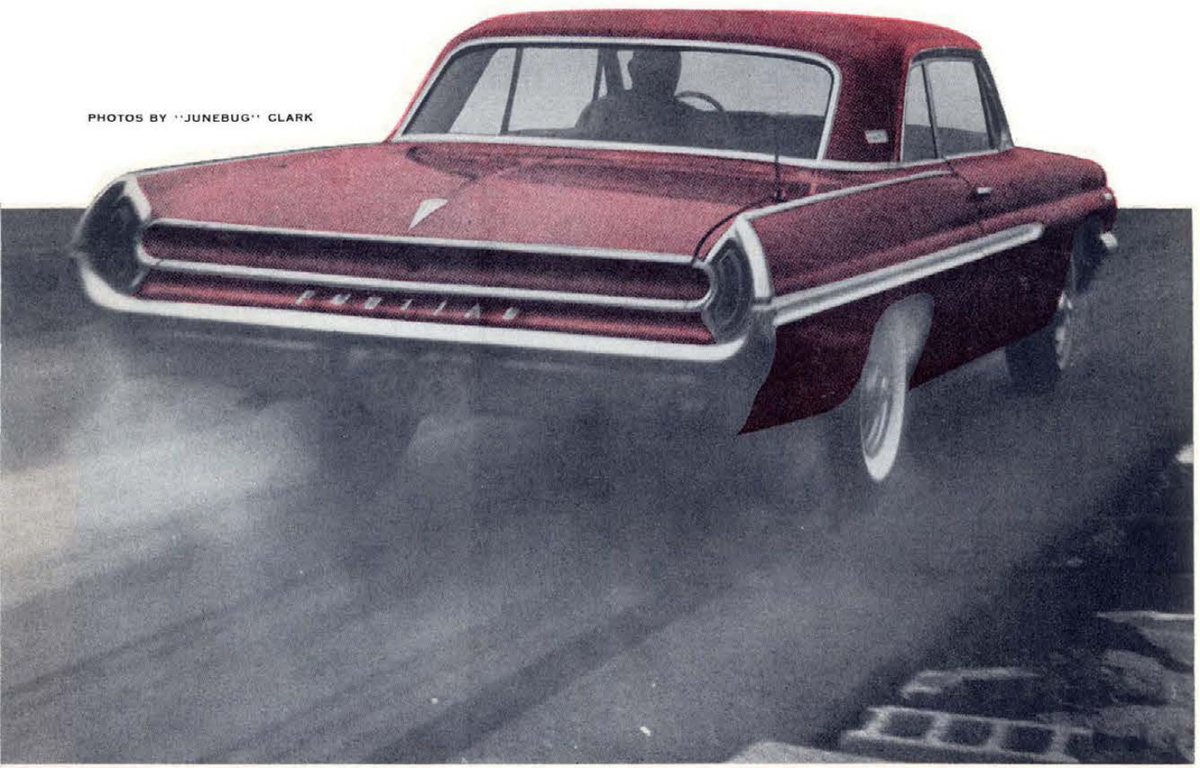
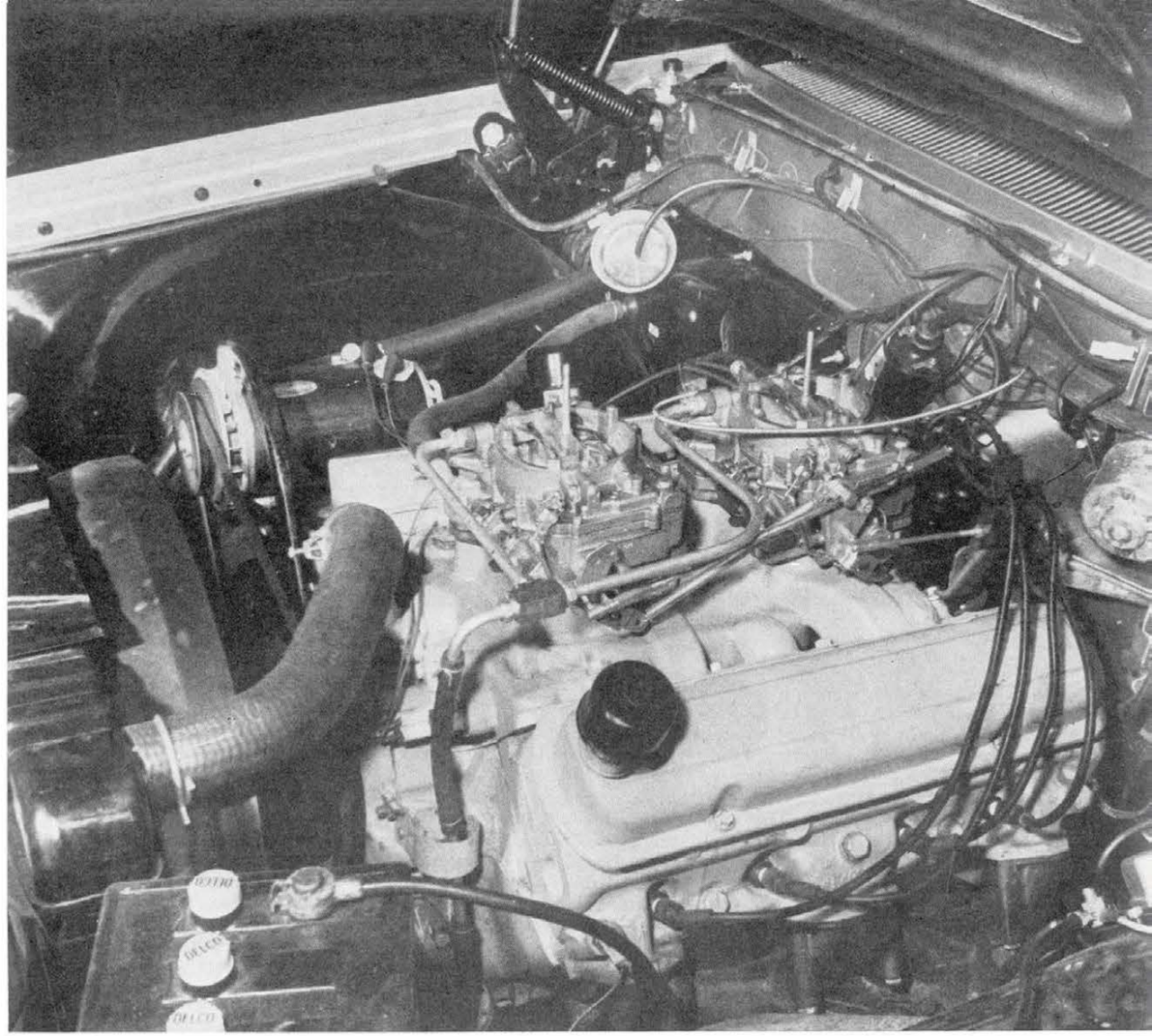
421 PONTIAC

MT Road Test

by Roger Huntington

PHOTOS BY "JUNEBUG" CLARK





THE LIST OF COMPONENTS USED IN THIS FULL-RACE-FROM-THE-FACTORY MILL READS LIKE A CALIFORNIA SPEED EQUIPMENT CATALOG PAGE.

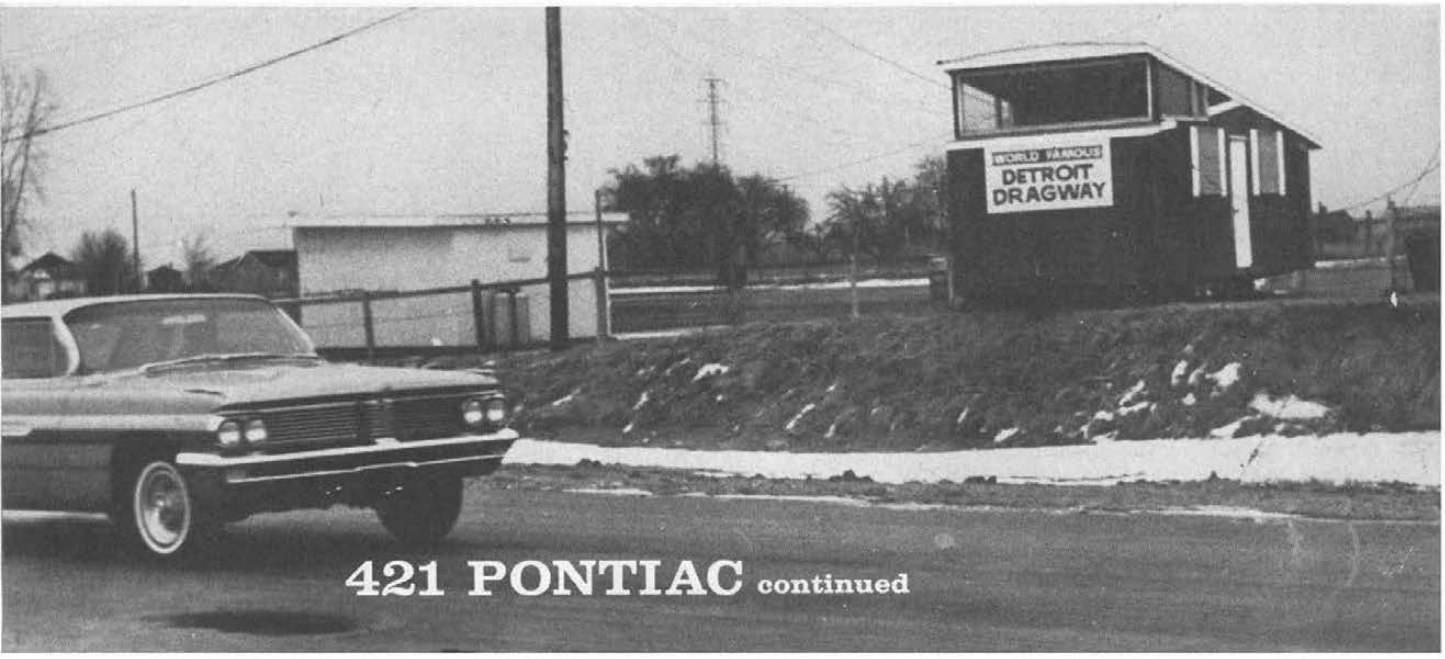
A new factory hot rod that makes fantastic power a buyer's option

JIM WANGERS pulled the big 421-cubic-inch '62 Pontiac Catalina coupe up on the starting strip of the Detroit Dragway, winged the throttle a couple of times and looked over at me. The scene was anything but suggestive of the big blast to come — a cold, gray January day, timing tower all locked up, puddles of ice and water down the center of the strip, a handful of devotees shivering in the background. I fingered my stopwatch. "Ready any time you are."

And *BOOM*. Wangers got into that big Poncho, and we *went*. Low gear was a rubber-burning fishtail, with the indifferent traction available. A snap shift to 2nd at 5500 rpm, and 60 mph came up in a bit over five seconds. The bellowing open exhausts rattled the whole countryside. Second and 3rd gears almost tore my head off. Then across the finish line in high at 5300 — stopping the watch at 13.9 and 107 mph! And finally that delicious back-off, with the exhausts popping and banging, and the wonderful smells of gasoline and rubber and clutch lining!

And here's the joker: This Pontiac *had just been driven off the factory assembly line*, with no more tuning than a spark advance check and valve lash adjustment! Acceleration figures like these are not unusual these days in the Super/Stock classes on our drag strips. But when you can turn them with a car just the way you buy it, you have something to scream about. Think of the potential with a little more tuning and better traction conditions. Pontiac has a fantastic package.

Here's the story . . .



421 PONTIAC continued

IN ITS FRESH-OFF-THE-ASSEMBLY-LINE FORM THE BIG PONTIAC STANDS A GOOD CHANCE OF TAKING STOCK ELIMINATOR AT ANY DRAG STRIP.

In the first place, MOTOR TREND and I were fortunate to be able to get this car for testing so early. It was one of five of the first 421-cubic-inch jobs actually built at the factory, before a supplier strike shut off supply of the long-stroke cranks. Four of the cars (built in December) had gone to professional racing men for Daytona. But the Royal Pontiac people in Royal Oak, Michigan, who have sponsored a big performance program for three years and who seem to have an "in" around Pontiac on this sort of thing, were able to nail the other one.

The car was supplied through the cooperation of their performance sales expert, Dick Jesse. It was tuned and set up by Royal's performance specialists, Frank Rediker and Jack Kay. I asked Jim Wangers to drive because of his experience with four-speed Pontiacs. (You'll recall he won top stock eliminator at the 1960 N.H.R.A. Nationals with one of Royal's cars.) This crew really made the road test jump!

I should point out that a "super-duty" package like this off the Pontiac assembly lines is something brand new. They have always steered away from offering their hottest equipment options off the line because of service, assembly and adjustment headaches. Up until December the hottest Pontiac you could order complete had the 348-hp Trophy engine with hydraulic lifters. If you wanted anything hotter you had to buy the parts over the counter and assemble the combo yourself. What changed the picture was the new N.H.R.A. rule that all stock-class cars must be available *as is* off the factory assembly lines. Over-the-counter equipment must run in a separate "Factory Experimental" class.

So the Pontiac people have followed Ford and Chevrolet off the deep end, with all-out *racing cars* assembled at the factory — and warranted just like normal cars. There are two packages, both available only in the Catalina two-door hardtop or sedan series. One is aimed at NASCAR track racing and will have the 389-cubic-inch block, single four-barrel carb on a cold aluminum manifold, and 3.42-to-1 rear end gears. (The 389 block is used because the Pontiac engineers are not sure how the long-stroke engine will stand up at continuously high rpm on the fast, banked speedways.) The other package is designed strictly for drag racing, with the big 421 engine and all the goodies — dual four-barrel carbs, close-ratio four-speed with Hurst floor-shift linkage, and 4.30 gears with "Safe-T-Track" limited-slip. This is the car we tested.

More specifically on the equipment: All late 421 blocks are coming through with .030-inch overbore, so this engine actually had *428* cubic inches. Cylinder heads are the '60-'61 high-performance type with 1.92-inch intake valves and 1.66 exhausts, bigger ports, undercut valve heads, and 1.65-to-1 rocker arm ratio to give high valve lift without excessive acceleration of the lifter-pushrod mass. The cam is the No. 10 McKellar solid-lifter job, giving 308 degrees intake duration and 320 degrees exhaust. The factory recommends a maximum of 5500 rpm with the standard dual valve springs.

The lower end of the engine is pretty well beefed up, with special heavy-duty connecting rods, Moraine aluminum bearings, Mickey Thompson forged pistons (giving 11.0-to-1 compression ratio), four-bolt main bearing caps, heavy-duty oil pump and six-quart pan, light flywheel with heavy-duty clutch and clutch countershaft.

The engine is set up loose for minimum friction. Pistons have a fantastic .009-.013-inch skirt clearance, .002-.003 bearing clearance, with .030-.035 side clearance on the rods. The pistons sound like a boiler factory when you start up cold — and the slap is only slightly less when warm! But it *runs*!

The carbs are big Carter AFB four-barrels that mount on a beautiful big-port aluminum manifold that *does not* have provision for exhaust heat in cold weather. A manual choke is provided. This, plus the fact that the special dual-point distributor has no vacuum advance, makes the car not really very suitable to drive on the street. You can get there and back, but it's like driving a racing car in traffic. The straight mechanical throttle linkage can overcarburate at the low end, too — no problem on the strip, but not the best on the street.

Incidentally, they use a lot of spark advance on this engine: The factory recommends an initial setting of 10 crank degrees, with another 27 degrees in the distributor — giving a healthy 37 crank degrees advance at the top end. The Royal mechanics frequently use five to ten degrees more on the initial setting. The engine seems to thrive on it.

The exhaust system deserves special comment. The unique "pulse-flow" dual-outlet cast-iron exhaust headers used for the last two years (where you have cylinders on each bank paired into two outlets so that exhaust pulses do not overlap) have been redesigned with huge *three-inch* outlets, two on each side. Then we have a special casting that bolts to the header outlet flange, with a three-inch opening on one side and an adapter for a 2.25-inch exhaust pipe on the back. The side open-

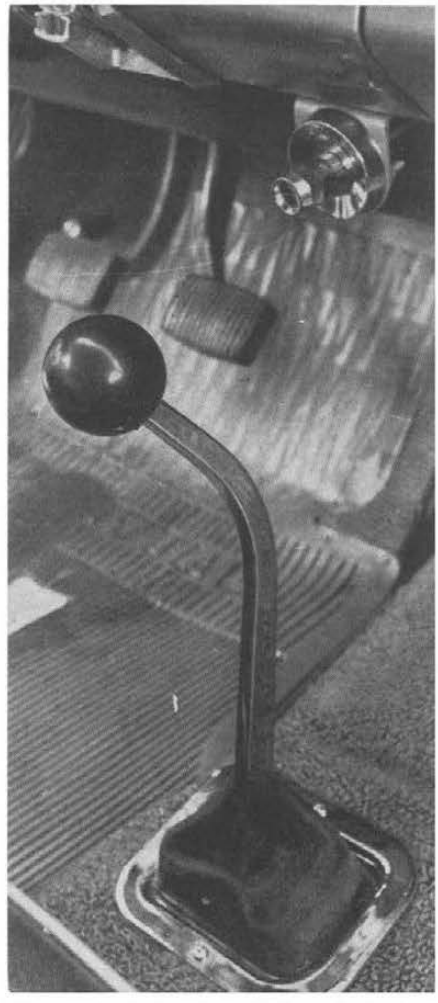
ing can be uncapped to free the exhaust at the drag strip. In other words, we have a factory "lakes by-pass." (Who could have predicted it ten years ago?) When capped we put the exhaust through dual low-restriction mufflers that give a maximum of quieting with minimum backpressure — very efficient.

The above engine and four-speed transmission package carries a list price of $1342.85 over the standard V-8 engine and three-speed transmission. In addition, our test car had several other extra-cost options, including heavy-duty radiator, battery, stiffer springs and shocks, Kelsey-Hayes aluminum wheel-drum units, radio, heater, interior decor group, etc.

About the only options you'd really *need* for the drag strip (other than the engine-transmission-rear axle package) would be the heavy-duty springs and shocks — which list at only $3.82. This would save weight as well as money. Our test car weighed 4070 pounds without passengers and a full tank of gas. You should be able to strip 250-300 pounds off for racing, maybe more.

But to the performance test . . .

To begin with, our using Gil Kohn's Detroit Dragway for this test had both advantages and disadvantages. The big advantage was that we could uncap the exhaust, which wouldn't have been possible even on our isolated test areas on public roads. The big disadvantage was poor traction. The strip had recently been covered with ice and snow, was dirty, and bite was nowhere near as good as under normal drag strip conditions — or even as good as a concrete highway. So the Royal team threw on a set of Goodyear 9.00 x 14 soft recaps, and added about 150 pounds of ballast in the trunk. This helped a lot — but the car never bit very good off the line. Also it put our test weight up just under 4500 pounds, which didn't do anything for the speed at the end of the quarter.



The unbeatable Hurst-Campbell floor shift and heavy-duty linkage setup is standard equipment with the four-speed box and 421 engine combination.

Here's a recap of the acceleration figures under these conditions:

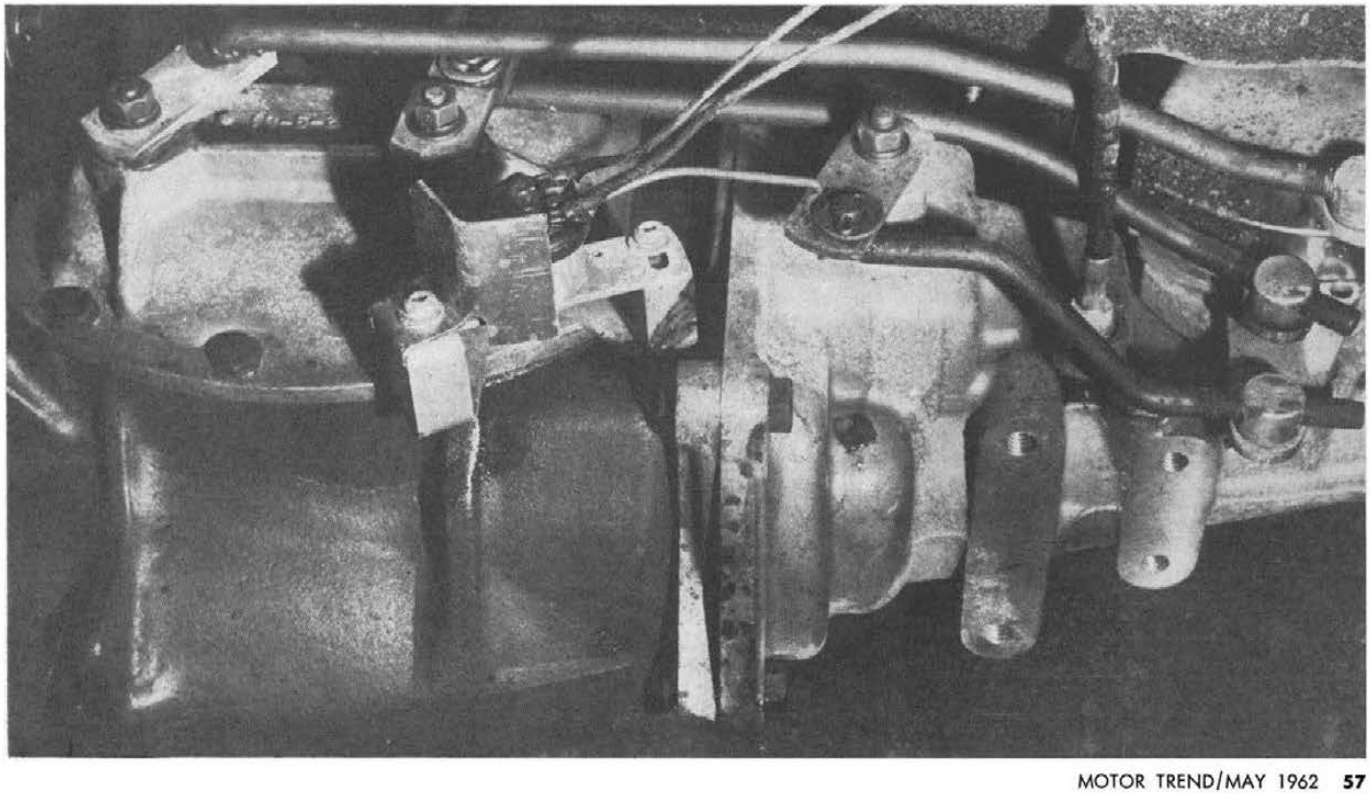
0-30 mph .....2.7 secs.
0-45 mph .....4.1 secs.
0-60 mph .....5.4 secs.
Quarter-mile ....13.9 and 107 mph

Wangers took it through the quarter once alone, without hand-timing and with the ballast out, and the tachometer indicated 109-110 mph. Keep in mind also that hand-timing with a stopwatch gives a bit different e.t. figures from the electric-eye timing at a drag strip.

My timing technique is to start the watch the instant the driver pops the clutch and punches the throttle, which is an instant before the car actually *moves*. With electric timing the car is *rolling* before it breaks the first light beam. I have found that this makes a difference of .2 to .3-second on e.t. for the quarter. In other words, with regular drag strip timing we would have been turning e.t.'s of 13.6 and 13.7 in this test.

I have no doubt that the potential of this car — under optimum conditions of strip surface, weather conditions, engine and chassis setup — would be e.t.'s around 12.5 and 112-115 mph! (And this would correspond to 0-30 times around two seconds flat, and 0-60's around 4.5!)

What shook me up more than the acceleration figures on the car was the *horsepower and torque* that it put out. The



421 PONTIAC continued

TEST CAR CAME EQUIPPED WITH CLOSE-RATIO CORVETTE GEARS, 4.30-TO-1 REAR AXLE AND ALL THE HEAVY-DUTY SUSPENSION OPTIONS.

factory rates this combination at 405 hp at 5600 rpm, and a maximum of 425 lbs.-ft. of torque at 4400 rpm. I took a series of accelerometer readings at various speeds in 3rd gear, and calculated out the true horsepower curve *at the clutch*. The peak was a fantastic *465 hp* at a crankshaft speed of about 5300 rpm — and the peak torque was *510 lbs.-ft.* at 3500! I didn't want to believe it either. But there it is. The accelerometer doesn't lie, as long as you feed correct speed and weight figures into the formula. I'm very confident of these figures within 10-15 hp.

Undoubtedly the cold air temperature (around 35°F) and open exhaust had a lot to do with it. The Pontiac advertised power figures are corrected to 100 degrees, under the GM "Test 7" code — and the difference of air density here would make a difference of around 30 hp. The Test 7 code doesn't call for mufflers, but our exhaust system might have been more efficient than the factory dyno system. I took a flash accelerometer reading at 5300 rpm with the exhaust outlets capped, and calculated 420-425 hp. That is, we were losing about 40 hp in the mufflers. So maybe that 460-465 *is* possible after all. I know it is possible to get more flash horsepower with an engine *in a car* than is generally possible on the dynamometer stand, running at constant speed.

One other important point on the engine: The power falls off very rapidly beyond 5400 rpm. A flash accelerometer reading at 5600 rpm showed that we had dropped approximately *100 hp* between 5300 and 5600! It felt almost as though you had shut off the fuel or ignition. And yet there was no sign of a miss or bucking.

A conference with Pontiac engineers solved the problem. It turns out that lower-tension dual valve springs from the 348-hp 425A engine are installed on these Super-Duty 421's at the factory, to prevent excessive camshaft lobe wear during the initial break-in. (After break-in you are instructed to install the regular springs.) Anyway these springs don't have the pressure to force the valves to follow the radical contours of the No. 10 McKellar cam above 5500 rpm. You don't get into a serious valve crash situation, but the power drops off pretty fast. With the regular Super-Duty springs, the Pontiac engineers say the engine should wind to 6200.

They also admitted that the '60-'61 high-performance cylinder heads, originally designed for the 389-cubic-inch block, didn't have enough valve and port area to feed the extra cubes of the new 421. The drop-off in power above 5600 rpm is steeper than it should be, even when the valves are working perfectly. It's obvious that another 20-40 hp could be available in this range with relatively minor head design changes. These new heads are now in the works. They've been designed and dyno-tested and are being tooled. They will be installed on assembly-line 421's as soon as possible. This might be the gimmick that will give us those 500 honest horses and that 115 mph in the quarter!

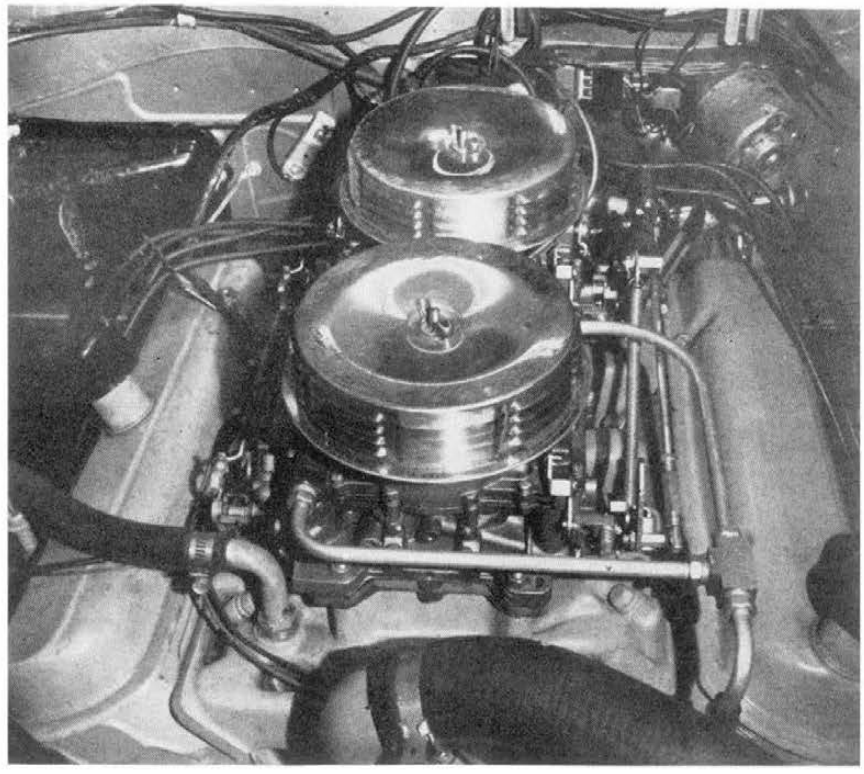
In conclusion, a word on the chassis: The close-ratio Corvette gears in the Warner four-speed (2.20 low, 1.66 in 2nd, 1.31 in 3rd) seem to be definitely better than the wider-ratio gears when used with 4.30 or 4.56 rear end gears on the drag strip. You've got all the starting ratio you can use, and the narrow rpm drop between gears is very important when you have to shift right near the peak of the horsepower curve, as we did with the light valve springs. We shifted at 5400-5500 rpm, and the tach dropped back to only 4200 in the next gear. When you have a very broad, round peak on your power curve — and if you can wind *beyond* the peak in the gears — the close-ratio gears aren't so important. But I imagine this 4.30 axle combination with Corvette gears will still be the most popular with 421 owners.

Pontiac is installing the Hurst-Campbell floor-shift linkage as standard equipment on this package — and I'm glad to see it. I'm glad to see them willing to spend extra money for quality parts in this critical area. It's unbelievable how some of these drag strip drivers can punish a shifting linkage with their lightening-quick speed-shifts. Standard factory linkages (and even lower-quality conversion kits) can bust up like taffy under this pounding. I've seen them. You need brute *beef* here — and the Hurst linkage has it. And yet it works as smooth and quick

as grease. It's an ideal finishing touch to this out-and-out drag strip package.

I can't over-emphasize the importance of ordering the optional heavy-duty springs and shock absorbers with this package. They should have made them standard equipment. Any car with the weight/horsepower ratio of this one, with flabby standard-equipment springs and shocks, will dip and dive and bob and lurch all over the place when you blast off the line or throw a fast shift under full power. Our test car had the stiffer suspension, and it was real steady under hard acceleration. The nose hardly lifted and there was little heeling of the body due to torque reaction.

I must say this new 421 Pontiac is a terrific piece of automobile. I'm still shaking!! /MT



A series of accelerometer readings showed horsepower peak, available at the clutch, to be 465 at 5300 rpm, with 510 lbs.-ft. of torque at 3500!

PONTIAC CATALINA

2-door, 6-passenger hardtop

OPTIONS ON CAR TESTED: 421-cubic-inch engine, 4-speed transmission, heavy-duty suspension, heavy-duty radiator, aluminum wheel/drums

PRICE AS TESTED: $4895.56 (plus tax and license)

RECOMMENDED ENGINE RED LINE: 6000 rpm

PERFORMANCE

ACCELERATION (2 aboard)

0-30 mph.....2.7 secs.
0-45 mph.....4.1
0-60 mph.....5.4

Standing start ¼-mile 13.9 secs. and 107 mph

Speeds in gears @ 5600 rpm

1st .....51 mph 3rd..... 89 mph
2nd .....70 mph 4th.....116 mph (est.)

Speedometer Error on Test Car

Car's speedometer reading.....	31	47	53	63	73	83
Weston electric speedometer....	30	45	50	60	70	80

Observed miles per hour per 1000 rpm in top gear.....20.5 mph

SPECIFICATIONS FROM MANUFACTURER

Engine
Ohv V-8
Bore: 4.09 ins.
Stroke: 4.00 ins.
Displacement: 421 cubic inches
Compression ratio: 11:1
Horsepower: 405 @ 5600 rpm
Torque: 425 lbs.-ft. @ 4400 rpm
Horsepower per cubic inch: 0.96
Weight-to-power ratio: 10.04:1
Ignition: 12-volt coil

Gearbox
4-speed, all-synchro; Hurst floor shift (dual pattern)

Driveshaft
Open tube — single

Differential
Hypoid — semi-floating
Standard ratio 4.30

Suspension
Front: Coil springs with upper and lower control arms; direct-acting 2-way shocks and heavy-duty stabilizer bar.
Rear: Coil springs; direct-acting 2-way shocks, torque being taken by control arms; heavy-duty stabilizer bars.

Wheels and Tires
Steel disc — 8 bolt
9.00 x 14 4-ply tires

Brakes
Hydraulic, internal expanding 2-shoe, single anchor. Ribbed aluminum air-cooled drums, with bonded cast-iron braking surface.
Front and rear: 11 x 2.50 ins.
Effective lining area: 173.7 sq. ins.

Body and Frame
Perimeter type — boxed
Wheelbase 120 ins.
Track, front 62.5 ins., rear 62.5 ins.
Overall length 211.6 ins.
Curb weight 4070 lbs.
Steering 4.25 turns lock-to-lock