has two shift rod holes. In production, rods are installed in the top holes. To shorten shift lever travel, merely move the rods into the lower holes. This makes it possible to shift gears faster, with the larger synchronizers allowing the transmission to handle this faster gear changing. However, shifting effort will increase with the new arrangement, due to a loss in mechanical advantage.

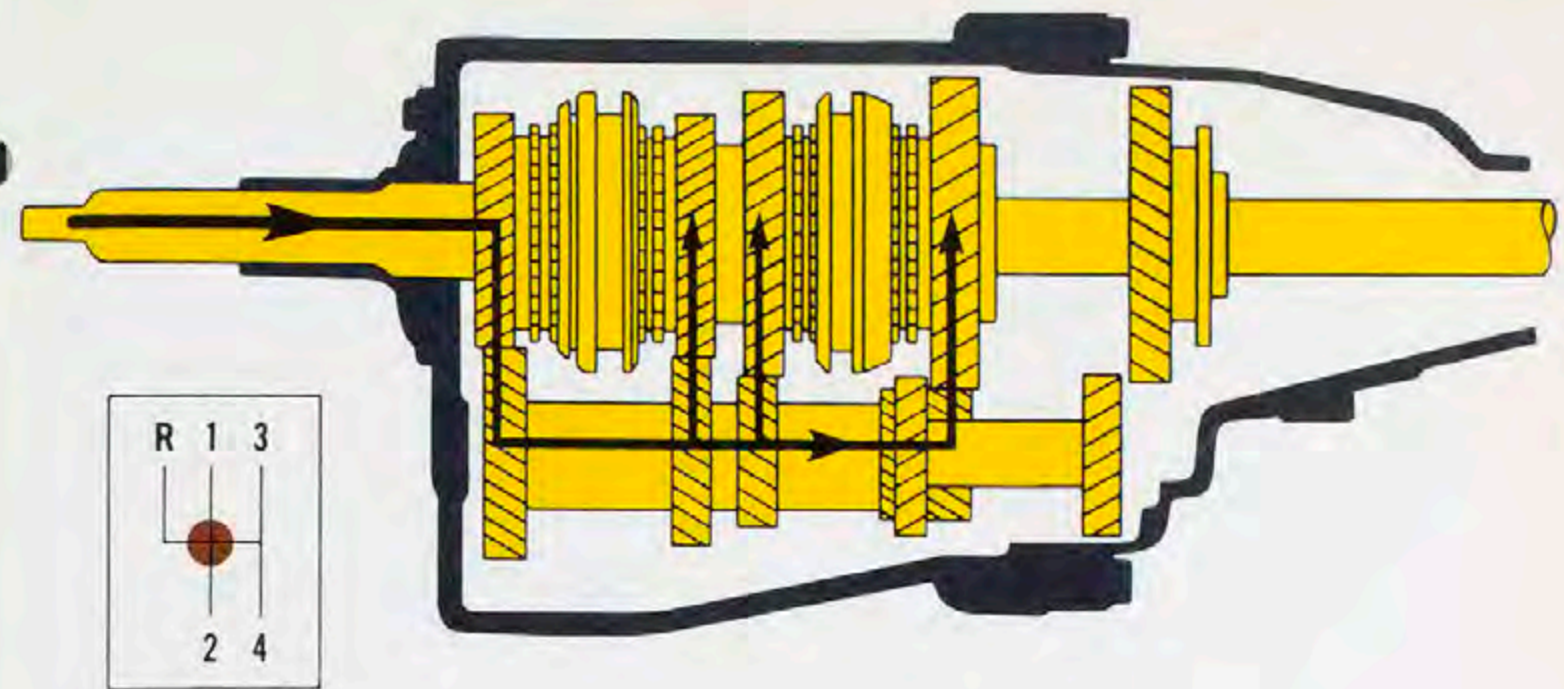
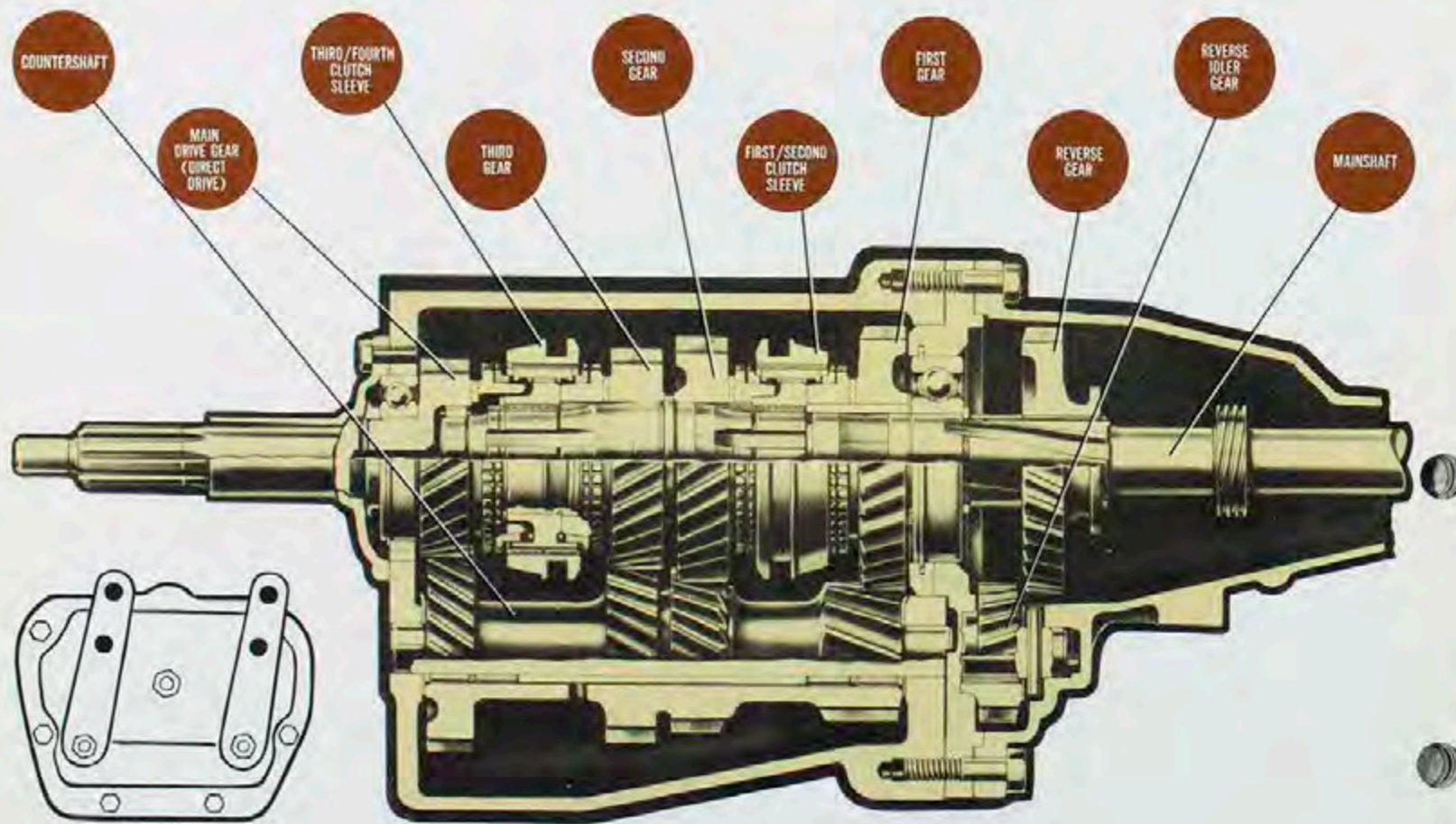
As far as maintenance, it is the same as for all Corvette manual transmissions. The unit should be checked every 6,000 miles for lubricant level and for evidence of leaks. And the unit should be checked at

operating temperature and filled as necessary to the level of the filler plug hole with the following: SAE 80 or SAE 80-90 Multi-purpose Gear Lubricant meeting requirements of U.S. Ord. Spec. MIL-L-2105B.

As a review of how both the new and former 4-Speed transmissions actually work, illustrations and descriptions are included here. While the new unit is shown in the drawings, the arrangement and operation are similar to that of the unit introduced in the spring of 1957.

The first, second and third gears have bushings in their inner bores, allowing these gears to float freely on the mainshaft. The reverse gear has splines on its inner bore to prevent rotation on the mainshaft, but to permit forward and rearward movement of the gear itself. Also splined to the mainshaft are the two clutch sleeve assemblies, allowing them to transfer torque to the mainshaft whenever they are engaged with a rotating gear.

The main drive gear, the third, second and first gears, and the reverse idler gear are in constant mesh with the countergear. With the engine running and the clutch engaged, third, second, first and reverse idler gears are running at all times, with the main drive gear supplying the power. The reverse idler gear is driven from the side of the countergear and rotates in an opposite direction.

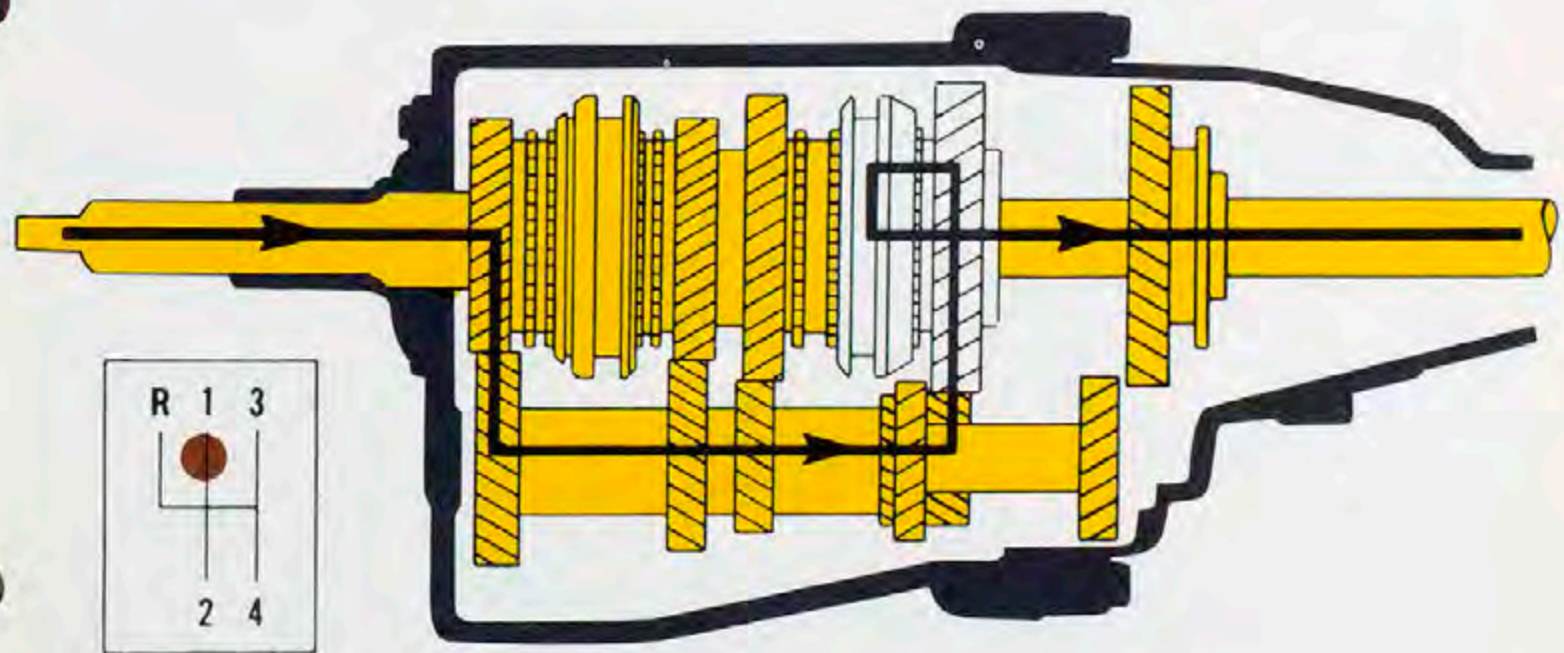


## In Neutral:

With the engine clutch engaged, the main drive gear turns the

countergear, which turns third, second, first and reverse idler gears. However, because the third/ fourth and first/second clutch sleeves are

neutrally positioned and the reverse gear is positioned to the rear (away from the reverse idler gear), power will not flow through the mainshaft.

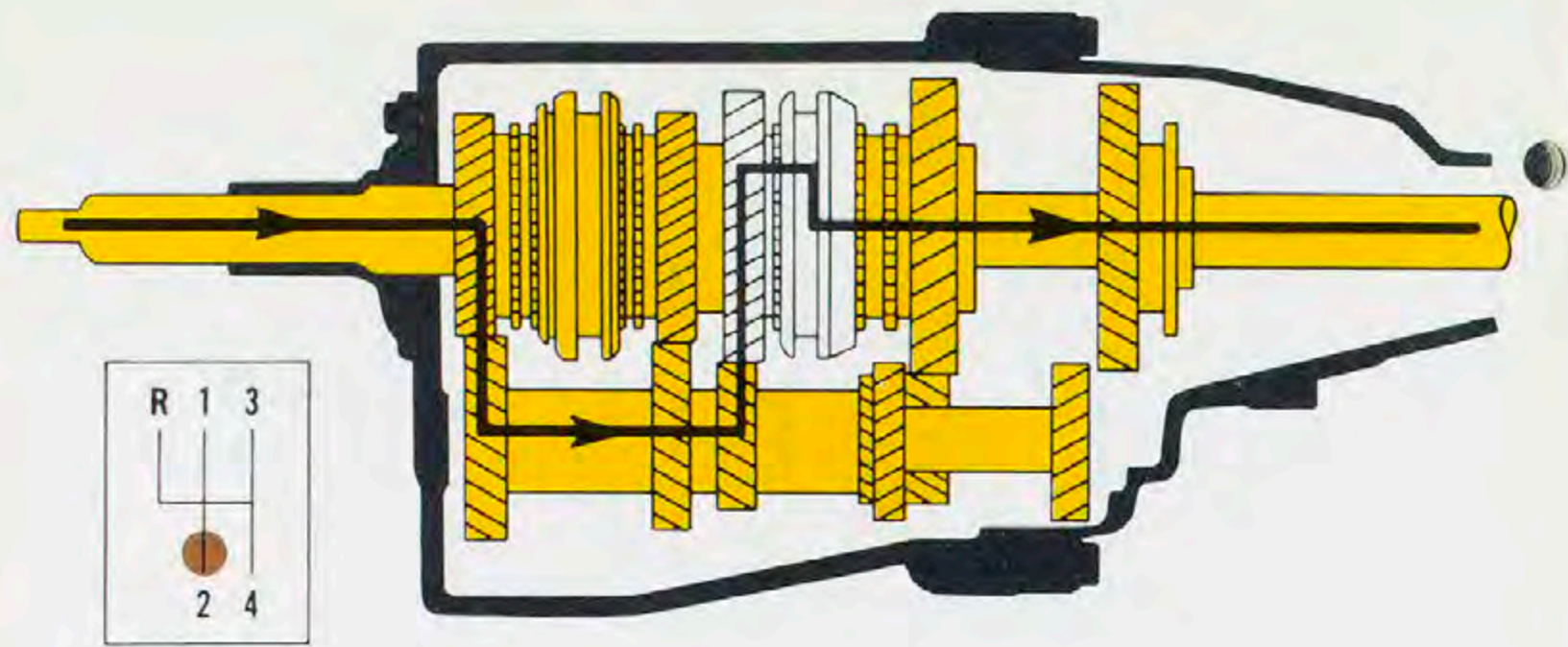


## In First:

The first/second clutch sleeve is moved rearward as the shift lever is moved forward, thus engaging

the first gear which is being turned by the countergear. Because the clutch sleeve inner bore is splined to the mainshaft, power is supplied to the mainshaft. In other words, torque is applied to the mainshaft

from the first gear, through the first speed clutch. Power from the engine is applied through the engine clutch assembly with the clutch disc splined to the front of the transmission drive gear.

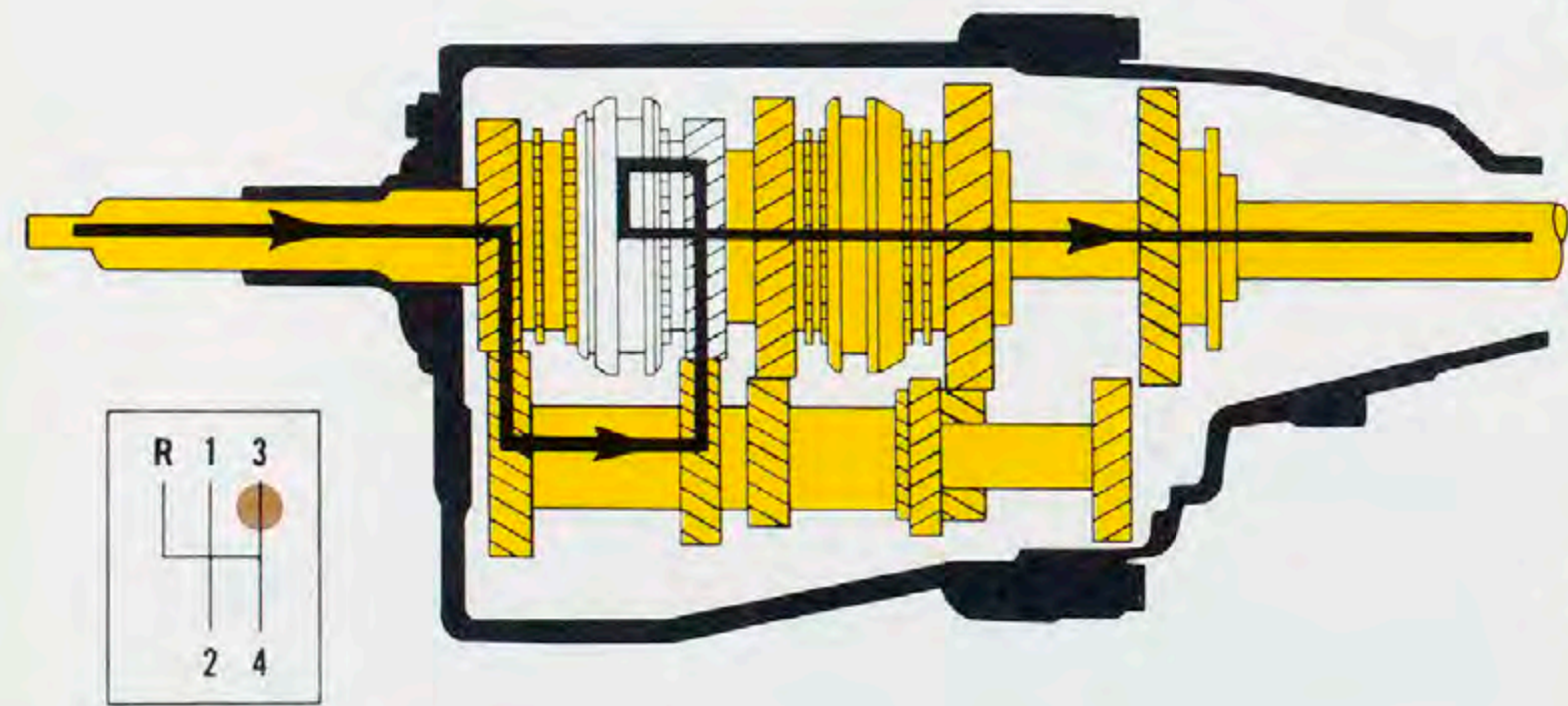


## *In Second:*

As the shift lever is moved rearward into second gear position,

the first/second clutch sleeve is moved forward. This engages the second gear which is being turned by the countergear. This engage-

ment of the clutch sleeve then imparts torque to the mainshaft because the clutch sleeve is splined to the mainshaft.

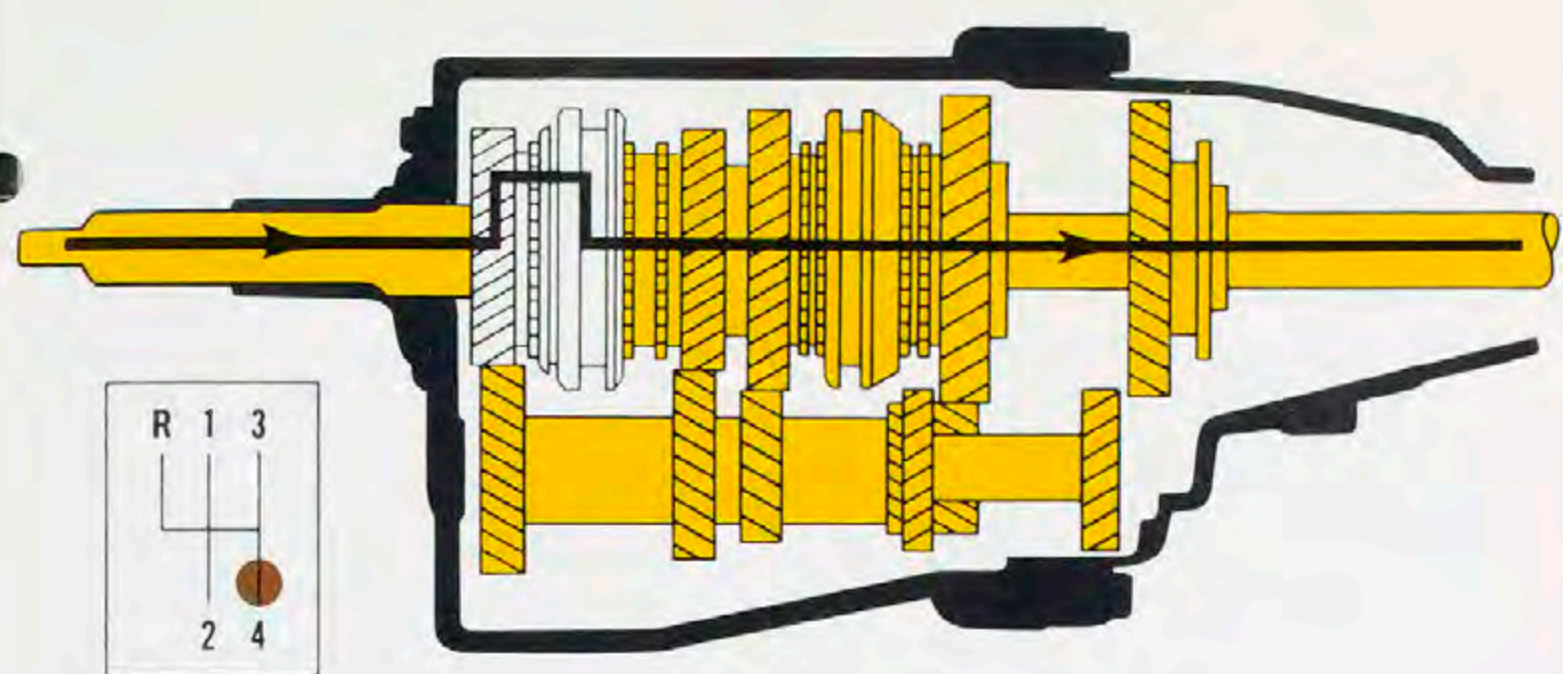


## *In Third:*

In third, the first/second clutch sleeve assumes a neutral position.

With the shift lever moving forward, the third/fourth clutch sleeve moves rearward, engaging the third speed gear. Third gear is being

turned by the countergear. Through the clutch sleeve splined to the mainshaft, power flows to the mainshaft from the third gear.

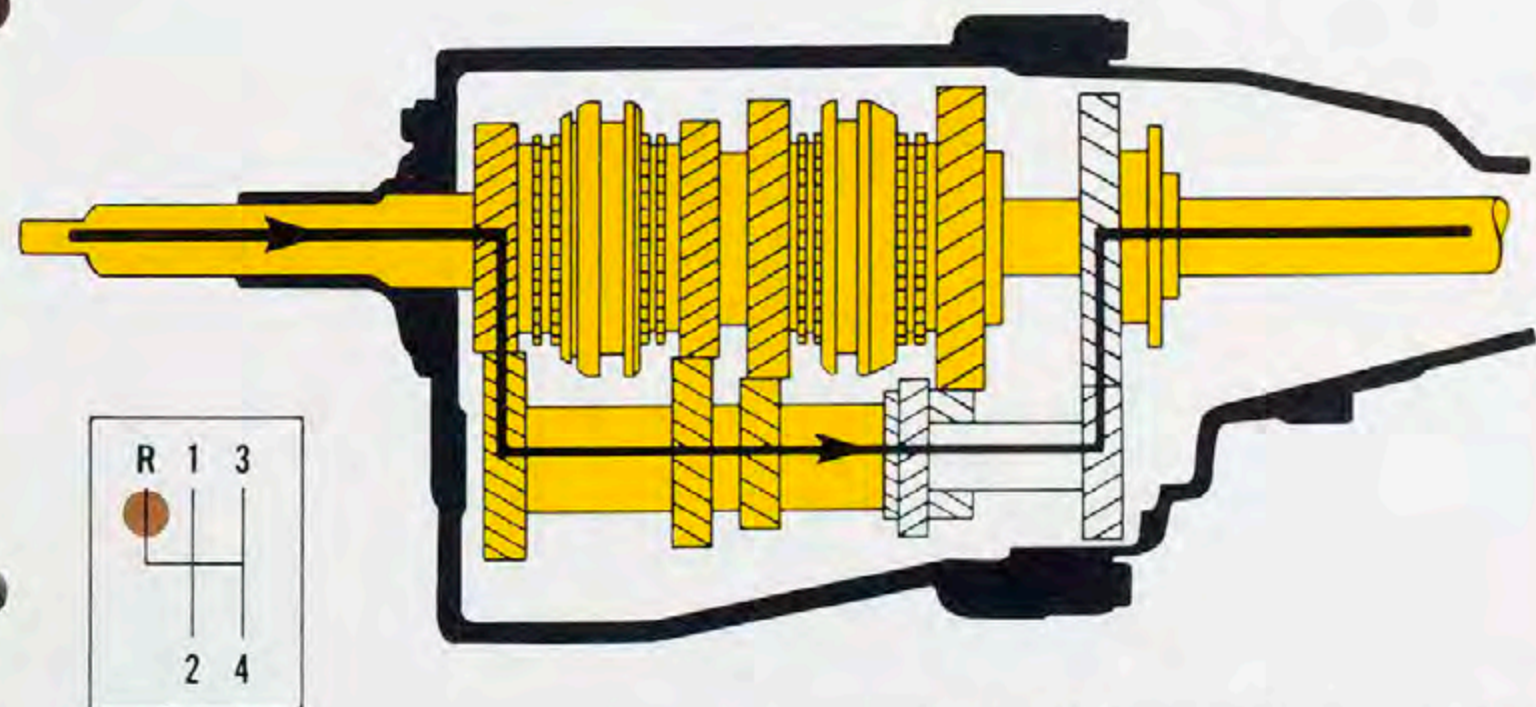


## *In Fourth:*

Fourth speed is direct drive. The third/fourth clutch sleeve is moved forward to engage the transmission

main drive gear. The first/second clutch sleeve remains in neutral position. In effect, this engagement of the main drive gear with third/fourth clutch sleeve locks the input

and output shafts into a solid connection. This means that power from the engine flows through the clutch disc, straight through the transmission to the driveshaft.



## *In Reverse:*

In reverse, both clutch sleeves assume a neutral position. The

reverse gear on the mainshaft is moved forward to engage the reverse idler gear which is being constantly turned by the countergear. The reverse gear is splined to the mainshaft, causing the main-

shaft to turn. Because power flows from the main drive gear to the countergear and through reverse idler gear to reverse gear on the mainshaft, the direction of rotation will be opposite that of the engine.

# ARTFUL USE OF THE TACHOMETER

**R**ide with a professional driver sometime—one who is really attuned to his car—and observe his technique with the gears. More than likely, you'll scarcely feel when he shifts up or down through the range. Of course, experience is a good portion of skill. The other portion, though, can be readily chalked up to art in the use of one instrument—the tachometer.

The tach's prime function, of course, is to measure engine rpm from idle to red line. And the proper use of what a tach tells you can make your driving more skillful, more fun and, in competition, produce faster lap times. A tach tells you three basic things: at what rpm your engine is idling, the maximum safe rpm limit and the range of maximum performance.

Of the three basics, only one is actually marked on the dial face—maximum rpm limit. It's revealed by the "red line" and the "yellow area" which is a warning. The specification sheet for the particular engine in your Corvette tells you at what speed the engine should idle (which, by the way, is invaluable for tune-ups). The third item—the range of maximum performance—is a function of two variables: (1) your particular engine's torque and horsepower characteristics and (2) the rear axle ratio and/or transmission ratio in your Corvette.

Taking the Corvette 375-hp Fuel Injection V8 engine as an example, a cursory glance at the horsepower-torque curves reveals that the torque is rated between 4400 and 4800 rpm. Horsepower is rated at 6200 rpm with the red line beginning at 6500 rpm. The desired full-throttle acceleration range can be determined by your own experience. However, most drivers feel the best accelera-

tion rate lies in the area between the approximate torque and horsepower peaks. One other point to bear in mind: always avoid overspeeding the engine.

Taking a straight-line acceleration event first, the technique boils down to getting a good start, then shifting smoothly to second gear when the engine reaches its peak output, and so on through third and fourth gears. For a road circuit, the technique is somewhat different. Here, practice will indicate which gears and proper tachometer indications should be used to achieve the most consistent maximum acceleration rate out of slow and fast corners alike. The skilled driver will use the transmission to shift down and up in a way that keeps the engine operating in its most efficient range.

For instance, if your driving takes you to different road courses, or just to casual Sunday events, the following suggestions can help you improve your skill and driving technique. First, observe your tach in slow corners. You will note the rpm reading falls considerably below the range of best acceleration if you don't downshift. In practice, start by shifting down one gear (say, from fourth to third). The result will be a tach reading showing higher engine speed. See if the engine speed indication is in the area of best performance. If not, downshift one more gear. The gear selected should put the engine close to the beginning of your engine's maximum performance range, i.e., in the maximum torque range. This gives you the greatest acceleration potential. If, however, a two-gear downshift puts the engine too high on the rpm scale (like 5500 rpm), then the acceleration rate will be very short—from 5500 to the red line at 6500. This

would call for a shift to the next higher gear—one that ideally puts the engine rpm down near the torque peak for best acceleration.

Readers who regularly engage in road work will quickly point out that transmission ratios aren't the only factor in determining lap time computations—that rear axle ratios and even tire sizes play a significant role. Those interested in learning information relating to transmission-rear axle comparisons for particular applications may refer to *Corvette News*, Vol. 7, No. 5, for a complete chart and calculations involved for proper conversions.

An important point to keep in mind is to prevent overspeeding the engine when downshifting. As an extreme example, downshifting the car from a road speed of 75 mph in fourth gear into first would cause the rear wheels to literally drive the engine well beyond its design limits. And this sort of activity could scatter an engine. The best rule of thumb in this case is to brake the car to a safe point and then downshift one gear at a time (from fourth to third, from third to second, etc.) to keep the engine from exceeding the red line in the next lower gear. Don't shift down two gears at a time just to utilize engine braking. Rpm builds up quickly in the lower gears.

How do you know how much to brake before downshifting? This requires practice on the course or a little slipsticking with the slide rule and the transmission gear ratios. Taking the 4-Speed transmission and the 375-hp engine cited earlier, the specification sheet on the 4-Speed lists the ratios as 2.20:1 first, 1.64:1 second, 1.28:1 third and 1.00:1 fourth. Calculate the percentage

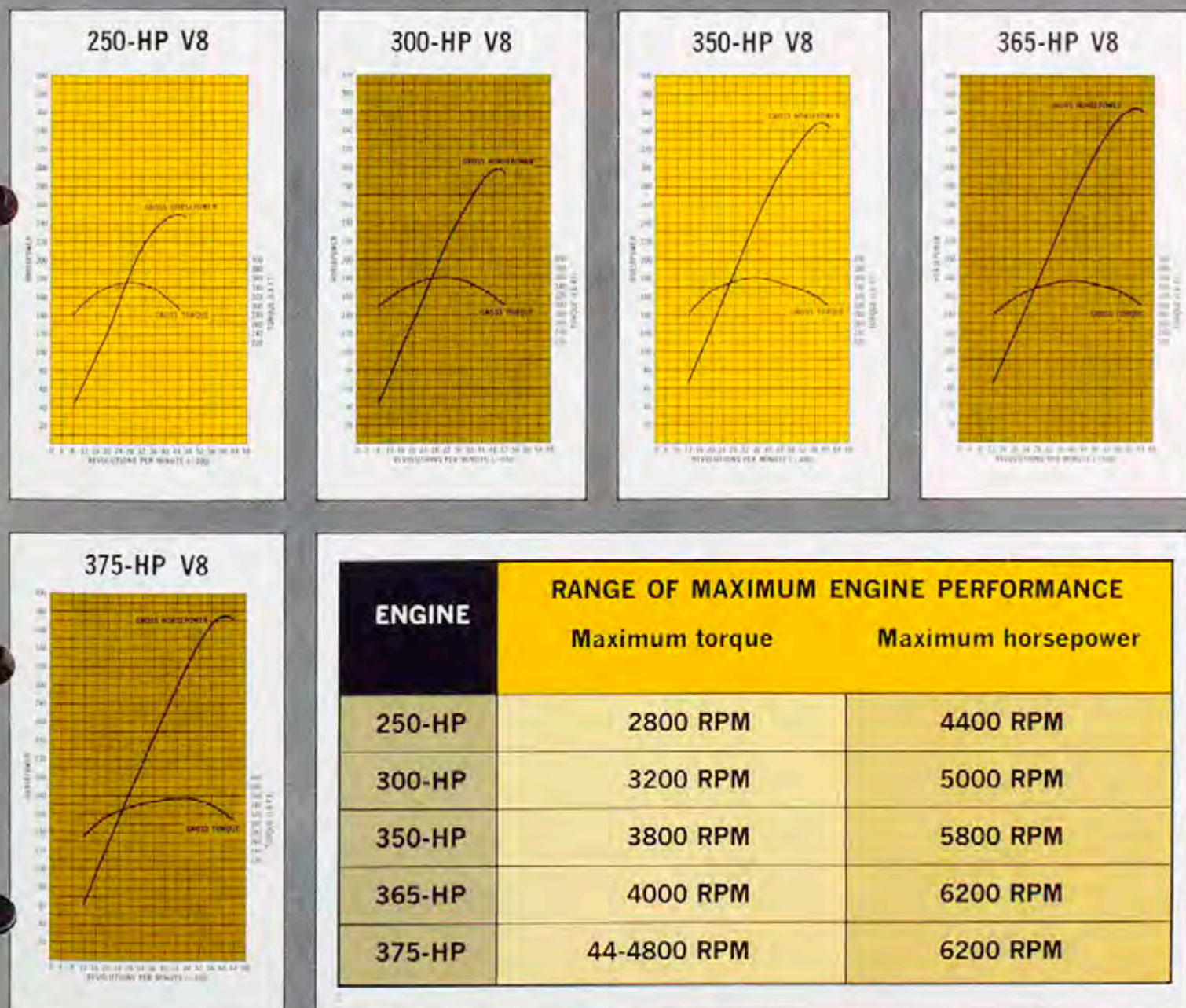
of reduction from first to second, second to third and third to fourth. This is done by subtracting the lower gear ratio from the higher, and dividing the result by the higher gear ratio. With the close ratio 4-Speed, the percentage differences are 25% between first and second, 22% between second and third and 22% between third and fourth gears. The next step is to multiply the percentage difference by 6500 rpm ("red line" for the 375-hp V8). The results are 1625 rpm difference between first and second, 1430 rpm difference between second and third, and a like amount between third and fourth.

Since the rate of maximum acceleration is between the approximate torque and horsepower peaks, each gear change will effect a 1430 or 1625 rpm change in engine speed. This, of course, will

register on your tachometer. Similarly, downshifting will raise engine speed a like amount. Knowing the rpm difference your transmission can provide when shifting up or down will enable you to plan shift points on paper to suit almost any given situation. You can determine the same shift points in actual practice as well.

If readers want to take the time to compare the torque and horsepower specifications on the Corvette V8s, an interesting fact will soon become evident. Transmissions and engines are matched to provide the best overall performance factors. The ratio differences found in the wider ratio 4-Speed transmission with the 2.56:1 first gear are easily accommodated by the slightly broader spread between torque rpm and peak horsepower rpm on applicable engines.

Skillful reading of a tachometer can make the difference in valuable seconds over a road course, and can help improve performance at the normal gymkhana-type event. The tach can help a driver deliberately keep the engine in lower speed ranges to help improve fuel economy. And for setting spark advance or distributor dwell with a meter, the tach will indicate the proper rpm settings for fine adjustments. But keep in mind that a tach only indicates engine rpm. It's up to the driver to keep the engine in the rpm range that's best suited for the kind of driving being done—straight-line acceleration, fun-type gymkhanas or road circuit driving. Practice in observing the tach and using the readings can help your casual driving, too. So for more Corvette fun, keep an eye on the dial that keeps its eye on your engine rpm.





first annual  
**GLEN**  
**500**

run through rain  
& reminiscences

Watkins Glen barely passed another historical milestone in August with the running of the First Annual Glen 500 for production cars. A new event on the calendar, yet it seemed already deeply steeped in tradition. Maybe it was the weather that triggered our nostalgia—two days of downpour and one of misty humidity—but we'd have sworn we saw the old BuMerc hot rod of Briggs Cunningham disappear over the brow of the hill right after the start. And there were visions of Cad-Allards and Bugattis and Maserati 4 CLT's dancing out of sight around the corners.

Or maybe it was the site—Watkins Glen, scene of American road racing's renaissance after WWII. Advancing age fosters reminiscences and, to most of the older active drivers and *dilettanti*, this is where it all began—about 16 years ago. The town has seen three race courses, dozens of events, and entries that read from the Who's Who of American racing. More recently, the international greats have come to compete on the 2.3-mile circuit that is so well supported by the town of the same name. And as the entry lists accrue over the years, there are very few really top drivers, and successful cars, that have *not* run the course.

A history of Watkins Glen, leading up to this first annual 500-mile event, takes us back to 1948. A young law student named Cameron Argetsinger decided that the town would be an ideal location for a road race, so he mapped out a course that was 6.6 miles long, followed city streets and back country roads, and traversed New York Central

railroad tracks in two places. The problems of getting any kind of event underway with the inherent traffic problems and lack of an experienced staff were almost insurmountable. Argetsinger surmounted them. The first event was held in October, 1948, and races continued under these conditions until 1952.

Crowd control problems were plaguing the organizers. In the early days crowds were so huge that estimates had the events outdrawing Indianapolis; there was no way of getting an accurate count or of collecting admissions from spectators who lined the city streets. However, the people of Watkins Glen were enthusiastic enough to want to continue with racing, so a second course was set up over 4.6 miles of country lanes just a few minutes from the town.

But new problems cropped up. The lanes were so small that they were impassable most of the year and getting them in raceable

shape was expensive and never entirely successful. The second course was doomed when drivers finally threatened to boycott because the circuit was so narrow and rough.

To pacify the drivers and, more importantly, hang onto the increasingly popular events, Argetsinger decided that a "for-real" race course was needed. Thus, the Watkins Glen Grand Prix Corporation was formed, and option to 550 acres near the second course was purchased. Bill Milliken, head of Cornell Aero Lab's Vehicle Dynamics section (and one-time participant in Watkins Glen races), was called in to help design a race course. The present circuit was ready for the 1956 season.

The course is 2.3 miles of very fast roadway, resurfaced in super-smooth asphalt before the First Annual Glen 500. There is only one really slow turn on the course, a right-hander just before the pits. For most

events, an artificial chicane is used at the horseshoe end of the course; for Formula One races—and the 500—this obstacle is eliminated. Jim Clark holds the lap record for the course without the chicane in a Lotus at 111.14. *With* the chicane, Jim Hall got his Chevy-powered Chaparral around at 100.72 mph. The stock car record is 85.00 for Buck Baker in a Chevrolet. By comparison (and a little ahead of our race report), the winning car in the Glen 500 lapped consistently in the 92-94 mph range.

Now for the big event. A 500-mile race is quite an attraction, especially if it is being held at Watkins Glen, so we expected to see cars and drivers in droves. Particularly, we were looking for the pre-Sting Ray Corvettes to take advantage of the distance. As it happened, the entry for the 500 was very light in all classes—a result of the bad weather and the long grind on a track



that allows average speeds of 90 mph or so. Those who did show in Corvettes included Don Yenko who talked Dr. Dick Thompson into co-driving with him. Frank Dominianni and Bob Grossman shared another B Production car, Bob Mouat and Ben Moore a third, and Ed Myers and Grady Davis a fourth. Alvin Forsyth and Millard Ripley brought a Sting Ray to contest two Cobras for A Production honors. Or at least that's the way things looked before race day. Practice changed things somewhat and Corvette chances took a turn for the worse.

A few laps after the beginning of practice, the Yenko/Thompson car was retired with a mechanical failure, and those two Corvette stalwarts took over the Davis/Myers car. Overall, practice and the preliminary events were in the traditional vein of SCCA national races. Ed Lowther, of McMurray, Pa., won the feature for large modified cars in his Genie-Cobra.

At the beginning of the 500, the Sting Ray of Ripley and Forsyth was able to mount a reasonable challenge to the lead Cobra, driven by Lowther and Harold Keck. Flying Frank Dominianni and teammate Grossman kept their B Production car well in the lead of that class and were maintaining a steady third overall.

The Davis/Myers car, ultimately driven by Thompson and Yenko in the race, was never quite right and fell back early. A minor adjustment to the injector unit of the Sting Ray dropped it out of contention for overall honors about midway in the 500 miles, allowing Dominianni and Grossman to sock away a solid second overall and first in B Production, followed by the Mouat/Moore Corvette and the Forsyth/Ripley Sting Ray (2nd in A Production).

The field had dwindled to 12 cars by the end of the 500 miles, and none was circulating very fast. As a crucial race in the national point championships, some entrants were forced to race in the Glen 500; unfortunately, many drivers preferred to wait and win their points in other events where they could gain as much glory for a hundred miles or so of racing than in the longer grind. Too bad, too, because 500 miles is a natural distance for an all-day event. With a larger field and better weather, the First Annual Glen 500 could have been a great success. However, the one thing about annuals is that they perpetuate themselves, so maybe next year will be different.



*Mud, rain, and racing: the Forsyth/Ripley Sting Ray ghosts through the mists at left; above, the Dominianni/Grossman Corvette looks a little drier. Everyone felt like making mud pies, particularly in driving conditions like those below that beset the Mouat/Moore Corvette on Saturday.*



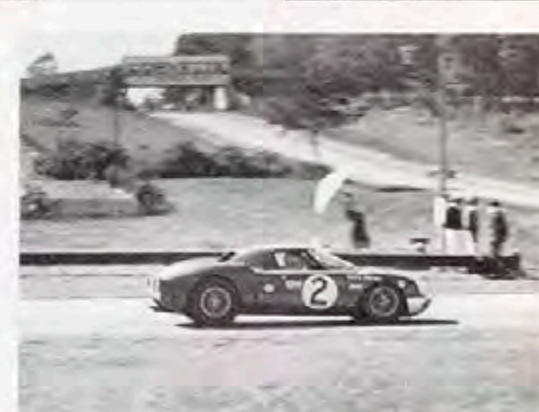
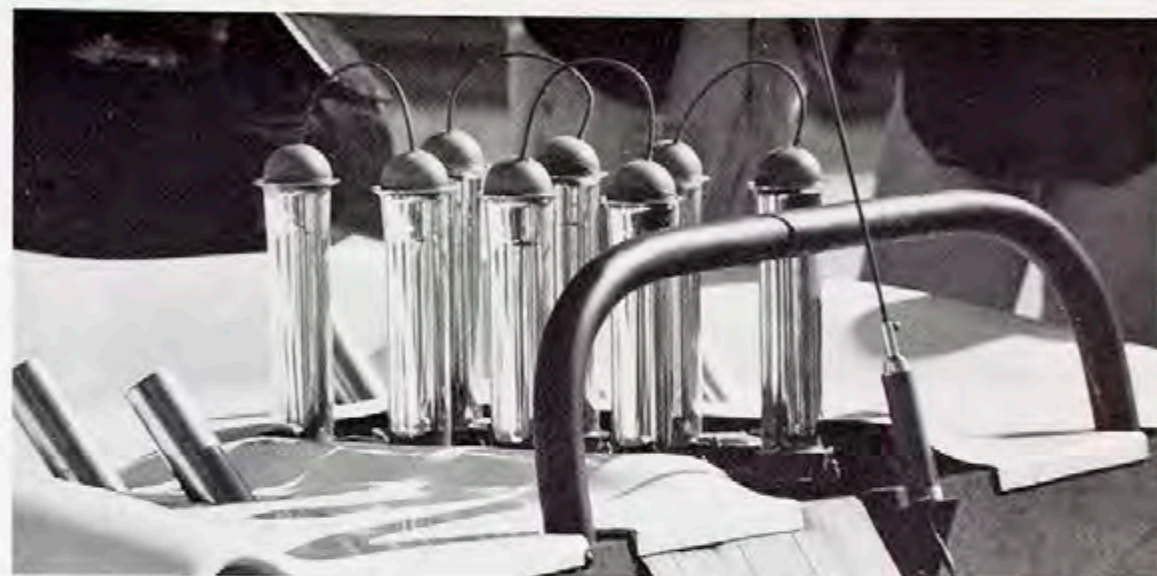
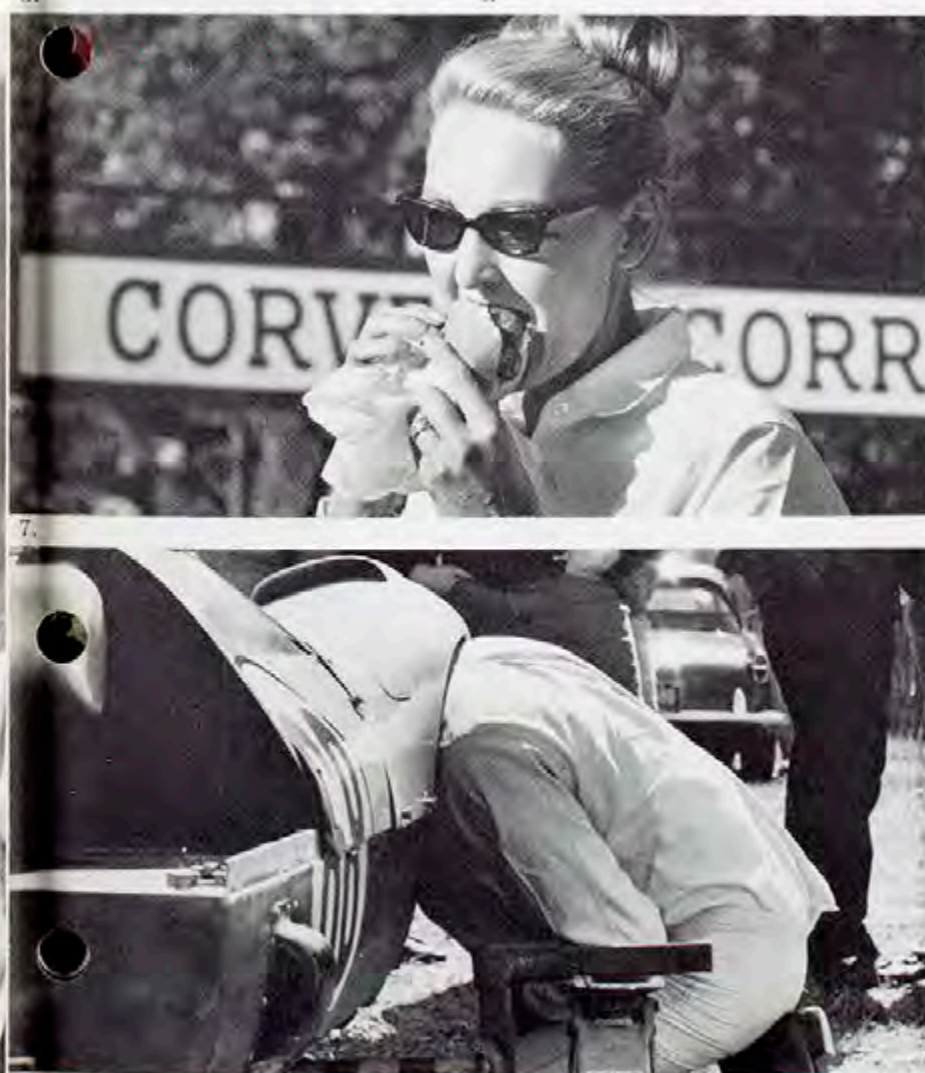
# CAMERA INQUIRY

## AT ROAD AMERICA'S 500

As always, plenty of local color and excitement met Road America spectators during September's 500 weekend. The three events on Saturday the 12th and the grueling 500 race on Sunday the 13th included lots of cheering action for Corvette devotees but, unfortunately, no overall or class wins. Noteworthy in Saturday's Badger 200 was the fine driving by Dr. David Ott in a '61 Vette as well as by the Sting Ray team of Tom Swindell/Gib Hufstader. On Sunday, the #67 Grand Sport and three Chevy-powered cars (the #68 Chaparral, #92 Cooper and #1 Lola) all performed exceptionally well during different times in the long grind. And, but for mechanical difficulties and the breaks, any one of these looked capable of taking the checkered flag. There'll be another chance come the 500 weekend next year.

We thought we'd provide a little change of pace in *Corvette News* coverage at Elkhart Lake by letting you test your mental and observation skills. No grand prizes. Not even kewpie dolls. Simply take the lettered captions at the right and match them with their correct numbers on these pages. You likely will have no trouble. If you do, you can always cheat by peeking at the upside-down answers on page 29.

- a. What some people won't do to find a spot to store rubber balls.
- b. Sweated Roger Penske and sun-glassed Jim Hall intent on every detail.
- c. Sightseeing in do-it-yourself seating comfort.
- d. Road America favorites ... gals & brats.
- e. Speed at the Grand Sport pits.
- f. America's favorites ... babes bunting.
- g. Ichabod Crane's modern-day antagonist used hundreds of horsepower.
- h. The 500's winning Ferrari in Corner 5.
- i. What some buffs won't do to get a choice vantage spot.



ANSWERS: 1-C, 2-F, 3-I, 4-A, 5-E, 6-H, 7-D, 8-G, 9-B.





