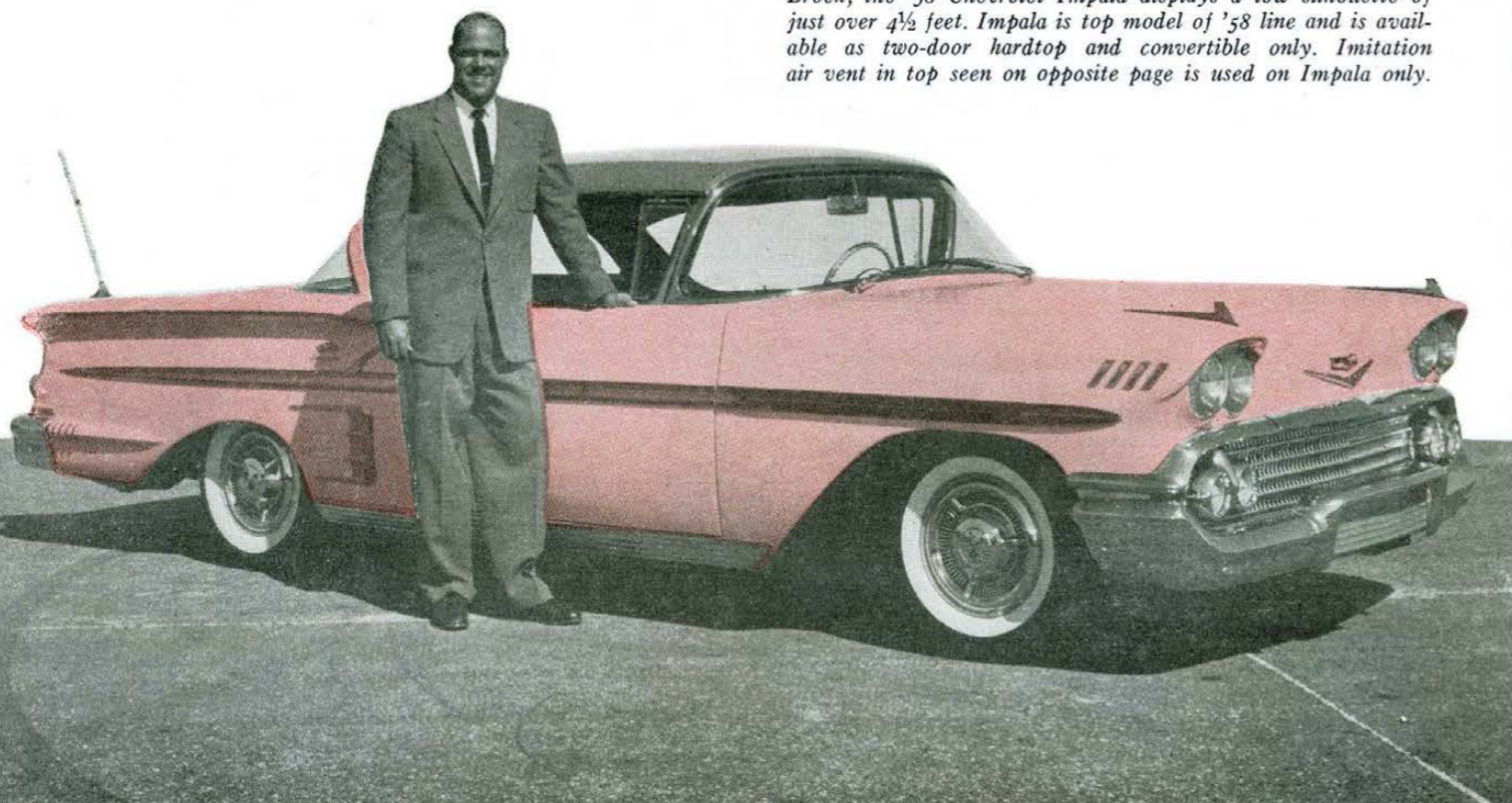


Big 348-inch V8, radical X-type frame, fresh body styling, air suspension. This is the...

'58 CHEVY

Cutaway of Chevy's new 348-inch V8 engine available as an option in all models except the Corvette. The top of the block is surfaced at an angle of 16° from perpendicular to the bore and by using a pent roof piston, the combustion chamber is entirely within the block. The compression ratio is 9.5 to 1.

Compared to HRM's six-foot, two-inch Technical Editor, Ray Brock, the '58 Chevrolet Impala displays a low silhouette of just over 4½ feet. Impala is top model of '58 line and is available as two-door hardtop and convertible only. Imitation air vent in top seen on opposite page is used on Impala only.



...A NEW BREED OF CAR

By HRM, Technical Editor, Ray Brock

Photos by Brock, Parks and D'Olivo

There are three main selling points for the new car salesman to use when trying to convince a prospective customer; styling, engine and chassis. If any of these three is really different from what it was the previous year, the car attracts attention and the salesman has a good chance to close the deal easily. But, if all three of these points are brand new at the same time, the car will probably hit the market like a bomb shell and demand the attention of everybody who is the least bit interested in automobiles. If the car buying public likes what they see, the salesman is going to have an easy selling job and the manufacturer is going to sell plenty of cars. So, we don't feel the least bit reckless in predicting that Chevrolet is going to have a big sales year with its 1958 models.

The '58 Chevy passenger car is so new that there probably won't be more than just a handful of parts that will interchange with those on '57 models. Frame, suspension, steering, body and looks are all new and there is a big 348 cubic inch engine available. The Corvette for '58 is new, too, but mainly in styling. Frame and suspension are basically the same as for '57 with only changes which would

improve handling and performance made to them. The 348-inch engine is not available in the Corvette, mainly due to the fact that it outweighs the 283-inch engine by more than 100 pounds and upsets the superb balance of the car. The '58 Corvette is a true sports car with no concessions made to comfort at a loss of handling or performance. A tour through the GM Proving Ground "handling" course in a Corvette with fuel injected 283 engine, four-speed close ratio transmission, Positraction rear end and stock running gear (tubeless tires and 22 pounds pressure) left no doubt in our minds that the U.S. at last has a sports car that will show its heels to all but the modified European factory specials. So, with this much said, we'll skip the '58 Corvette for the rest of the article and get back to it in a later issue when we plan to do a test and devote plenty of space to it.

You will have seen the '58 Chevy by the time this issue is on sale and chances are that you have stopped to look at one parked on the street or in a dealer's show room so we'll skip the part about styling, interior, paint and trim, that much you can easily see and judge for yourself. The chassis and engine are the items not

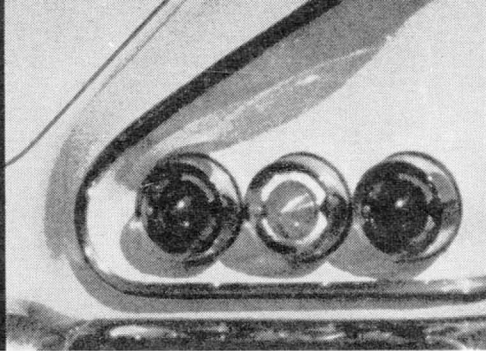
readily seen so we'll dismember the complete car and inspect the pieces as we put it back together.

As you will notice by inspecting the picture of the new Chevy frame on page 19, a big change has taken place. The parallel rail ladder type frame is no longer used, instead a sturdy X-type frame takes its place. The rigid tube-like center section of the frame is very resistant to twisting forces that are transmitted to it from the four corners of the X-frame. The low slung design permits minimum overall car height while also providing plenty of foot room for rear seat passengers. Frame rails are completely boxed and welded and three crossmembers are used. The front crossmember is of welded box design with a channel rear crossmember and a removable channel member that bolts between the frame rails to support the rear transmission mount.

Since there are no frame rails running near the outer edge of the body as in previous years to support the body, the rocker panel section beneath the doors has been strengthened greatly and tied into the cowl section and dash panel to give ample body support. Two underbody (Continued on following page)

'58 CHEV

continued



crossmembers extend across the underside of the floor pan and tie into the rocker panel channels to give additional strength to the body across the narrow wasp-waist portion of the frame. In spite of the narrow appearance at the center of the frame, this type of frame is extremely rugged and will absorb far more punishment than the pre-'58 ladder type without developing squeaks or misalignment. The 1958 wheelbase is 117.5 inches and tread is 58.8 inches both front and rear.

The front suspension is about the only part of the new Chevy that even resembles the '57 models. Unequal length control arms are used to maintain constant tread and proper wheel geometry through full wheel travel. The spindle support arm fastens between the A-arms to ball-joint pivots on the ends of the upper and lower A-arms. Conventional springing is coil between the lower A-arm and a spring pad in the frame rail. The tops of the coils are inclined inward to stabilize the front of the car and the upper A-arms are mounted at an angle to minimize nose-dive on stops. Delco tubular shocks are mounted inside the coil springs between the lower A-arm and a frame bracket. Air suspension is available to replace the coil springs but we will skip this until a little later in the story. A rubber bushed link type front stabilizer bar, absent from '55-'57 models, has been

added to all V8 models for '58 but is still not used on the six cylinder cars.

Another new item on the '58 Chevy is the location of the steering gear and linkage. Instead of worrying about clearance problems between linkage and engine oil pan as in the past, the engineers just simply put a U-joint in the steering gear shaft near the firewall and moved the steering ahead of the wheels. The only things that mount in front of the steering gear box are the radiator and the grille. Both standard and power steering units are Saginaw recirculating ball type with the same gear box used for both. The gear ratio is 20:1 and overall ratio including linkage is 23:1 which is fairly "quick" for a full size American passenger car. 5.2 turns of the steering wheel are required to go from lock to lock and although this sounds strange in view of the "quick" steering and average lock to lock turns of around $4\frac{1}{2}$ on most cars, the answer is that the '58 Chevy turns much sharper than previous models and will actually cut a circle in just over 40 feet. So, although the new Chevy is nine inches longer than the '57 models, it should be even easier to parallel park in a tight hole. Steering ratios and lock to lock turns are the same for the power steering as for conventional with a power link assist used to lighten the load without taking the "feel" of the road away

from the driver. The power steering hydraulic pump is driven by an extension of the generator shaft.

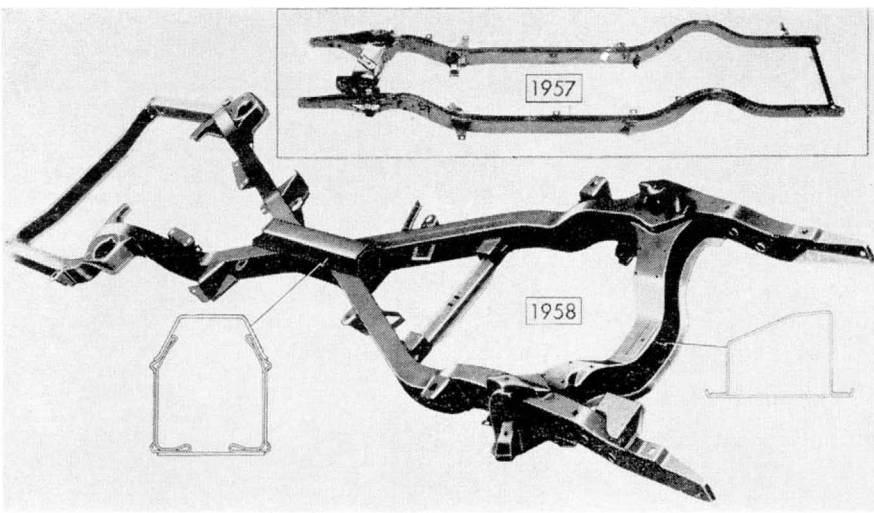
Moving back to the rear of the car for a look at the axle and suspension, the first thing you notice is that you've never seen anything like this on a Chevy before. Look a little farther and you will realize that you haven't seen this particular arrangement on any car before. Semi-elliptical leaf springs have been discarded in favor of coil springs on the rear and although Chevy certainly isn't the first to use coil springs on the rear, the linkage arrangement devised is completely different. Take a look at the pictures on page 19, then perhaps you will better understand the word description. Two stamped steel lower control arms are rubber bushed to brackets on the outside of the frame rails just aft of the frame center section. The other ends of these control arms are rubber bushed to brackets welded near the outer ends of the axle housings. A pad welded to each control arm just ahead of the rear axle housing supports a coil spring between the control arm and another spring pad welded to the frame. A horseshoe shaped upper control arm is also stamped from steel and the open ends are rubber bushed to brackets on the inside of the frame rails at a point just ahead of the rear axle. A bolt through the stamped arm is rubber bushed to a bracket welded on the rear of the steep banjo axle housing and eliminates side movement of the axle. The linkage arrangement between the control arms and the axle is such that torque and braking forces are taken by the control arms, with "nose-dive" on stops and "squatting" on acceleration almost completely eliminated. The center mounting of the upper control arm to eliminate side movement prevents the loose feeling associated with a cross chassis anti-sway bar and the ride is excellent through all types of dips and rough road. Delco tubular shocks are bracketed between axle housing and frame.

Rear axle ratios are 3.55:1 with the standard transmission, 3.36:1 with the automatic transmission (either Powerglide or Turboglide) and 4.11:1 for overdrive transmissions. An option that should be particularly helpful to those interested in drag racing or to those people who do quite a bit of driving in mud and snow is the Positraction limited slip differential. As the name implies, the Positraction gives full two-wheel traction on all types of surface but also allows a differential between wheel speeds for normal cornering. The Positraction is optional with all axle ratios.

Brakes are down slightly in lining area from 1957; 157 square inches of lining versus 169 last year with the reason for the drop being a change from $11\frac{1}{2}$ -inch



The '58 Corvette has been given a drastic face-lift while still using the same basic body shell. Quad headlights are standard equipment and only the 283-inch V8 engine is available, but with fuel injection and Duntov camshaft, rating is at 290 horses.



All new frame for '58 Chevy takes the shape of a large X with sturdy tubular-like center section that is only 8 inches wide. Compared to the '57 frame, the X-frame differs in many ways. All frame members are fully boxed except two crossmembers.

drums to 11-inch drums this year and narrower lining on the rear. Front lining width is still 2 inches but the rear lining has been cut from 2 inches to 1.75 inches. Although there is less brake area, nearly all of the twelve square inches was taken from the rear brakes, which does not noticeably lessen brake effectiveness since weight shift on fast stops puts the majority of the load on the front brakes. The 1/2-inch smaller drums provide better air circulation around the drums which are pretty well contained within the 14-inch wheels so the 1958 Chevy brakes should suffice for the average driver, although like nearly all modern cars, severe usage such as fast downhill mountain driving will cause quick brake fade. Optional power brakes are vacuum booster type with the unit firewall-mounted and integral with the master cylinder.

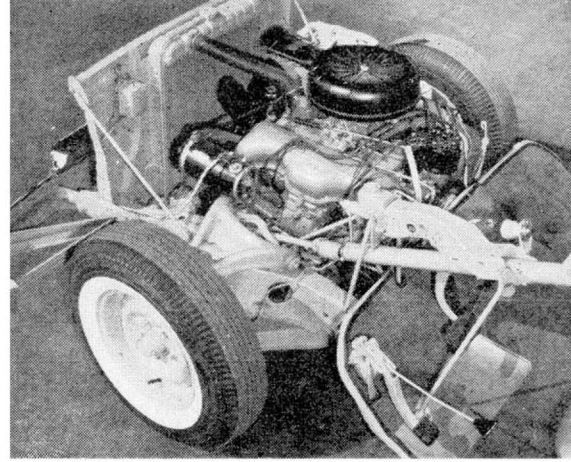
While we are still in the running gear department, we'll get back to Chevrolet's air suspension which is going to attract a lot of attention among prospective car buyers. Air suspension sounds complicated but is actually quite simple. A small air compressor mounts on the top left front of the engine in a position formerly occupied by the power steering pump and is belt driven by the crank pulley. The compressor air intake is drawn through an alcohol filled filter jar to remove moisture and prevent freezing in cold weather, then pumped to a reserve tank which is regulated to a pressure of approximately 250 pounds per square inch. Steel lines are routed from a distributing block near the tank to "air springs" which take the place of the four steel coil springs used in the standard suspension system. Also, steel lines return to the distributing block to "bleed" off pressure as the system requires.

The suspension air springs consist of a bell shaped steel reservoir, a steel pis-

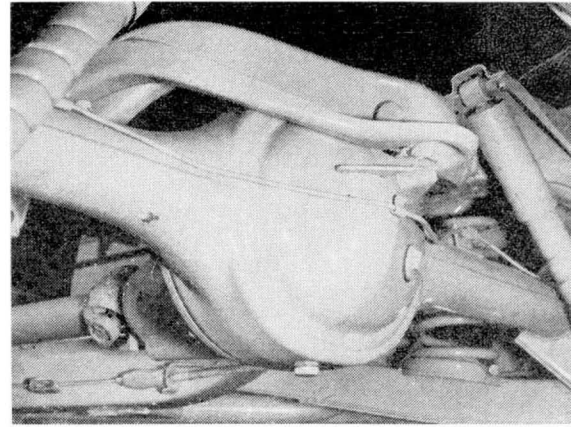
ton that sticks up into the open end of the bell with a heavy fabric-reinforced rubber bellows sealing the opening between the reservoir and the piston. A leveling valve is mounted inside the reservoir can with a roller tipped arm that rides on top of the piston. Should a load be added to the car and cause the piston to press against the roller, the leveling valve opens to high pressure air and enough air is let in the unit to return the car to normal height. When weight is removed, air is exhausted until car height is normal. The leveling valve arm will permit a small amount of travel in either direction without opening the valves so in normal highway travel, very little air is exhausted or taken in and the air in the unit provides springing. As mentioned, the air springs take the place of the coil springs and simply bolt into place. The front shock absorbers must be mounted to brackets outside the spring pads.

The ride of the '58 Chevy with the conventional coil springs is very good and although air suspension is probably a bit smoother for highway travel, the difference between the two is very slight, with the coil springs getting the nod for cornering since they are slightly stiffer than the air springs. Chevy's air suspension has several distinct advantages over the coils, however, such as the automatic load leveler which adjusts the car to the same level whether the trunk is full of feathers or full of scrap iron. Also, there is a tricky little valve mechanism on the distributing block that permits a jumper hose to be hooked between the reserve tank and the suspension system so that all four air springs can be pumped to full height should you get caught in snow or mud and need more ground clearance.

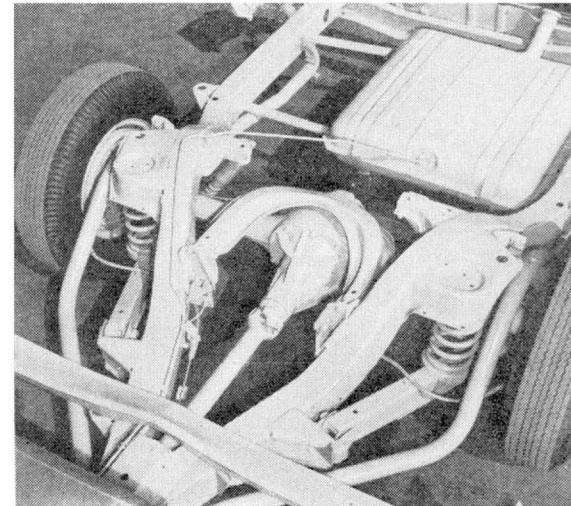
Moving to the engine department, we
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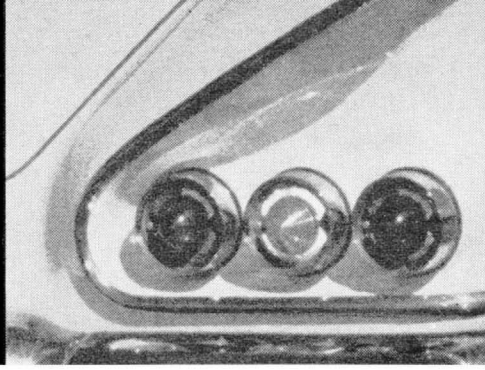
Special display chassis is fitted with the 348-inch V8 and four barrel carburetion. Close inspection reveals a U-joint in the steering shaft just ahead of firewall and Saginaw steering gear mounted on frame ahead of A-arm, just behind the radiator.



U-shaped upper control arm for rear suspension is hooked to a bracket welded on rear axle housing. Rubber bushings between housing and bolt in control arm allow enough freedom for axle to go through full travel without shifting sideways.



Overhead view of display chassis reveals two lower control arms, U-shaped upper control arm, shock absorber brackets. The exhaust tailpipes follow along rails through narrow section of frame, then duck outside rear coil springs, pass over axle.

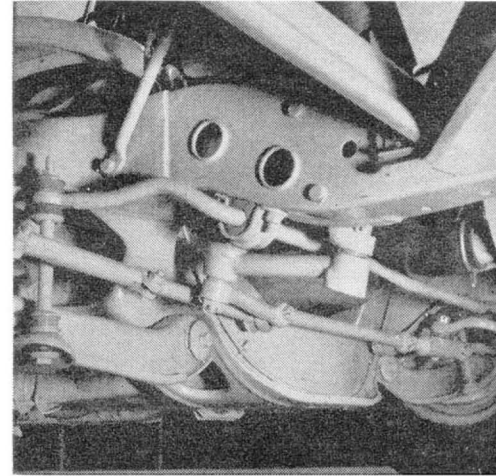


One important change has been made to the heads on the '58 283 engine. A small groove is cast in the surface of the head alongside the plug hole and the groove connected to the water jacket in the head by drilled holes. This gives a full 360° of water passage around the plug seat which cools the plug much better and permits the use of a hotter range plug which will not fuel foul. This solves

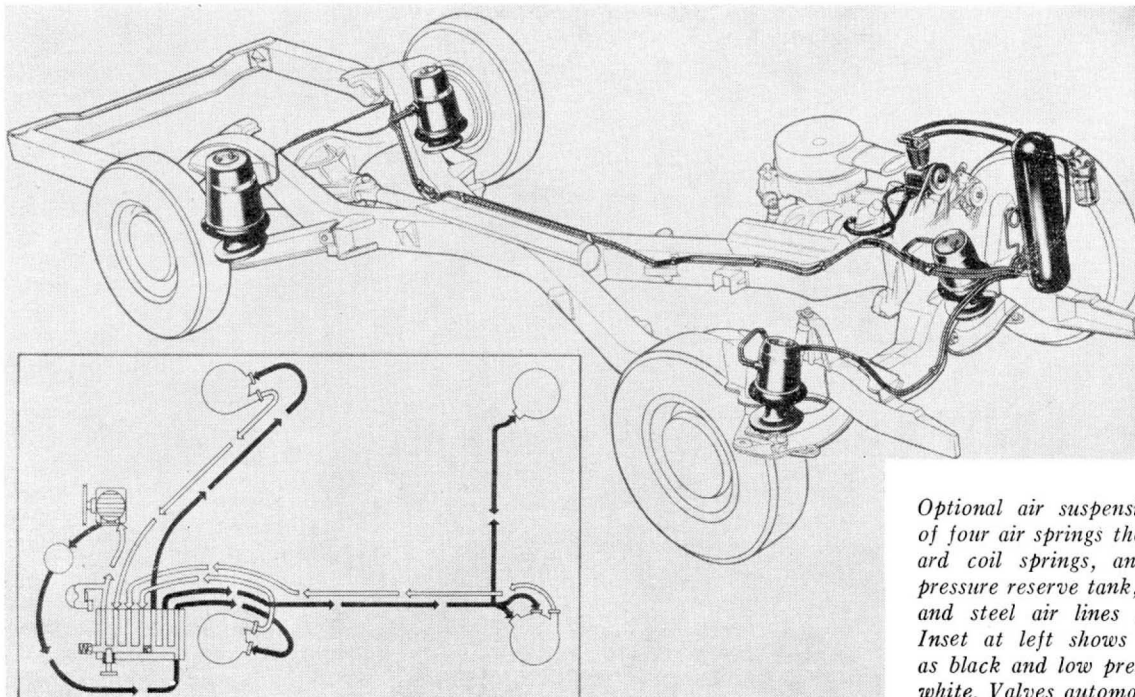
find the familiar looking six-cylinder engine of 235 cubic inch displacement, a familiar looking 283-inch V8 and a completely new 348-inch V8. The six is the economy engine of the line and should be investigated if low initial price and operating costs are your prime targets. For the performance minded, though, we will part company with the six and get into the V8's. The first V8, 283 cubic inches of displacement, is a refined version of the engine that has been showing competition the short way home since it was introduced in 1955 at 265 cubic inches. Bore and stroke are unchanged since last year, 3.875 x 3.0, and only a few very minor changes have been made.

Horsepower ratings on the 283 V8 start at 185 for the two-barrel carburetor engine at 4600 rpm with 8.5 to 1 compression. Torque is 275 lbs/ft at 2400 rpm. The optional four-barrel carburetor (standard for Corvettes) and 9.5 to 1 compression gives 230 hp at 4800 and 300 lbs/ft of torque at 3000 rpm. Another

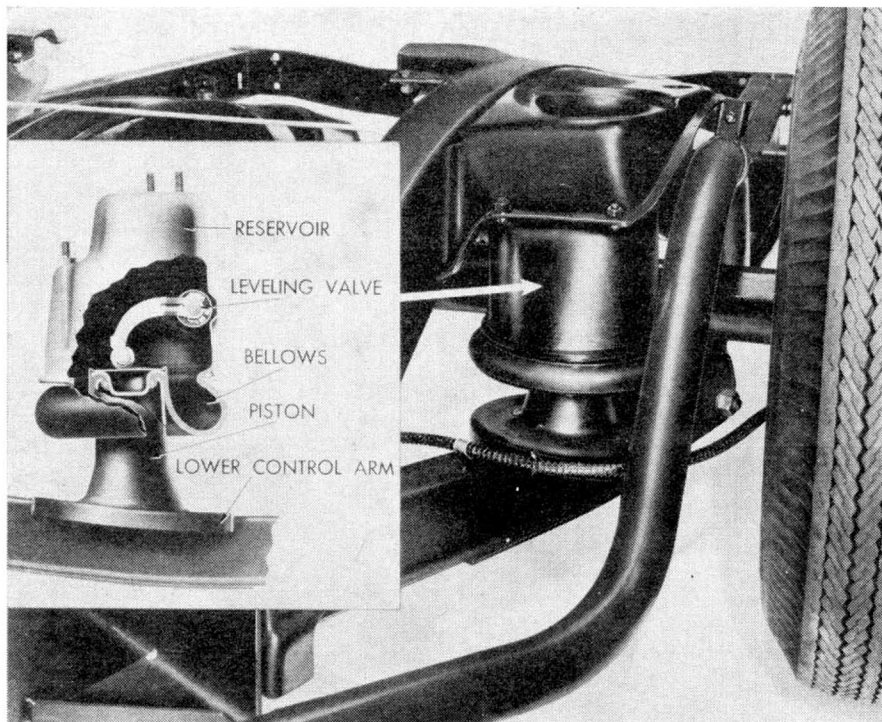
optional engine uses two four-barrel carburetors and is rated 245 hp at 5000 rpm with 300 lbs/ft of torque at 3800 rpm. The last of the 283 engines has fuel injection, 9.5 to 1 compression, 250 hp at 5000 rpm and 305 lbs/ft of torque at 3800 rpm. No, we didn't make a mistake on the horsepower ratings of those last two engines and although they are rated lower than dual-quad and injected jobs for '57, there is a reason. First, all of these passenger car engines have hydraulic lifters, therefore a milder cam than the mechanical cam used in the '57 performance models and secondly, you'll notice that 9.5 to 1 is the maximum on compression, even with the injector. A 290 horsepower engine of 283 inches displacement has been reserved as an option for the Corvette. This engine has 10.5 to 1 compression and one of Zora Arkus-Duntov's high winding mechanical lifter cams. The 290 horses come in at 6200 rpm with an identical torque rating of 290 at 4400 rpm.



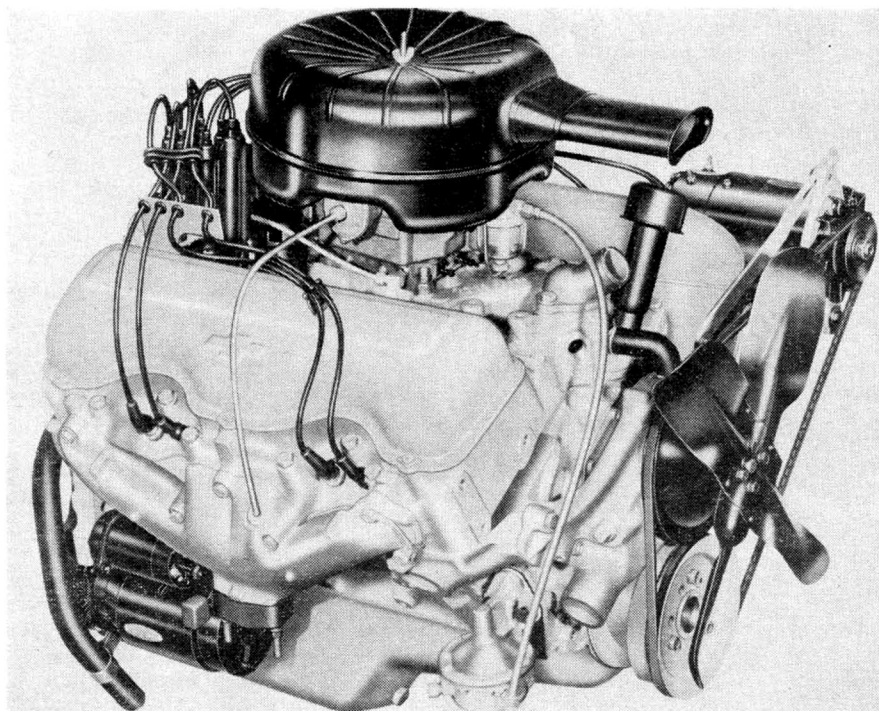
All steering linkage for '58 Chevy passenger cars is mounted ahead of front cross-member with more room for lateral movement which permits shorter turning radii. Link type front stabilizer bar, absent since '55, has been added to all V8 cars.



Optional air suspension for '58 consists of four air springs that replace the standard coil springs, an air compressor, a pressure reserve tank, a distributing block and steel air lines to all four wheels. Inset at left shows high pressure lines as black and low pressure return lines as white. Valves automatically level the car.



Cutaway view of an "air spring" used to replace the steel coil springs for air suspension shows the important parts of the unit and illustrates how the leveling valve roller rides on the top of the piston to intake and exhaust air for adjusting height.



New 348-cubic-inch V8 resembles the popular 283-inch V8 externally somewhat with the distributor at the rear of the block, fuel pump at lower front, but odd shaped rocker arm covers and easy-to-reach spark plugs above the exhaust manifold are new.

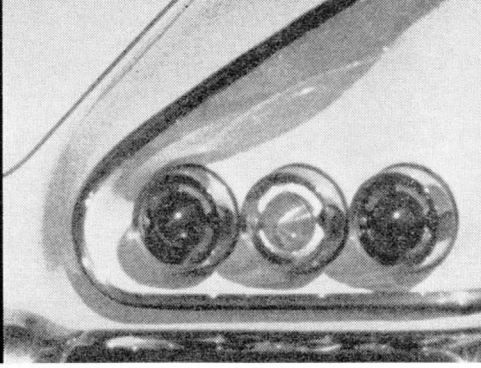
a problem often encountered with the dual-quad equipped Chevy engines during the past couple of years. A fairly hot plug had to be used for town driving to keep the plugs from fouling while a much colder plug was needed for competition or highway speeds. The better plug cooling will permit the same set of plugs to be used in the city and out on the highway.

Now to get to the part a lot of you have been waiting for, Chevy's new 348 cubic inch V8 engine. This is not just a bored and stroked version of the 283 V8 although lots of pieces from the two engines resemble each other. It is entirely new and about $1\frac{1}{2}$ inches longer, about $1\frac{1}{2}$ inches wider, about the same in height and a little better than 100 pounds heavier. You can buy this engine in any chassis except the Corvette and take your choice of two power ratings. Both versions have 9.5 to 1 compression but one has a single four-barrel carburetor and is rated 250 horsepower at 4400 with 355 lbs/ft of torque at 2800 rpm. The other uses three two-barrel Rochester carburetors and is rated 280 hp at 4800 with 355 lbs/ft of torque at 3200 rpm. Both are available with hydraulic lifters only, no high performance cams.

In overall outward appearance, the 348 engine looks somewhat like the 283. The intake manifold is the top engine cover, the distributor is at the rear of the block, the fuel pump is on the lower right front and a few other points are similar but the differences far outnumber the similarities. The block is conventional in that it is made of cast iron and not aluminum, as some of the early rumors had it, but the top of the block is not surfaced perpendicular to the bore. Look at the engine cutaway drawing on page 16 and you will see that the block is surfaced at a 16° angle on each bank. A couple of big advantages are achieved by the angle cut on the block. First, the combustion chamber is in the block, therefore it is completely machined and there are no casting irregularities to cause pre-ignition. (There is a shallow pocket cast around the valve seats in the head.) Secondly, an angle cut across a round bore gives an elliptical shape to that portion of the head which caps the bore and permits valve placement at a more advantageous position for inducting and exhausting gases.

The bore of the 348 is $4\frac{1}{8}$ inches with a stroke of $3\frac{1}{4}$ inches. The crankshaft is forged steel and weighs $61\frac{1}{2}$ pounds, 12 pounds more than the crank in the 283 engine. All five main bearing journals are 2.50 inches in diameter (less clearances) and rod journals are 2.20 inches in diameter, $\frac{2}{10}$ ths of an inch larger on

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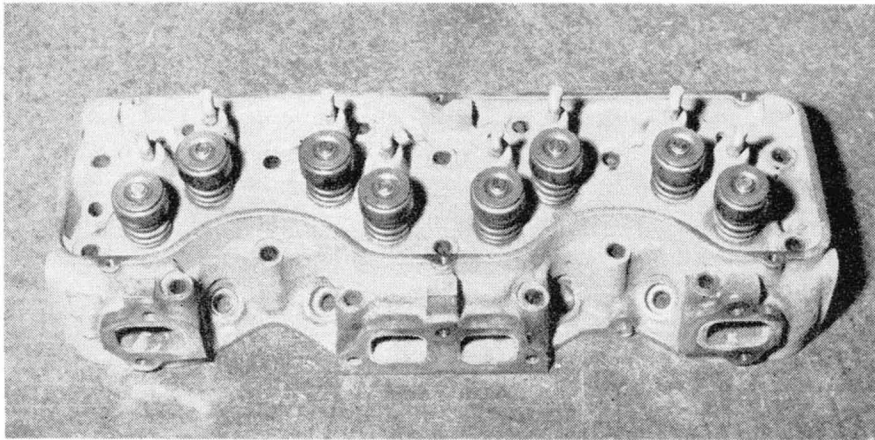
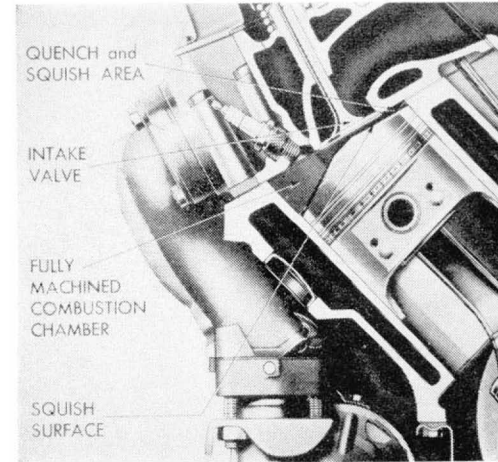
Pent roof piston of 348 engine at top center has a 16° angle on each slope of the piston to match the angle of the block and form a "squish" area that causes high turbulence in the combustion chamber within cylinder. Chamber is fully machined.

both main and rod journals than the 283 engine.

Connecting rods for the 348 are 6.135 inches long, crank journal center to pin center, with a pin diameter of .990 inches. Pistons are Autothermic aluminum alloy with slipper skirts and a pent roof. The top of the piston has a 16° angle on each side so that the upper side of the piston matches the angle of the block cut to provide a squish area. The other side of the pent roof piston forms the floor for

pounds when fully open.

Chevy's lightweight stamped steel rocker arms are used on the new engine but their ratio has been raised to 1.75 to 1 while the 283 engine still uses rockers with a 1.5 to 1 ratio. Rocker arm studs are pressed into the cast iron heads, with hollow steel pushrods maintaining rocker arm alignment by passing through slotted holes in the edge of the heads. Valve lifters are hydraulic, with valve chamber lubrication passing through the hollow



Valves in heads of 348 engine are offset with studs for 1.75 to 1 stamped steel rocker arms used as in 283 V8. Large individual ports are short due to valve location and unrestrictive. Core placement around plug seat provides 270° water cooling of seat.

the combustion chamber. Three rings are used with a chrome top compression ring plus chrome rails for the three-piece oil ring.

The cylinder heads are larger than those used on the 283 and the valves seat in a slight pocket cast into the head to keep them out of the way of the piston on top center. The spark plug also occupies this pocket which is the only portion of the combustion chamber that is not machined. Intake valve diameter is 1.940 inches and the exhaust valve is 1.660 inches in diameter. Both intake and exhaust valve springs are the same, a single spring with 78-86 pounds seat pressure and 184-196

pushrods from the lifters.

Only one cam is available for the 348 engines, and although it looks good on paper, a racing grind should help considerably, especially with the three two-barrel carburetors. The intake valve opens at 29°42' before top center, closes at 78°52' after bottom center. The exhaust valve opens 79°42' before bottom center and closes 36°52' after top center. Total intake valve duration is 288°.

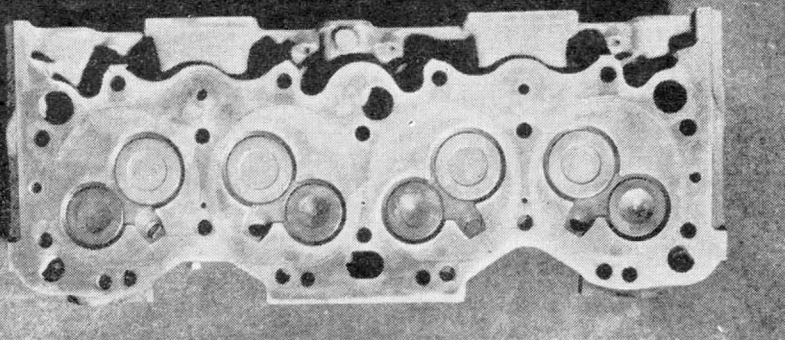
A single Rochester or Carter four-barrel carburetor comes as standard equipment on the 348 engine with triple two-barrel carburetion optional. Fuel injection is not available for the big engine.

The triple carburetion is identical in operation to Oldsmobile's J-2 and Pontiac's Tri-Power triples. Normal fuel distribution is handled by the center carburetor with a vacuum switch tripped by the center carburetor linkage at 60° throttle opening to activate a vacuum diaphragm and open the two end carburetors wide open. With this arrangement, fuel economy is good on the center carburetor with plenty of extra reserve at the driver's command for passing or other high power demands.

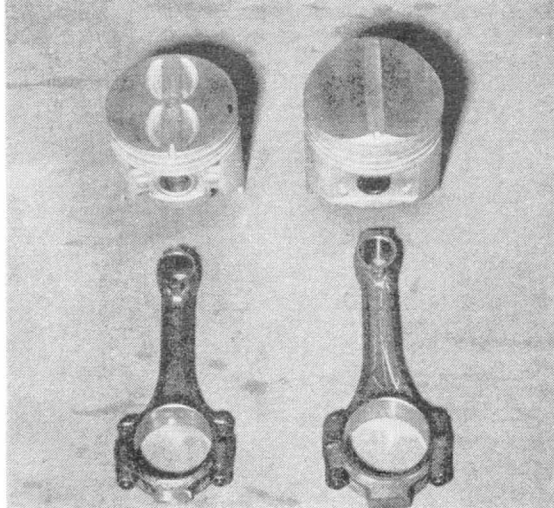
Exhaust gases leave the engine through well-designed cast iron manifolds that have center outlets and hook to dual exhaust pipes, standard equipment on the 348 engined cars. Spark plugs are located above the exhaust manifolds and are grouped in pairs instead of being evenly spaced along the head. Accessibility is very good for plug changing.

Three transmissions are available with the 348 engine: Powerglide, Turboglide and standard shift. You cannot order an overdrive with the 348 engine. Sounds strange but that's the straight scoop. A standard shift, yes, but overdrive, no. Seems as though it disturbs production to have too many engine-transmission power trains—they have 18 combinations now. Too bad because the 348 engine with triple carburetion, stick shift, overdrive and a 4.11 rear axle should make quite an automobile. (Wonder how many potential customers would have to squawk to their dealers to make the overdrive available?)

For the stick shift transmission, a 10.5-inch Borg and Beck semi-centrifugal clutch is used with 1835 pounds of spring pressure. Gear ratios in the standard



1.94-inch intake, 1.66-inch exhaust valves and spark plug tip are recessed in shallow cast pocket of otherwise flat head. Note how elliptical shape of cylinder opening has permitted overlapping of valve for more efficient gas flow. In photo at right, large 4 1/8-inch 348 piston and rod are compared to piston and rod from 283 engine to show size difference.



transmission used behind the 348 engine are high ratio with a 2.21, low; 1.32, second; direct, high; and 2.51, in reverse. Standard transmission ratios with 283 engines are 2.47, low; 1.53, second; direct, high; and 2.80 in reverse. A two-piece driveshaft is used on all models with a center bearing and U-joint mounted in the narrow portion of the X-frame so that the need for a deep driveline tunnel is eliminated with the swinging shaft length reduced.

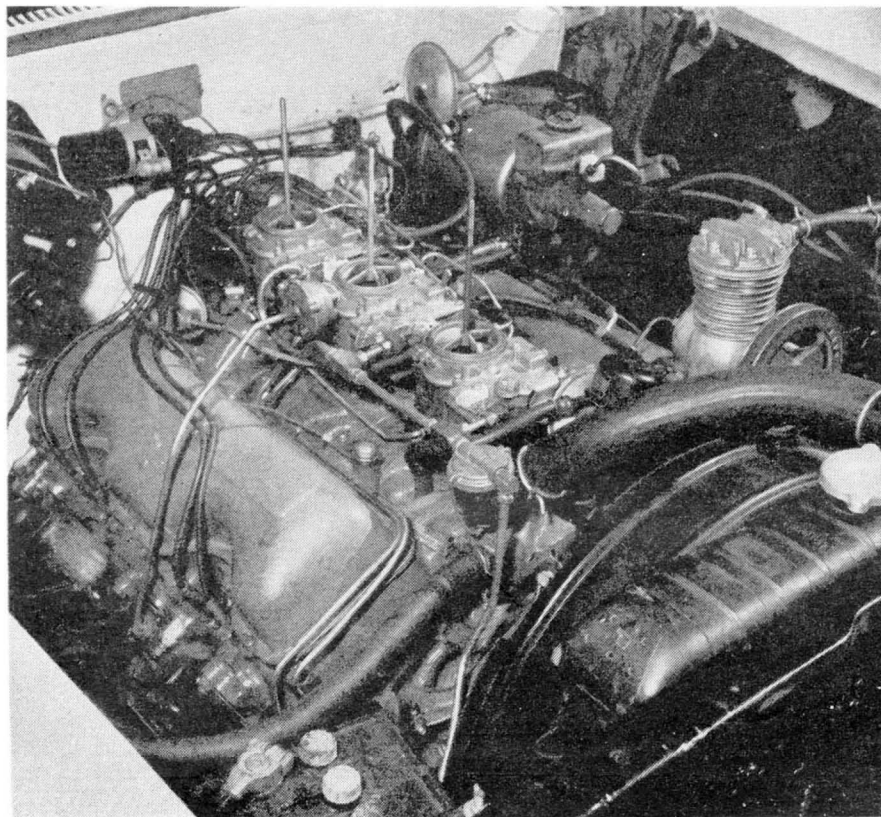
Two automatic transmissions are available for '58, the Powerglide model and the Turboglide, both of which use torque converters with planetary gears. The Powerglide is the more positive of the two with starts automatically made in low range at a ratio of 1.82 to 1, with extra

gearing through converter multiplication. An automatic shift is made into drive gear depending upon throttle setting, with a final cruise ratio of 1 to 1. The triple converter Turboglide has two planetary gear sets with ratios of 2.67 to 1 and 1.63 to 1. In normal operation, the car starts with turbine blade settings in combination with planetary ratios for an initial ratio of 3.8 to 1. As car speed increases, engine speed remains nearly constant with turbine settings changing and smooth planetary clutch shifts taking place unnoticed until a final ratio of 1 to 1 is reached at about 60 mph. Normal cruising range kickdown for passing results in a 1.63 ratio with torque converter multiplication for extra power and a 4.3 to 1 ratio is available for unusual starting con-

ditions. A 2.67 to 1 hill retarder ratio can be selected by the driver but this gear is just what the name implies, a hill retarder only. Attempts at fast starts by using the hill retarder position on the quadrant as a low gear merely produced lots of engine rpm and a severe upshift when the shift lever was moved to drive.

No attempts were made to really turn on the speed when driving the '58 Chevy except for short spurts. All of our driving took place on GM's Proving Grounds near Milford, Michigan, where almost any type of terrain and road condition is available. The acceleration of the 348 engine with triple carburetion and Turboglide transmission was very good and the increased torque supplied by this engine makes the car climb hills like a deer. On one very steep hill in the test area, the Chevy overhauled one of GM's higher priced '58 models with ease although there were four passengers in the Chevy and only a driver in the other make.

Roadability is very good with steering, braking, cornering and engine response on the tight, twisting "handling" course much better than we had anticipated. The '58 Chevy has 2 1/2 inches more wheelbase, nine inches more overall length for a total of 209.1 inches, outweighs its predecessor by around 150 pounds and it is still very agile. Action through severe dips seemed much better than most automobiles with leaf springs and although we approached the car with a critical eye in all departments, we could find very little to criticize. Now it's up to you, the public; do you like the 1958 Chevrolet?



Three two-barrel Rochester carburetors are available as the only option for the 348 engine. Normal operation is on the center carburetor only with a vacuum switch tripped at 60° throttle to open end carbs.