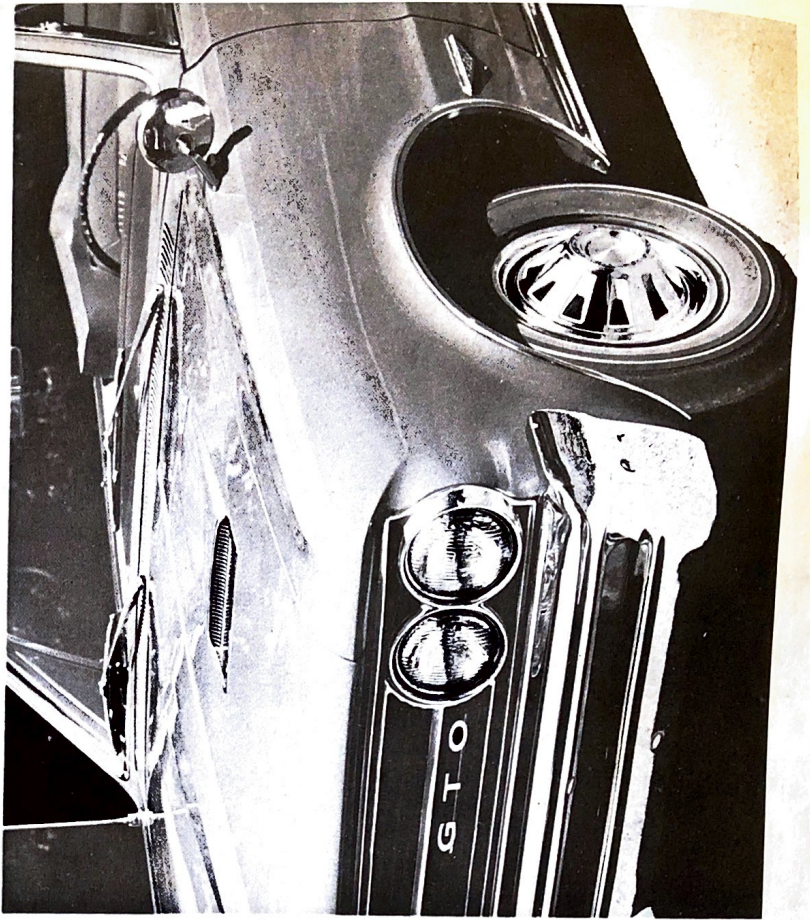
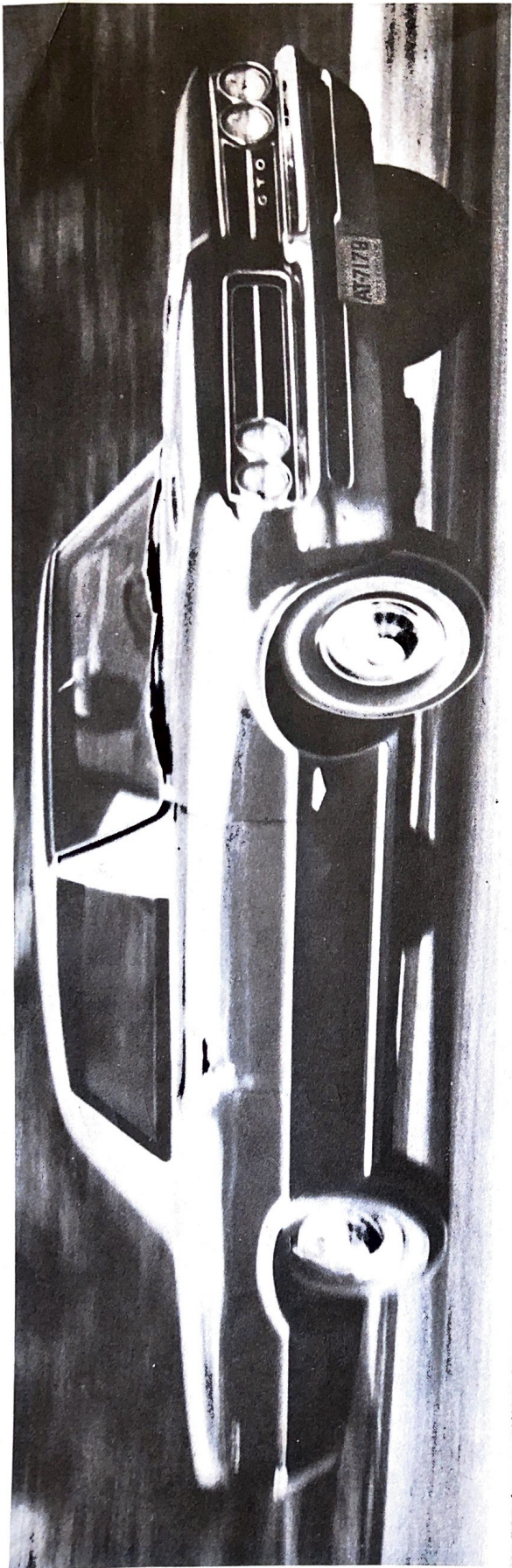


PONTIAC GTO

AMERICA'S PREMIER SUPERCAR



By Martyn L. Schorr



CONTENTS

HISTORY OF THE GTO 1964-1974	4
1964	8
1965	10
1966	12
1967	14
1968	16
1969	19
1970	22
1971	25
1972	28
1973	30
1974	32
DRIVING THE 1965 GTO	34
PONTIAC PERFORMANCE HISTORY	37
TOPCAT TUNING	45
THE RAM AIR MYSTIQUE	49
STREET PERFORMANCE GUIDELINES	52
BASIC GTO BLUEPRINTING	55
TURNING ON THE TURBO-HYDRO	56
THE SUPER-DUTY 455 ENGINE	58
DYNO TUNING THE 455 GTO	60

SPECIAL THANKS: To Craig Henderson and Kern Overstock, H-O Racing Specialties, P.O. Box 429, Hawthorne, California 90250 for the street performance guidelines on Pg. 52 and to Motion Performance, 598 Sunrise Highway, Baldwin, L.I., N.Y. 11510 for the dyno-tuning and specialty car data supplied throughout this book. Plus special thanks to Fred Mackerodt and Judy Siff at Pontiac Public Relations for their help in assembling the year-by-year documentation on 1964 to 1974 models. Pontiac performance freak Joe Oldham compiled the historical articles on the history of the GTO, history of Pontiac performance and the piece on driving the GTO.

Copyright 1978. All rights reserved Performance Publications. Edited by Martyn L. Schorr. Prepared and produced by Performance Media. Performance Publications, 2159 Grand Ave., Baldwin, L.I., N.Y. 11510. 516-223-3117.



HISTORY OF THE GTO

1964-1974

Legend has the conception like this:
The scene is Pontiac General Manager Pete Estes' office. The time is very early 1963. The man walking through the door is Jim Wangers, Pontiac account executive for MacManus, John and Adams, the Pontiac advertising agency. Wangers is also an avid performance enthusiast, drag racer and part-time product planner for Pontiac.

"Have you seen the memo, Jim?" Estes asks.

"Yeah. No more racing. Why don't those guys tend to their corporate stuff and leave the details to us," Wangers says. "Look, Pete, with no more racing, that means no more Super Duty 421 Catalinas and that means no more performance image to the young guys who are buying our cars. We've got the image now and I don't want to lose it. Remember, it's the young guys who have pushed us into third place in sales and they're the guys who are keeping us there."

"I know that, Jim. We've got to do something. But what?" Estes asks.

"Look, I've got this crazy idea. It may work and it may not. I think we should give it a try," Wangers says.

"What's the idea?"

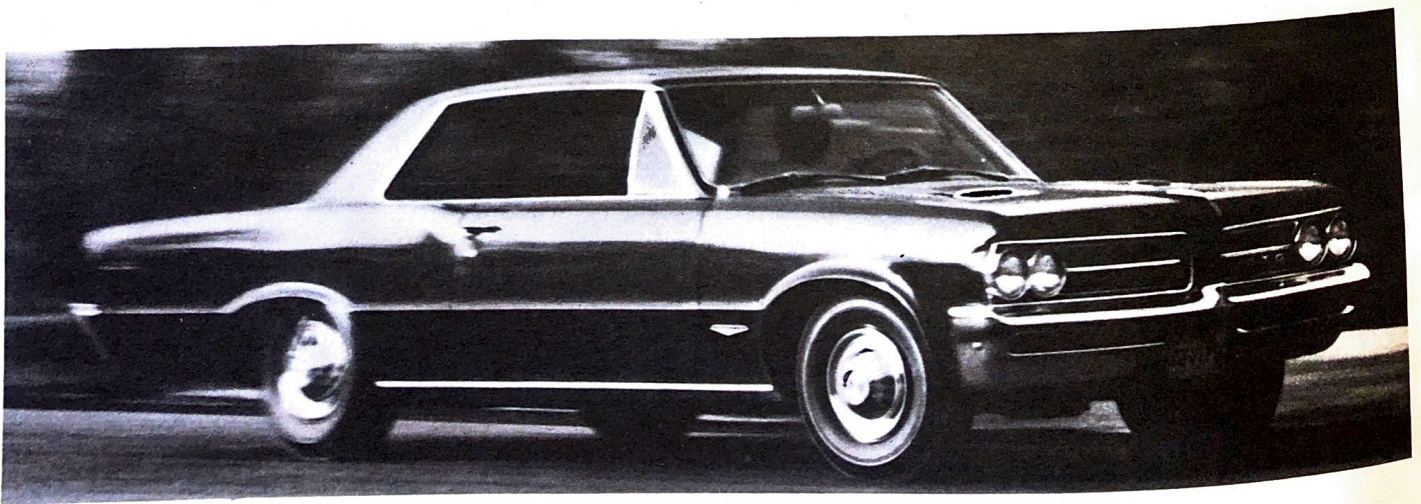
"It's just an old hot rodder's trick but I think it could work. An engine swap," Wangers answers.

"What?" Estes is puzzled.

"Look," Wangers goes on, "we've got the new intermediate A-body series coming out in the fall. Our Tempest will be a compact size with a nice 115-inch



1965



wheelbase. Instead of offering just the 326 engines, let's drop in the big 389s from the full size cars, put on some heavy duty suspension components and call it something with a racing connotation, something like...GTO—like the Ferraris."

"You're crazy," Estes says. "The GM front office just gave the word. No racing. They'll never go for it."

"That's the beauty of it," Wangers explains. "We won't be racing it and we're not building a race car. We're building a high performance street machine. There's a big difference. And besides, we don't exactly have to yell about what we're doing. Let them find out after the model is out."

"What about the engineering side of it. Will it work?" asks Estes, a former Pontiac chief engineer.

"I'm almost positive it'll work, Pete," says Wangers. "But let's call John and make sure." A call is put through to John DeLorean, Pontiac chief engineer. Estes outlines the plan.

"Well, what do you think John? Can it be done?" asks Estes.

"No sweat," answers DeLorean.

And so, the '64 Pontiac GTO is born.

And with it grows a legend and a whole breed of car that was to completely dominate the automotive industry until the safety, insurance and emissions advocates sounded the supercar's death knell in 1971.

Those were some cars, those early GTOs. Buyers recognized it, too. Original production plans called for about 5000 units just to test the market. But by January 1964, hardly into the model year, 10,000 had been sold and dealers were happily compiling waiting lists of performance-happy customers who couldn't wait to get their hands on one. By the end of the model year, there 32,450 proud GTO owners.

The '64 GTOs had either the standard Bonneville engine—389 cubes, 325 horsepower with a single 4-barrel Carter AFB, 273/289 camshaft—or the same engine with three 2-barrel Rochester carburetors which raised the output to 348 horsepower. Other goodies you could order were a 4-speed trans, a brace of rear axle gears, optional suspension stuff on top of the already stiffer standard GTO setup, and all the other comfort, convenience and performance options that had made Pontiac's option list the envy of the industry.

In 1965, Pontiac increased the rating of the standard 4-barrel engine to 335 horsepower but brought out a real goodie of an engine option. It was still 389 cubes, but a new cam that had 292 degrees intake duration, 302 degrees exhaust duration and more streamlined cast iron exhaust headers added up to 360 big ones. And they meant it. Those weren't just paper ponies. In the May 1965 issue of *Car Life* magazine, Roger Huntington took some of his famed accelerometer readings in a 360 horsepower GTO and found that the car was being propelled by 345 actual horsepower at the clutch. And the true torque reading was 420 lbs./ft. compared to the factory rating of 424 lbs./ft. By the way, that issue was the first time the word "supercar" was used to describe the new breed of big-engined intermediates.

In addition to the straight engine stuff, there was also a ram air, fresh air package offered late in the model year. To cure the braking problem—GTOs still used the pitifully small 9.5-inch Tempest drum brakes—Pontiac offered finned aluminum drums with harder organic linings. For still more abusive driving, they also carried over the metallic lining option.

One of the best parts of the whole scene in 1965 was prices. We thought they were high then, remember? In '65, the list price of a base GTO was \$2556. That's right, \$2556! A loaded GTO with the optional 360 horsepower engine, 4-speed transmission, power steering, power brakes, metallic brake linings, rally wheels, Safe-T-Track

limited slip differential, heavy duty suspension, seat belts, custom steering wheel, rally gauges including tachometer, tinted glass, padded dash and AM radio listed at \$3579, which means you could have probably bought the car for around \$2800! Now *that* was a bargain. Those were the good old days.

They say that the '65 GTO was the fastest GTO ever. They may be right. The '65 body was still like the lean, taut original '64 body style. Fully loaded, the car weighed just over 3400 pounds. One thing was certain. The street guys were really into the car now, buying 75,352 of them in '65.

In '66, Pontiac made some improvements to the engine. They went to larger carbs on the tripower option, now using Rochester 2GC carbs at all three locations. There was also a cold air package on top of the tripower setup. The single 4-barrel engine was unchanged, still rating 335 hp at 5000 rpm and 431 lbs./ft. of torque at 3200 rpm. The tripower engine was still rated 360 hp at 5200 rpm and 424 lbs./ft. of torque at 3600 rpm despite larger carburetors. Even the optional ram air setup didn't change the horsepower rating in Pontiac's opinion.

Naturally, this made it easier for GTOs to dominate their class at the drags since the engine was actually putting out damn near its advertised horsepower. Few other companies were smart enough to do this with their horsepower ratings until a few years later. This gave Pontiac a tremendous advantage in NHRA stock class competition.

But more horsepower wasn't the big story for '66. It was the new body style and it was a good one. It looked sharp and 'now' and youthful and sporty and luxurious all at the same time. It was everything any young man could want in an automobile. And they accepted it. In spades.

Pontiac sold 96,946 GTOs in 1966, still the largest sales year in the GTO's history. But the bigger, heavier body was the beginning of the GTO's girth problem. The new body added size, weight and rear overhang. As a way of reducing weight, you could special-order a '66 GTO with all the sound deadener and sealers removed. This saved a lot of scraping if you were going racing, but made for a leaky car that rattled on the street. It was still to no avail. The '66 GTOs were up around 3650 pounds and climbing—almost the weight of a full-size '62 Catalina.

Halfway through the '66 model year, there was another in what seemed like an endless series of GM front office crackdowns on racing and performance. This time they were serious. No more super performance options. No more multiple carburetion setups. No more racing-oriented advertising. And most of all, no more drag racing of factory backed cars, even if the factory backing was out the back door.

So the '67 GTO actually marks the beginning of the marque's de-emphasis on all out performance. Gone was the tripower engine option. Now, the hottest setup available was a single Rochester Quadrajet on a high rise intake manifold. But all was not lost. Pontiac saw fit to drop the 389 engine and introduce an enlarged, bored out version which displaced 400 cubic inches. In addition many new engine pieces had been developed since '64 and were all introduced in a group on '67 engines. For one thing, a new set of cylinder heads were designed. The heads were sorely needed and replaced the antique heads which were originally designed for the '55 287 cube V-8. The new heads sported clean combustion chambers and ports, 2.11" intake valves and high flow capacity. Pontiac felt that the increase in displacement plus the new heads warranted a retention of the 360 hp rating despite the drop from three 2-barrels to one 4-barrel carb. The 360 hp was the high per-



formance option with the HO cam, long branch exhaust manifolds, etc.

But Pontiac wasn't done at that. Halfway through the model year, they introduced a completely new ram air package which not only had a fresh air intake system but all kinds of special internal components packed into the same 400 cubes. A special block with 4-bolt main bearings and Moraine 400 bearings were used along with forged rods and pistons, lightened, swirl polished valves, stiff valve springs and a ram air cam with 301/313 degrees duration. Pontiac, smart to the end, rated the new engine 360 hp at 5400 rpm and 438 lbs./ft. of torque at 3800 rpm. That's right, with all those extra goodies, they kept the horsepower rating at 360.

Styling of the '67 was similar to the '66, only cleaned up. There were less loose pieces of chrome and less gimmicks. The '67 is still considered one of the cleanest looking GTOs ever. The public responded by purchasing 81,722 of them.

As we said, by '67 the ram air packages had developed into something really special around Pontiac. It was another instance of Pontiac leading the industry. They had discovered the 10 percent boost in power with cold air before anyone else and exploited it to the fullest. Not only was the ram air package a status symbol around the drive-in, it really worked because it included the above mentioned specific internal engine parts that were completely different from the standard engine packages. And Pontiac played the horsepower rating game to the hilt. Both the standard high performance, or HO, engine and the ram air engine were called 360 horsepower. Despite the identical horsepower ratings, obviously the ram air engine was much stronger. Yet both engines ran in the same class according to NHRA rules. It was situations like this which finally forced NHRA to factor horsepower ratings.

We can personally attest to how strong the '67 ram air GTO was because the staff here at Cars ran one all year in open competition. The car was originally set up and prepared by Royal Pontiac, then sent to New York where Motion Performance put the final tune on the car and maintained it all year. Driven by the former editor of CARS, Marty Schorr, the car racked up an impressive number of wins in the B/SA class at many strips all over the East Coast.

The '68 GTO was all new from the chassis up. *Motor Trend* recognized its unique qualities of luxury, performance and great styling by naming it Car of the Year for '68. Sales rose to 87,684 for '68 but the complexion of the car had changed in the transformation and it would never be the same again. The '68 GTO was on a 112-inch wheelbase, down from the 115 of previous years. And if anything,

the styling was more sporty than ever before. But the car had crossed into that nether world of being more luxurious than performance oriented and it would remain so till 1974. The engine lineup remained unchanged for '68, as all the available money went into the new body and chassis.

One of the neat things about the new '68 GTO body was its Endura front end. It was a rubber-like polyurethane material painted the same color as the body so that it looked like the car had no front bumper. Really racy. In awarding the Car of the Year award to the GTO, *Motor Trend* termed the GTO's bouncy bumper "the most significant achievement in materials technology in contemporary automotive engineering."

Halfway through the '68 model run, Pontiac introduced a completely revamped ram air package that really put out the ponies. Strangely enough, they called it the '68½ Ram Air package. The '68½ Ram Air engine rated 370 horsepower at 5500 rpm and 445 lbs./ft. of torque at 3900 rpm. This was still on the 400-cube block. The engine used a 308/320 hydraulic camshaft with 1.50 rocker arms, superbeef throughout, light valves and new heads with round exhaust ports for much better breathing.

The 1969 car was unchanged from the award winning '68 except for some minor trim shuffling. And the engine lineup was almost unchanged at the beginning of the model year. The HO engine was now called the Ram Air III because it had open scoops on the hood. The rating was now 366 hp at 5100 rpm. Midway through the model year, Pontiac made two changes. First they added the Judge model to the car lineup. The Judge was a gimmick-ridden GTO with a wing on the back and bright orange paint and strips. This was at the height of popularity of Rowan and Martin's "Laugh In" TV show. Probably at the time, the name sounded good. But through the miracle of hindsight, we all know that the name and the car were both lead balloons.

In the performance department, the '68½ Ram Air package was updated slightly and called the Ram Air IV engine for '69. New heads gave better breathing and 1.65 rocker arms replaced the 1.50s, to give a full .520" lift to the valves. Horsepower and torque ratings were unchanged, however.

In all, 72,287 GTOs were sold. And while the Ram Air IV engine package made the '69 GTO among the hottest Detroit street machines, it frankly lacked the brute performance capabilities of such competition as the Mopar 426 Street Hemi, the 427 and 428 Fords, and all kinds of other street beasts which, by now, were as common as rubber shorts in a gay bar.

In 1970, the full



safety/insurance/emissions blitzkrieg was on and all performance cars were suffering. As such, Pontiac initially ignored the engine compartment and turned its attention to the handling of the GTO. Frankly, the GTO had fallen behind its competition in this area, continuing to offer relatively skinny 70-series tires and neglecting other suspension innovations that other intermediates had already been using. For '70, a much needed rear sway bar was added. The width was 7/8" in diameter in standard form but an optional handling package was available on all GTOs. It included fast, variable-ratio power steering, G60-15 white lettered tires on 15x7 wheels, high rate springs and shocks and 1-1/8" front and rear antiroll stabilizer bars. This package put the GTO on a par with anything in its class and then some. The engine lineup for 1970 was as follows:

The standard engine was the 400-cube, 350 hp, 4-barrel engine with 10.25 compression ratio. The exact rating was 350 hp at 5000 rpm and 445 lbs./ft. of torque at 3000 rpm. The Ram Air IV engine was still available but was played down and was only a limited production option. The Ram Air III engine was also available and still rated 366 hp at 5100 rpm. Near the end of the model year, both Ram Air III and IV engines were dropped and the optional engine became a 455-cubic-inch, 360 hp engine which was nothing more than a low performance bored and stroked version of the 400. The 360 hp rating was at a ridiculously low 4300 rpm but the engine's torque rating was 500 lbs./ft. at 2700 rpm.

As a last gasp toward capturing some of the lost performance, Pontiac announced the availability of a Ram Air V engine for optional installation in GTOs. It was almost a completely new engine. The heads featured round intake and exhaust ports for super top end breathing. The aluminum high rise intake manifold mounted a 780 cfm Holley 4-barrel. The camshaft was a 308/320 degree unit that worked with solid lifters for higher revs. All this, plus the engine had special beefed rods, 4-bolt mains, extra webbing, etc., for increased high rpm durability. None of these engines were ever installed on the assembly line but it was possible—and still is—to purchase a whole Ram Air V engine at any Pontiac parts counter. Only 40,149 1970 GTOs were sold.

Nineteen-seventy-one was the year of the low compression ratio. It was also the year of a complete de-empha-

sis of performance in Detroit as the emission thing really powershifted its way into high gear. Everyone was afraid to mention performance for fear of being labeled pro air pollution. A GM management edict lowered all compression ratios so that all '71 GM engines could run on low-lead or no-lead gas. The standard 400-cube GTO engine had an 8.2 compression ratio and rated 300 hp at 4800 rpm with 400 lbs./ft. of torque at 3600 rpm. Optional was a low compression 455 4-barrel with 8.4 compression, 335 hp at 4800 rpm and 480 pounds/feet torque at 3600 rpm.

Came '72 and suddenly every engine looked emasculated if you looked at the horsepower ratings. Remember, this was the year that the SAE net horsepower rating system went into effect. Thus the standard 400 GTO engine now rated 250 hp at 4400 rpm and 325 lbs./ft. of torque at 3200 rpm. Optional was a 455 4-barrel that rated 250 hp at 3600 rpm.

But leave it to Pontiac to sneak in a ringer. Deep down in the option sheets—so deep that you could hardly find it—was a little ditty called the 455 HO engine option. It was essentially a 455 block but chock full of the old ram air goodies. The new horsepower rating was 300 at 4000 rpm with an 8.4 compression ratio. Torque output was a true 415 lbs./ft. at 3200 rpm. We never got to run a GTO with this engine but we did test a Firebird Trans-Am with the 455 HO and we know that it was the strongest street engine available for '72.

But hardly anything could bolster sagging sales. Nineteen-seventy-one sales had dropped to a quarter of what they were in '70 which was only 50% of what they were in '69. Only 10,532 sales of GTOs were made in '71. In 1972, only half that amount were sold—5807.

Last year, all GM intermediates were completely redesigned and the LeMans body got new skin too. The GTO, now just an option that could be added to any LeMans body, was one of the sharper looking '73 intermediates.

At the press preview for the '73 GTO, Pontiac engineers announced a new engine option called the Super Duty 455 to replace the 455 HO. The Super Duty designation had a long tradition at Pontiac, first used in the late '50s for the top engine option available. Now that it was revived again, everyone had high hopes for Pontiac and the recapturing of some of its lost sporty image. The engine was unreal. Not only did it have all the 455 HO goodies but it also had such niceties as a built-

in provision for dry sump oiling and new cylinder heads which flowed at least 10% more than any other previous Pontiac production cylinder head.

The original plan was to make the Super Duty 455 an option in both GTOs and Firebirds. We named the Super Duty 455 GTO the CARS Magazine Top Performance Car of the Year. But a change in Pontiac's top management closed down the Super Duty engine project and the engine was never released as an option for the GTO. And only 4806 GTOs were built last year.

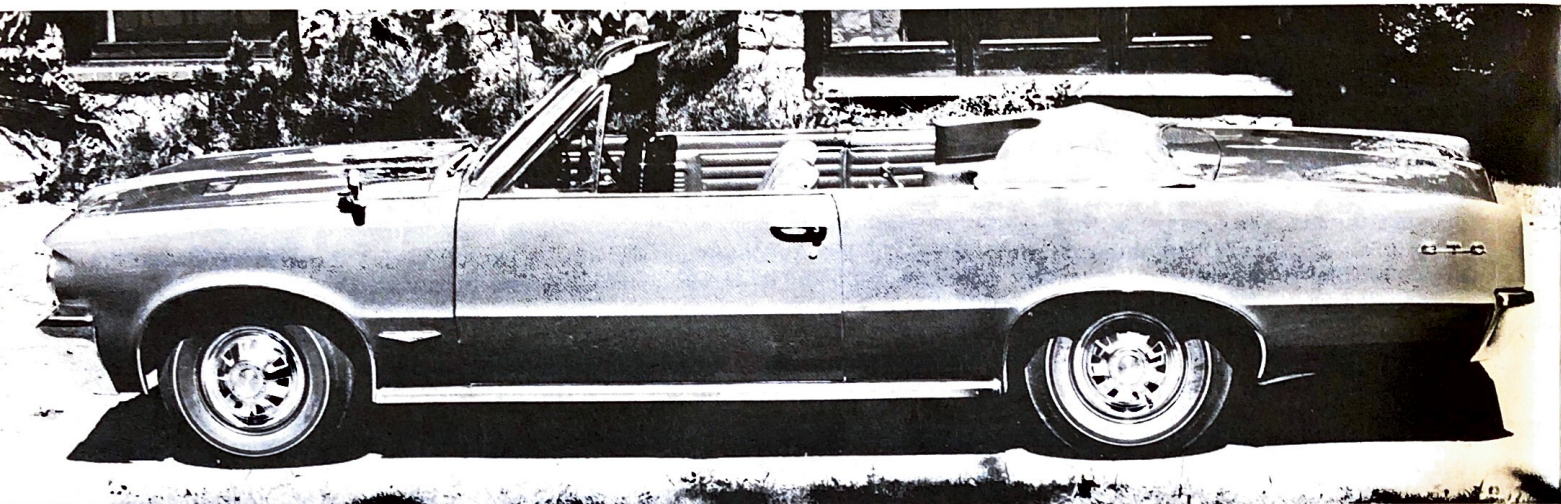
And now, 1974. Ten years after the GTO started the entire supercar genre, Pontiac adds a new twist. As you must know by now, the '74 GTO is an option on the smaller and sportier Ventura rather than being an option for the larger midsize LeMans series. This makes a lot of sense. The Ventura is lighter, and thus can deliver equivalent performance with a smaller engine. Smaller engines mean less pollutants and lower insurance premiums. In addition, the Ventura is more in keeping with the original concept of the GTO which was small, light car with enough power to move it out smartly. Frankly, the LeMans series had simply become too heavy and luxurious and the GTO concept was lost in the process.

This year there is only one GTO engine. It's a 350-cubic-inch 4-barrel engine rated 200 hp at 4400 rpm and 295 lbx./ft. of torque at 2800 rpm. All GTOs come with a fresh air shaker hood scoop as standard equipment plus such other goodies as heavy duty suspension with front and rear antiroll stabilizer bars, wide tread tires and styled wheels.

Pontiac has projected that 10,000 GTO-optional Venturas will be built this year. If Pontiac is correct, watch for all the other companies to make a performance package available on their compacts rather than their intermediates. As we said, it makes sense, and good sense should be reflected in high sales. And if there's anything Detroit reacts to, it's high sales. Witness the phenomenon that grew out of the original '64 GTO ten years ago.

The '74 GTO will never be the "King of the Street" as the original was. And unless something radical happens in the near future, the GTO will never again regain the mystique of sheer power that it once possessed. But the car will always hold a special place among performance enthusiasts because it was an original. Not a copy of anything before it. And the original is still the greatest.

1964



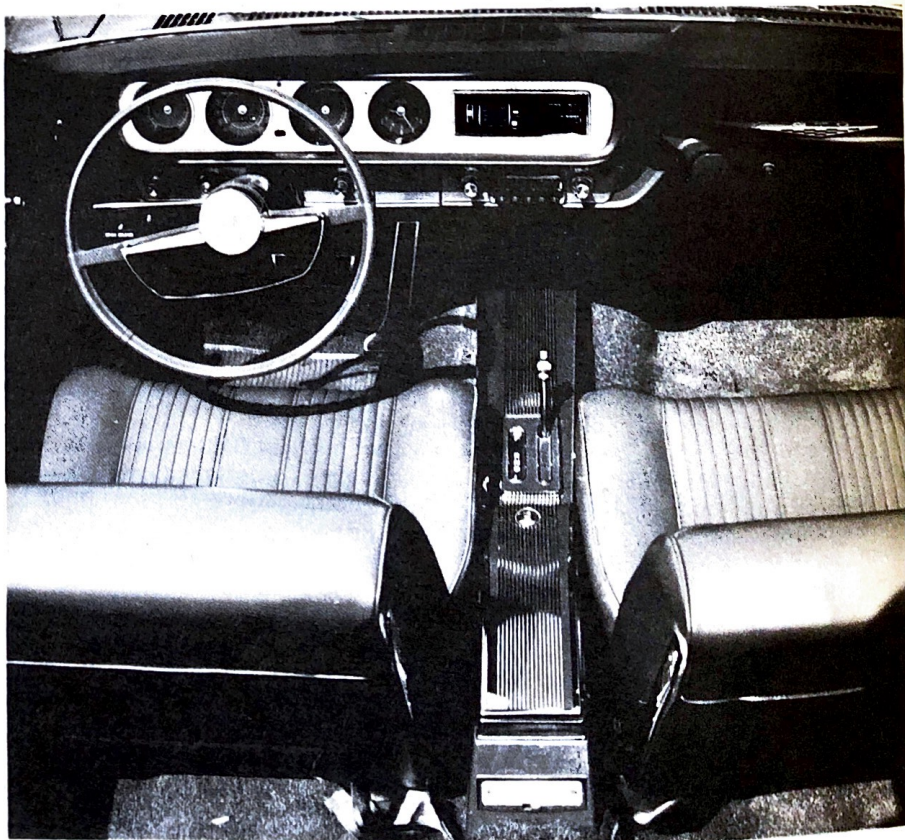
PONTIAC MOTOR DIVISION has announced an exciting new 1964 sports car option called the GTO (Grand Turissimo Omologato). Using a basic Tempest design, it will be available in the LeMans two-door coupe and convertible.

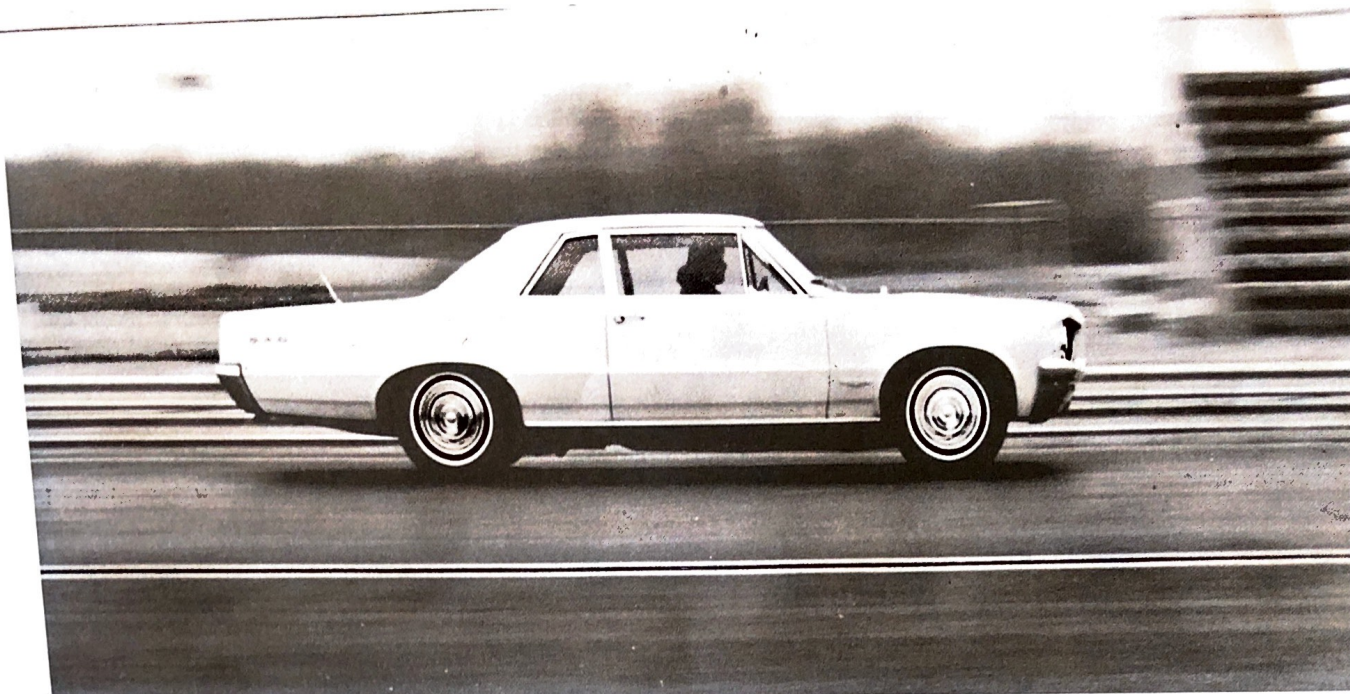
E. M. Estes, General Motors vice-president and Pontiac general manager, said the GTO affords Pontiac customers an even greater opportunity to choose an automobile that more closely fits their personal needs and tastes. "GTO is a significant addition to Pontiac's list of individualized sports car developments," Estes said.

Along with many performance options that enhance the sports car theme, the GTO has its own special styling features including bucket seats, an engine-turned aluminum instrument panel applique and stylized air intake castings on each side of the hood panel.

The GTO standard equipment engine is a 389 cubic-inch V-8 that develops 325 horsepower. It has a 10.75-to-1 compression ratio and a four-barrel carburetor. A three-speed, floor shift synchromesh transmission and dual exhausts are standard. Four-speed synchromesh and automatic transmissions are available.

Built on a 115-inch wheelbase, the GTO has heavy-duty, wide rim wheels for greater lateral stability and 7.50 x





14-inch red stripe, premium cord tires are standard. Whitewall tires of the same size may be ordered at no extra cost.

A four-speed synchromesh transmission with floor shift and an automatic transmission with a steering column shift are optional. When the optional console is

ordered with the automatic transmission, the shift lever is on the floor. A tachometer is offered also as optional equipment.

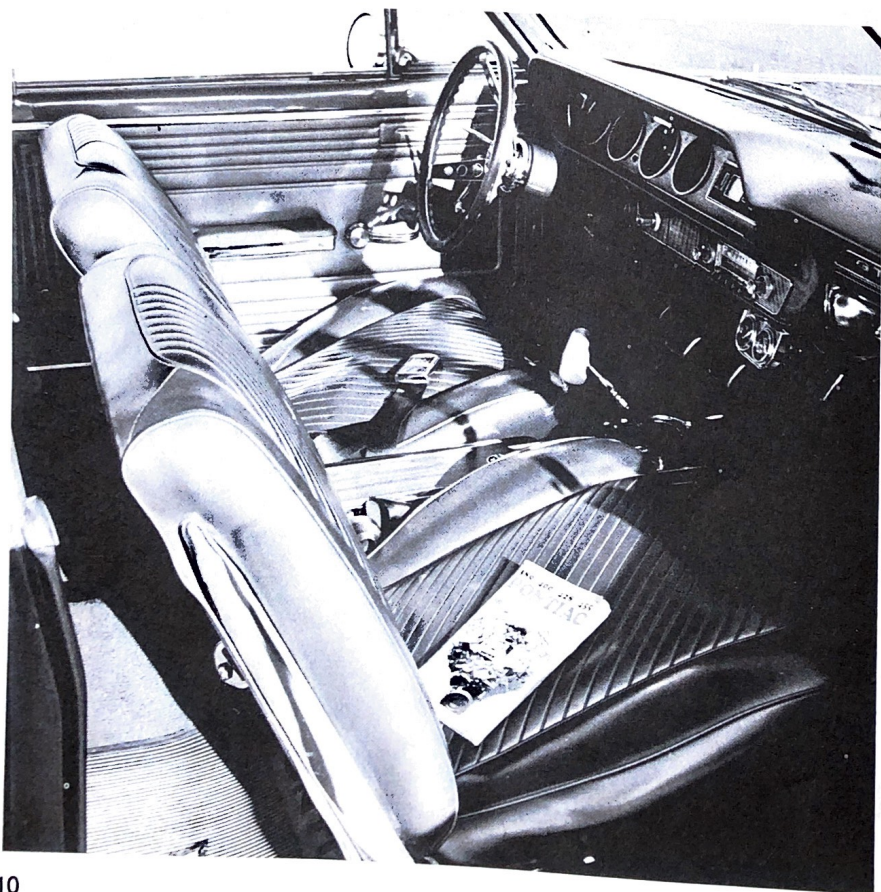
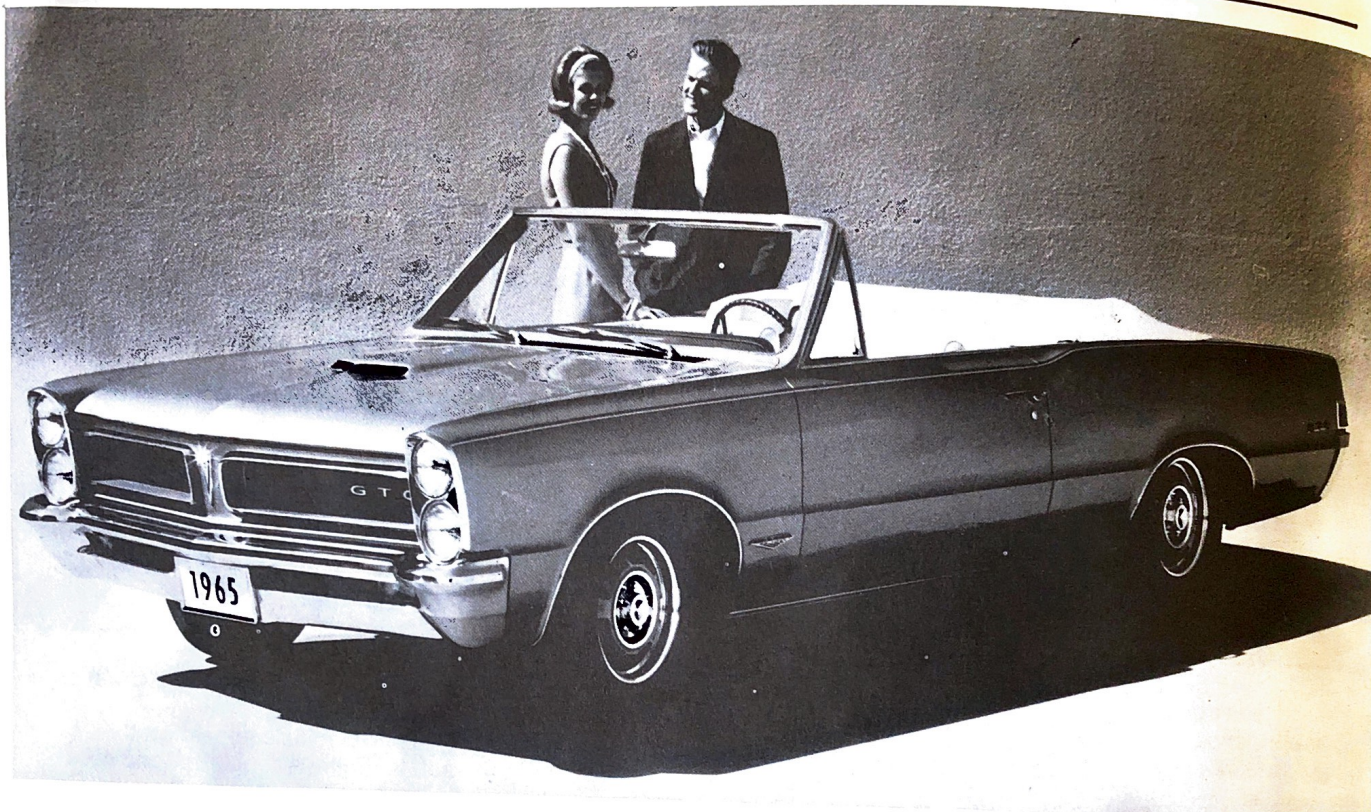
The GTO suspension is sprung similar to other sports cars, providing a firm ride in keeping with the car's design. An optional, even firmer ride package is available and

includes a 20-to-1 steering gear ratio for quick turning.

The GTO initials appear on the radiator grille, rear quarters and deck lid, while a GTO triangular crest is mounted on the front fender and the instrument panel. All other optional equipment for the LeMans series is available with the GTO.



1965



WITH EMPHASIS on greater passenger comfort and improved performance and handling, Pontiac Motor Division's 1965 Tempest series has been engineered and refined to once again incorporate the most advanced automotive designs.

More than three inches longer, from 203 inches in 1964 to 206.1 inches in 1965, the new Tempests feature a long list of engineering advances. The new Tempest station wagons are 204.4 inches long.

All Tempest and LeMans models offer as optional a high-performance 326-cubic inch V-8 engine. Variations include a regular fuel two-barrel carburetor V-8 which delivers 250 horsepower up to the highest performance engine with four-barrel carburetor which is rated at 285 horsepower. The GTO option provides 389-cubic inch V-8 engines rated at 335 and 360 horsepower. Higher engine performance levels have been achieved mainly by increasing the breathing and improving fuel distribution characteristics of the engine.

The reduction of weight is also an important factor in raising

performance levels and Pontiac engineers have pared excess poundage from many parts of the engine assembly, intake manifold, crankshaft and cylinder heads. A new cylinder head with revised valve train upper area lubrication system has made possible a reduction in weight. The valve train now receives its oil from the valve lifters up through hollow pushrods to the new rocker arms through a hole in the rocker arm in the pushrod contact area, and to the rocker arm ball. The valve stem is lubricated with oil spillage from the rocker arm.

The GTO option contains many new and exclusive features designed specifically for this popular model option. A new and distinctive simulated air intake is located in the center of the hood top panel. Also an eye-catching exclusive is a body paint stripe just below the fender upper peak and extending the full length of the car from the rear of the

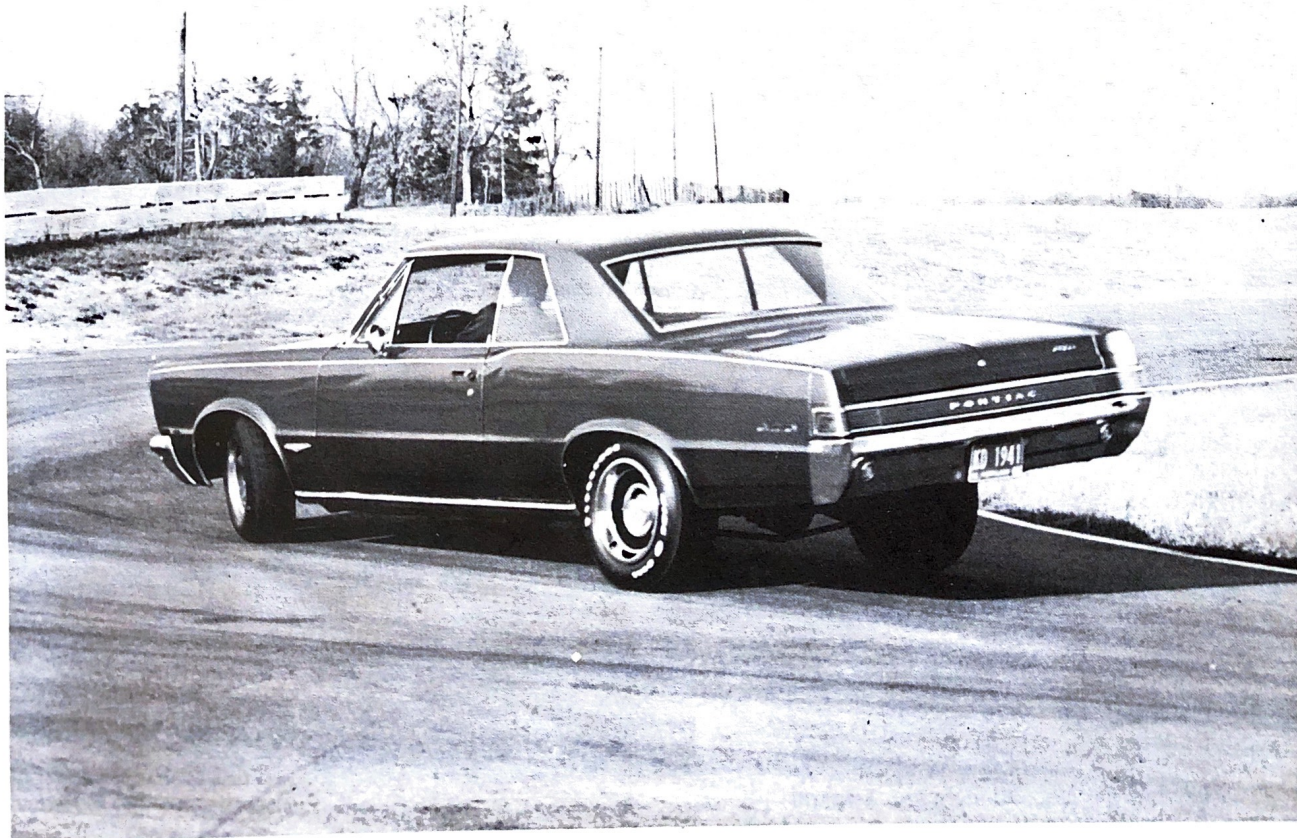
front headlamp to the tail lamp. The GTO is powered with the famous Pontiac 389 cubic inch engine with four-barrel carburetor as standard and an optional engine with three two-barrel carburetion. Compression ratio is 10.75-to-1 and a three-speed synchromesh transmission with floor shift is standard.

Sheet metal on the newly-designed Tempest front end for 1965 features greatly improved structural strength and maximum stability through all driving speeds, regardless of road surface conditions.

Front end sheet metal design is improved. Hat or channel sections combined with a baffle improves geometric construction and permits structural integrity of the sheet metal with improved durability. Significant changes in design make possible a low front end silhouette with maximum stability for greater comfort, a smoother ride and increased pleasure with positive car control.

GTO					
Type-90° V-8, Valve In-Head					
Bore and Stroke-389 cu.in.-4.06x3.75 Standard					
Standard	Synchromesh (a)	10.75:1	4 Bbl.	335 @ 5000	431 @ 3200
Optional	Synchromesh (a)	10.75:1	3-2 Bbl.	360 @ 5200	424 @ 3600

(a) 3-speed standard, 4-speed optional



1966



PONTIAC MOTOR DIVISION's 1966 models, from the Tempest to the Grand Prix offer extensive advancements in automotive styling, engineering, safety and model availability.

The entire Tempest line has been redesigned, expanded by the addition of five new models including a new GTO series, and for the first time in an American passenger car, an overhead camshaft six-cylinder engine is offered as standard equipment on all Tempest models except the GTO.

"Our new models are a true reflection of Pontiac's policy of continuous and evolutionary progress in automotive design and with our new overhead cam engine we feel we are presenting a major engineering break through as well," John Z. DeLorean, a General Motors vice-president and Pontiac's general manager, said.

New roof lines give the 1966 Tempests a completely new styling theme and big car appearance. Body side sculpturing is noted by its clean simplicity with a suggestion of sports car flair. Both coupes and convertibles are noticeably faster in profile with dropping belt lines and on the coupe a complete break away

from conventional upper design prevails. All models are one-half-inch longer overall, measuring 206.4 inches with a 115-inch wheelbase. Rear track is now 59 inches.

Tempest front end appearance retains the split grille design but has been styled to give an even wider stance. Deep tapered air intakes are framed with narrow bright chrome edges and recessed within the dynamically sculptured front end sheet metal. Each front end is identified by appropriate emblems and series identification.

The Tempest rear end design features a strong chrome molding treatment that defines maximum width and lowness characteristics. Rear bumpers have shaped ends to complement the rear end and tail lamp scheme. The LeMans back end treatment has an additional bright ribbed full width molding between the tail lamps.

The GTO, a completely new 1966 series, has its own front end including grille, parking lamps, hood and ornamentation. The side view shows a full length rocker panel molding plus rocker extensions on the front and rear fenders. The GTO rear end has its own tail lamp design consisting of horizontal painted

louvers on each side of the rear end panel. Each louver has a fine bright chrome edge and the red tail lamp lens is recessed in the slits between the louvers. Individual block letters are mounted on the central painted panel and a GTO initial ornament graces the deck lid. The new GTO series includes a sports coupe, hardtop coupe and convertible.

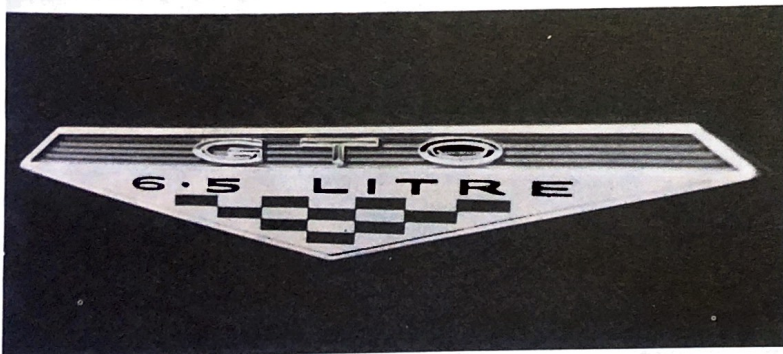
Pontiac's highly-rated V-8 engines, both the Tempest 326 cubic-inch option and the 389 and 421 cubic-inch engines available on Pontiac models, have been refined with the emphasis on smoother operation and greater economy.

Variations of the optional Tempest V-8 include a regular fuel two-barrel carburetor engine which delivers 250 horsepower up to a high-output engine with four-barrel carburetion and rated at 285 horsepower. The standard GTO engine is 389 cubic-inch, four-barrel carburetor and 335 horsepower. The GTO option is rated at 360 horsepower and has three two-barrel carburetors. The Pontiac crankshaft is of nodular iron and the pistons are of an all aluminum design for a significant reduction of weight for 1966. The piston rings feature a reverse twist design for added oil economy.

GTO
389 Cubic Inch, 90° V-8, Valve In-Head
Bore & Stroke-4.06x3.75 Standard

Standard	Manual (a)	10.75:1			
Optional	Automatic	10.75:1	4 Bbl.	335 @ 5000	431 @ 3200
Optional	Manual (a)	10.75:1	4 Bbl.	335 @ 5000	431 @ 3200
Optional	Automatic	10.75:1	3-2 Bbl.	360 @ 5200	424 @ 3600
			3-2 Bbl.	360 @ 5200	424 @ 3600

Legend: (a) 3-speed standard, 4-speed optional



1967

THE 1967 MODELS of Pontiac Motor Division represent a bold new approach in automotive styling combined with many new engineering features designed to increase the safety, comfort and convenience of driving.

An energy-absorbing steering column, a dual braking system and an inside rear view non-glare tilting mirror are standard equipment on all 1967 Pontiacs and are just three of the many safety developments available as standard equipment on every model.

"By extensively following Pontiac's continuous policy of making safety our major objective in the design, manufacture and testing of our cars, Pontiac again this year meets the highest standards in the automobile industry," John Z. DeLorean, a General Motors vice-president and Pontiac general manager, said.

Pontiac has increased the number of models from 33 last year to 35 in 1967. The popular Pontiac GTO is offered in a sports coupe, hardtop coupe and convertible.

The Tempest, Tempest Custom and Pontiac LeMans grilles are identified by vertical ribs alternately spaced to create a distinctive pattern. The Pontiac GTO grille has a

unique aluminum wire mesh texture to provide a new overall effect.

Tempest, Tempest Custom and Pontiac LeMans models have chrome rocker mouldings and model identification lettering on the sides. On the GTO two paint stripes run the full length of the car and the famous GTO block letters are placed at the rear of the rear quarter panel. The GTO also has its own taillight arrangement of four horizontal lights on each side.

The standard Pontiac V-8 engine has been increased from 389 cubic-inch displacement to 400 cubic-inches and the optional 421-inch engine now has 428-inch displacement.

Pontiac's famous overhead camshaft six-cylinder engine is standard on all Tempest, Tempest Custom, Tempest Safari and Pontiac LeMans models. It has a one-barrel carburetor, 9.0-to-1 compression ratio, 230 cubic-inch displacement and a horsepower rating of 165. The four-barrel Sprint engine has 10.5-to-1 compression, 215 horsepower and is now available on all Tempest station wagons as an individual engine option. A three-speed manual transmission is standard and a four-speed manual or automatic transmission optional.

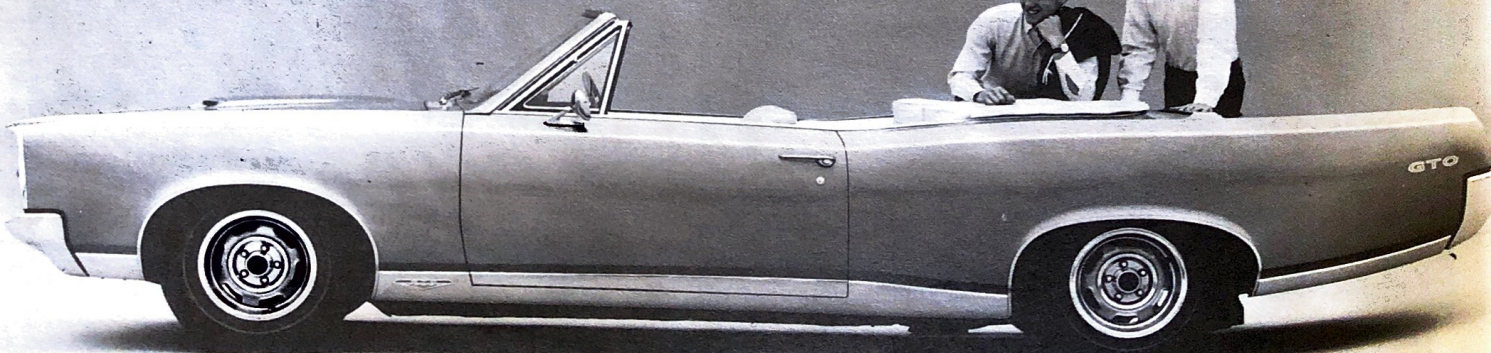
The standard Pontiac GTO engine

has 400 cubic-inch displacement, 10.75-to-1 compression ratio and 335 horsepower. The standard transmission is three-speed manual and a three-speed automatic or four-speed manual optional.

The larger bore of the 400 cubic-inch engines is 4.120 inches and has a smoother finish for improved oil economy. All Grand Prix engines will have specific cylinder heads and larger valves. Combined with a revised valve angle, the new design permits centralizing the combustion chamber over the cylinder bore for freer breathing. More complete removal of burned gasses is also gained on the exhaust cycle.

Pontiac accessories for added convenience and comfort feature several firsts in the industry. These include a tachometer mounted on the hood in easy view of the driver and a capacitor discharge ignition system—a system capable of firing the engine consistently under the most difficult conditions.

Also new for 1967 Pontiac models is a stereo tape player, an AM-FM stereo radio, disc front brakes, cornering lights, dual stage heavy-duty air cleaner, automatic leveling system and a fire extinguisher.

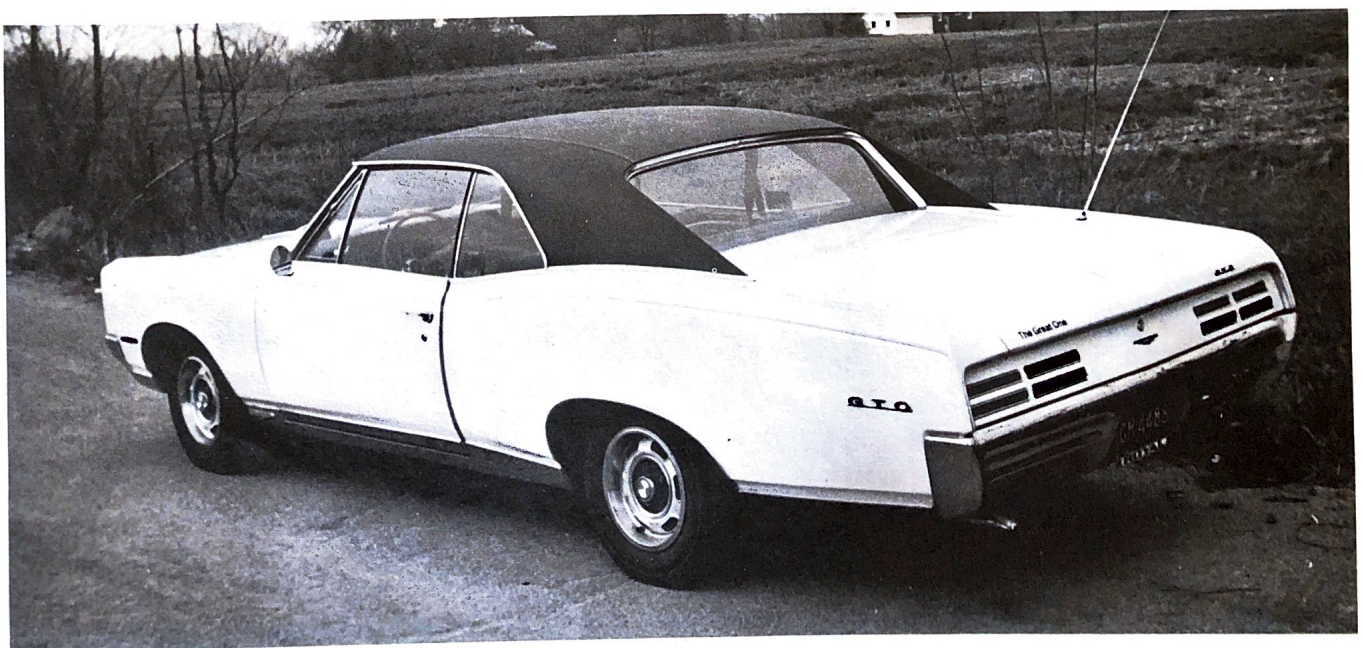




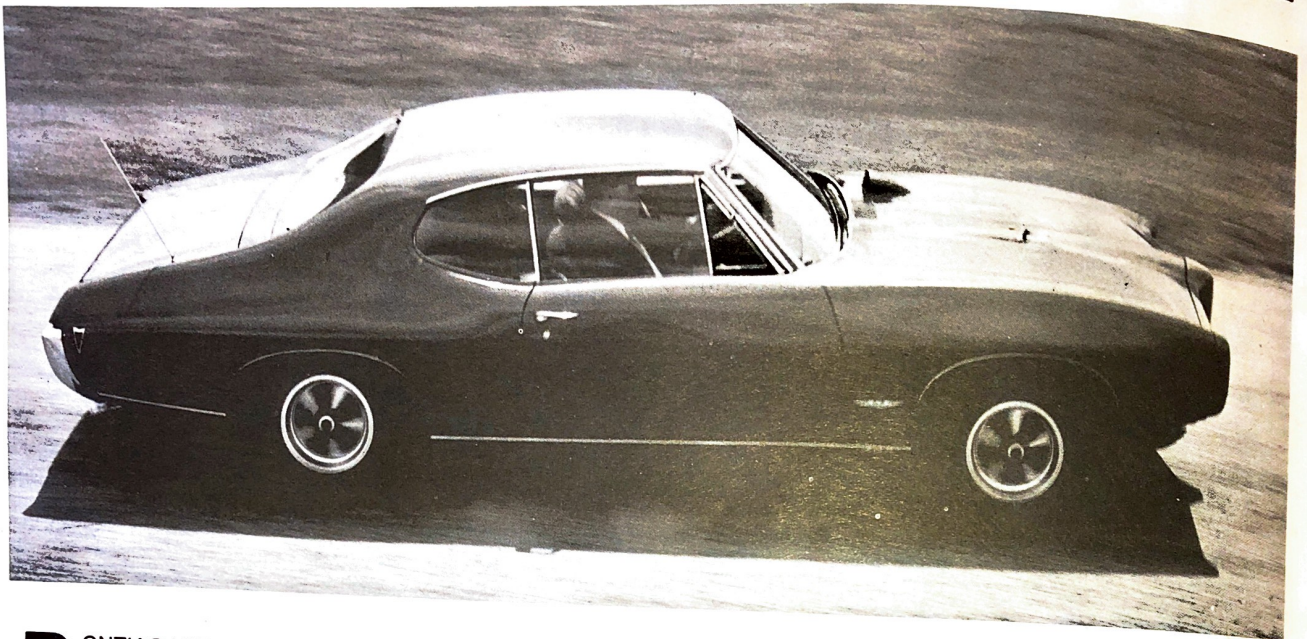
GTO
 400 Cubic Inch, 90° V-8, Valve In-Head
 Bore & Stroke-4.12x3.75 Standard

Standard	Manual (a)	10.75:1	4 Bbl.	335 @ 5000	441 @ 3400
Optional	Automatic	10.75:1	4 Bbl.	335 @ 5000	441 @ 3400
Optional	Manual (a)	10.75:1	4 Bbl.	360 @ 5100	438 @ 3600
Optional	Automatic	10.75:1	4 Bbl.	360 @ 5100	438 @ 3600
Optional (Ram Air)	Manual (a)	10.75:1	4 Bbl.	360 @ 5400	438 @ 3800
Optional	Automatic	8.6:1	2 Bbl.	255 @ 4400	397 @ 2400

Legend: (a) three-speed standard, four-speed optional



1968



PONTIAC MOTOR DIVISION today received the Motor Trend Car of the Year Award for its 1968 GTO.

The announcement was made by Motor Trend Publisher Walter A. Woron and it marked the fourth time in eight years that Pontiac has won the award—a feat accomplished by no other auto manufacturer.

In presenting the Golden Calipers trophy to John Z. DeLorean, a General Motors vice-president and Pontiac's general manager, Woron said, "Pontiac has established new design standards and supplied the entire industry with a method for accomplishing them."

"Never before has an automobile been so successful in confirming the correlations between safety, styling and performance as the 1968 GTO," Woron added. After extensive evaluation of the 1968 product lines of all domestic automotive manufacturers, *Motor Trend* singled out the GTO for top recognition.

"Not only does the GTO continue to establish the class standard in the fifth year of its existence, but it also represents a unique and revolutionary engineering-styling function," Woron pointed out.

He added that Pontiac is also being recognized for an innovation that integrates the industry's first rubber-like bumper with the overall body design.

Motor Trend termed the GTO's bouncy bumper "the most significant

achievement in materials technology in contemporary automotive engineering."

Upon accepting the Car of the Year Award, DeLorean said that Pontiac was "highly honored."

"All of us in the industry are aware of the extensive testing and evaluation which precedes the selection of the Car of the Year and we regard the winning of this award as a vote of confidence that we are building the best cars possible," DeLorean stated.

In tracing the history of the GTO, DeLorean noted that Pontiac in 1964 became the first passenger-car manufacturer to build an exciting sports-type car that the man in the street could afford. He pointed out that in its first sales year 32,000 GTOs were sold, making it the best selling first-year car that Pontiac had ever had. GTO sales this year are estimated to exceed 100,000.

"The success of the GTO has shown that many young new car buyers desire a car that offers high





performance, excellent handling with around-town suitability, distinctive appearance and moderately low cost," DeLorean asserted.

It is this unique combination, he added, rather than any one individual feature, that has made the GTO the pacesetter in its field. The result is that a new market has been opened and a new class of cars has been fostered.

Pontiac first won the Car of the Year Award in 1959 for its wide-track; the second time was in 1961 for the Tempest and the third award was presented to the 1965 Pontiacs for styling and engineering leadership.

Pontiac Motor Division's 1968 Tempests enter the new model year with the most extensive styling changes, engineering improvements and built-in safety since this popular series was introduced seven years ago.

An exclusive energy-absorbing front bumper for the GTO, separate wheelbases for two-door and

four-door models, increased engine displacement and a new level of interior comfort and protection head a long list of 1968 Tempest, Tempest Custom, LeMans, Safari and GTO features.

For the first time the Tempest will be built on two wheelbases. All two-door coupes and convertibles will have a 112-inch wheelbase and the four-door models and station wagons will be built on a 116-inch base. The wide track has been increased to 60 inches at both the front and rear.

"A new sports car atmosphere surrounds our 1968 Tempests," John Z. DeLorean, a General Motors vice-president and Pontiac's general manager said.

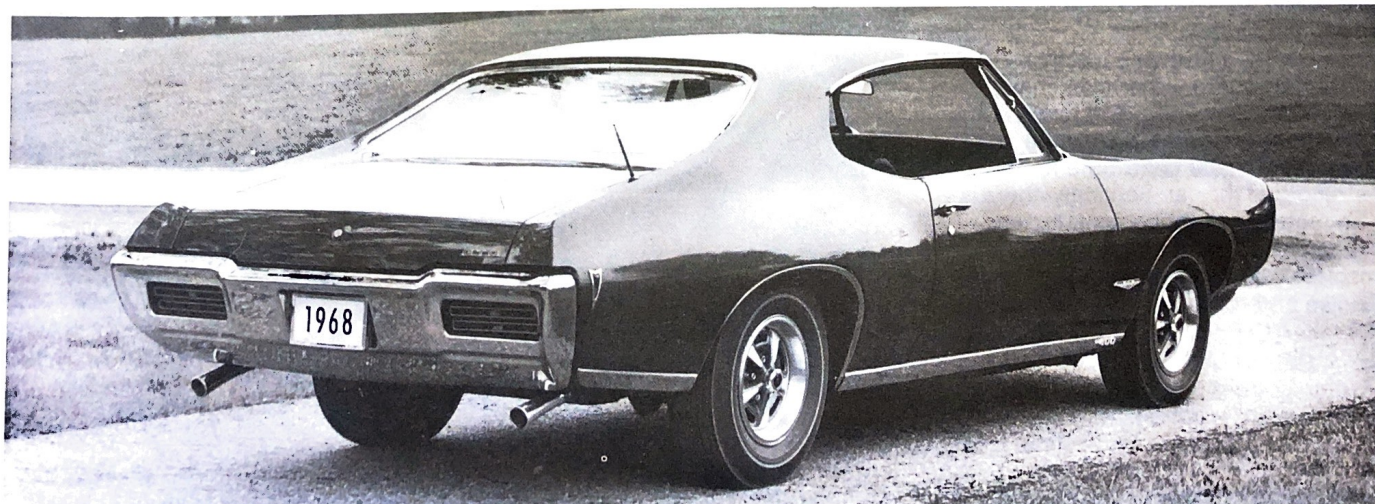
The industry's first and Pontiac exclusive energy-absorbing front bumper is standard on all GTO models. It is the same color as the exterior body paint for a completely new and different front end appearance. In addition, its absorbing feature makes it

functionally superior to any metal bumper now in use. GTO headlamps and grille are in a horizontal arrangement and concealed headlamps are optional for this series.

Long hoods sweep up to the windshield wiper linkage adding to an even longer looking view. Dual simulated air inlets widely spaced on the GTO hood add a sports car touch.

Tempest body sides are all new with particular emphasis on a venturi shape accentuating the long hood, short deck style. Subtle blending of the new low roof lines into the quarter and rear adds grace to the profile. All models are tastefully accented with long low rocker moldings. Side markers contribute to additional warning.

From the rear new Tempest styling reveals deep section bumpers housing three sectional stop, tail and back-up lamps at the outer ends. The GTO has its own distinctive dual stop and tail lamps spaced horizontally





for a wider look to the already wide track stance. There are two GTO models, a hardtop coupe and a convertible. In addition the Sprint option is available on all models except station wagons and the GTO.

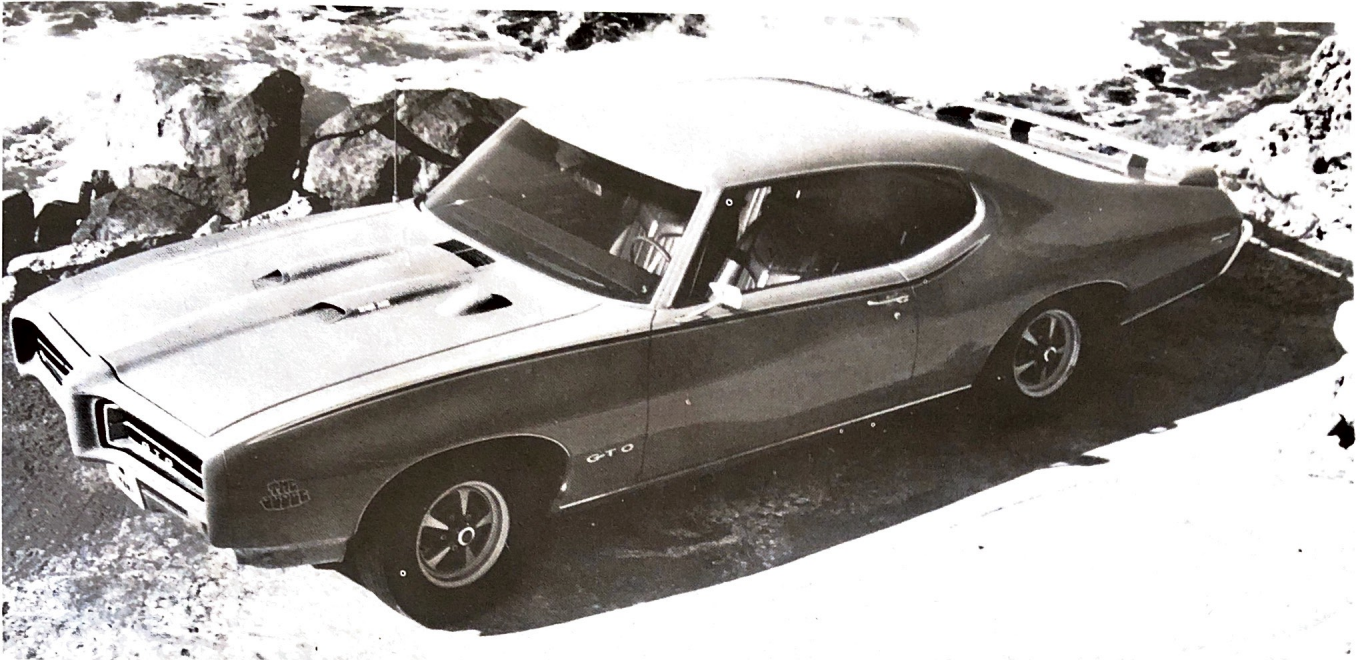
The standard GTO 400 cubic inch V-8 is rated at 350 horsepower with an optional 360 horsepower HO engine or a two-barrel, regular fuel version rated at 265 horsepower.

Transmissions include the three-speed synchromesh standard and four-speed synchromesh (except on one-barrel six-cylinder) optional and two-speed automatic optional. The GTO models offer the Turbo Hydra-Matic as optional.

An all new frame maintaining the perimeter swept hip configuration is designed for both 1968 Tempest wheelbases with two particular advantages. First, the body comes down over the frame and forms with it an integrated whole, thus the body and sheet metal contribute to the strength of the car. Secondly, there is no metal-to-metal contact. Instead rugged body mounts of rubber isolate the driver and passenger from noise and road disturbances.



1969



THE 1969 INTERMEDIATES from Pontiac Motor Division blend big car styling with exact engineering and safety. The entire lineup of Tempest, Custom S, Le Mans and GTO models reveals a new vertical theme front end appearance, newly-designed instrument panels and the absence of vent windows on hardtop coupes and convertibles. In addition, there is a new two-way tailgate for station wagons, an ignition-steering gearshift lock, two Ram Air options for GTO customers and the three-speed Turbo Hydra-matic has been made available on all models.

"These new models are styled and engineered to further accelerate the surge which is carrying them to new sales records," John Z. DeLorean, a General Motors vice-president and Pontiac general manager said.

The new Pontiac look is most apparent from the front where the finely compartmented grille design is deeply recessed inside the chrome bumper. The GTO continues with its exclusive Endura energy-absorbing front bumper. Twin horizontal headlamps are placed at the extreme ends of the peripheral bumper.

The line has individual parking and side marker lamps for 1969. The parking lamps are below the bumper on all models except the GTO where newly-designed lamps are set in the outer ends of the valance panel. Side

markers for all models including the GTO have their own circular design and are on the lower side of the front fender forward of the front wheel opening. All models except GTO continue with the Vee crest rear side marker on all except station wagons which have rectangular lamps. A new GTO crest rear side marker provides added identity to this sporty series.

The sides emphasize the venturi shape and accentuate the long hood, short deck silhouette appearance. All models have a long, low, bright rocker molding extending from wheel to wheel. The GTO is 201.5 inches long, 52.3 inches high and 75.8 inches wide and has a wide track of 61 inches front and 60 inches at the rear for all models.

The standard GTO V-8 engine has 400 cubic-inch displacement and four-barrel carburetion. A three-speed manual transmission is standard and Turbo Hydra-Matic optional.

A performance Ram Air hood induction system is available on the GTO which features driver control of the air intake on the hood scoops. The two hood scoops are functional with this option and are manually operated from inside the car by a cable which allows running with the scoops open or closed.

There is also a new Ram Air IV option designed to provide the utmost for the sports enthusiast. It

provides the driver-controlled hood scoops, two air duct systems through the grille and a higher-performance engine.

Pontiac Motor Division announced on December 19, 1968 that it will introduce a new car next month that "goes one performance step further" in the popular muscle car field, a field and market Pontiac opened up five years ago with the GTO.

The new supercar, named The Judge, is specially designed to offer a unique combination of added performance, excellent handling characteristics and a very distinctive appearance.

It will have as the standard power train a 366-horsepower, V-8 Ram Air engine with 400 cubic-inch displacement, 10.75-to-1 compression ratio and four-barrel QuadraJet carburetion, coupled with a fully synchronized three-speed, heavy-duty manual transmission floor mounted control with a Hurst T-handle. A 3.55-to-1 axle ratio will be standard as will dual exhausts.

Available as a hardtop coupe or a convertible, the Judge will be easily recognized. The front will be distinguished by a black grille, exposed headlamps and functional Ram Air hood scoops. A three-color slash stripe on the upper edge of the front fender running back to the door, "The Judge" decals on the front fender and Ram Air decals on

THE JUDGE by Pontiac
Quick Reference specifications

ENGINE

Cylinders	8
Bore and stroke	4.12x3.75
Displacement	400
Compression ratio	10.75:1
Horsepower	366 @ 5100
Torque	445 @ 3600
Valves: Intake	2.11 in.
Exhaust	1.77 in.
Camshaft:	
Lift (Man. Trans.)	.413 intake, .413 exhaust
Duration	
(Man. Trans.)	301° intake, 313° exhaust
Lift (Auto. Trans.)	.414 intake, .413 exhaust
Duration	
(Auto. Trans.)	288° intake, 302° exhaust
Carburetion	1 4-bbl. Quadra-jet
Exhaust system	Dual w/low-restriction muffler

SUSPENSION

Front	Heavy-duty coil
Rear	Heavy-duty coil
Stabilizer	1.00-in. diameter
Tires	G70-14
Rims	6-in. wide
Steering gear:	
Type	Recirculating ball bearing
Ratio	24.1
Turning circle	37.4 ft.
Turns of steering wheel lock to lock	5.6

DIMENSIONS

Wheelbase	112 in.
Front track	60 in.
Rear track	60 in.
Overall height	52.3 in.
Overall width	75.8 in.
Overall length	201.5 in.
Shipping weight	3506 lbs.
Test weight, pre-production car	N.A.
Crankcase capacity	5 qts.
Cooling system	17.8 qts.
Fuel tank	21.5 gals.

DIFFERENTIAL

Ratio	3.55:1
-------	--------

BRAKES

Type	Drum, front & rear
Dimensions:	
Front diam.	9.5 in.
Swept area	269.2 sq. in.
Rear diam.	9.5 in.
Swept area	269.2 sq. in.

TRANSMISSION

Type:	3-speed manual
Ratios:	
1st	2.42:1
2nd	1.61:1
3rd	1.00:1

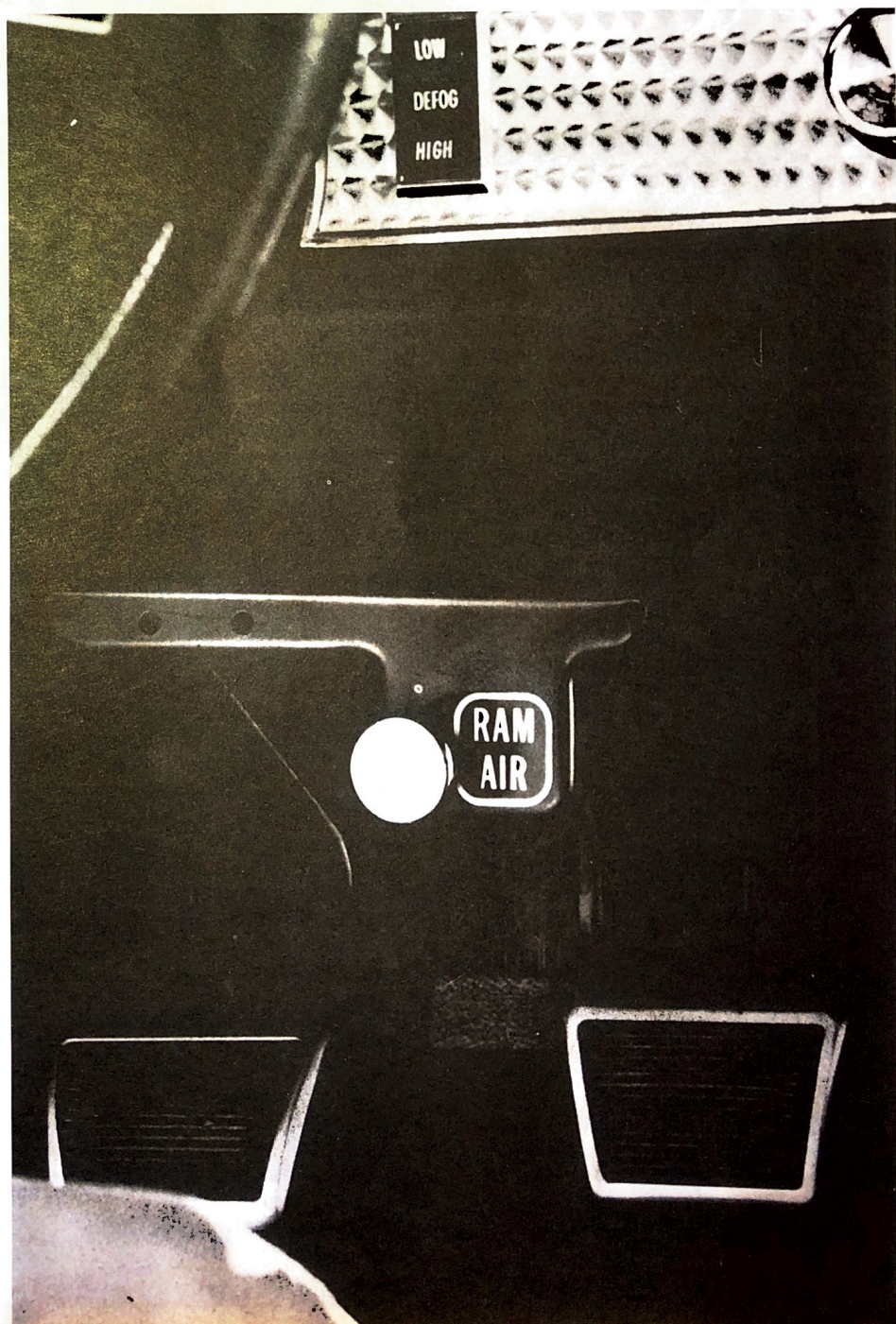


the sides of the hood scoops will provide side identification. At the rear will be a 60-inch floating deck air foil with The Judge emblem on the upper right hand surface.

To complete its distinction, the first production units will be painted a bright red including the Endura energy-absorbing front bumper.

As a companion to Pontiac's GTO, The Judge will ride on a 112-inch wheelbase and the Wide Track will be 60-inches both front and rear. Blackwall G70-14 Fiberglass tires will be mounted on Rally II wheels without chrome trim rings. Morrokide bucket seats, driver-oriented instrumentation, a shallow dish, vinyl-cushioned steering wheel and an upper level ventilation system will highlight The Judge's interior features.

A complete list of options and accessories will also be made available for The Judge which will be available in Pontiac dealerships in January. Pontiac's Ram Air IV engine rated at 370 horsepower is optional and includes functional hood scoops. Available transmissions will be both a close-ratio, four-speed manual and the three-speed Turbo Hydra-Matic. A hood mounted tachometer, a rally gauge cluster and power front disc brakes will also be offered.



1970



PONTIAC MOTOR DIVISION'S 1970 Tempest, LeMans, LeMans Sport and GTO models feature performance, comfort and safety. With a line-up of 15 models in the Tempest, LeMans, LeMans Sport and GTO series, Pontiac will have a new six-cylinder engine as standard and offer as optional a 350 cubic-inch and two 400 cubic-inch V-8's. In addition, a new 455 cubic-inch power plant is optional on the GTO. Every 1970 model is equipped with bias-ply, glass-belted tires.

All new Pontiacs have side guard door beams built in for added protection. This safeguard consists of a box-like steel beam positioned horizontally within each door plus additional door pillar reinforcements.

The concealed radio antenna, pioneered last year by Pontiac on the Grand Prix, will be used on all 1970 models. Fabricated in the windshield are two barely visible wires which are not subject to weathering, being bent or broken.

"Our 1970 models are designed to meet the full range of driving needs of even the most discriminating customer," said F. James McDonald, a General Motors vice-president and Pontiac general manager.

The standard intermediate engine in 1970 is a 250 cubic-inch, inline six-cylinder regular fuel engine rated at 155 horsepower with a compression ratio of 8.5-to-1.

Optional are a regular fuel 350 cubic-inch V-8 engine and the 400 cubic-inch V-8 available with two or four-barrel carburetion. The 400s will be offered with the Turbo Hydra-Matic transmission only.

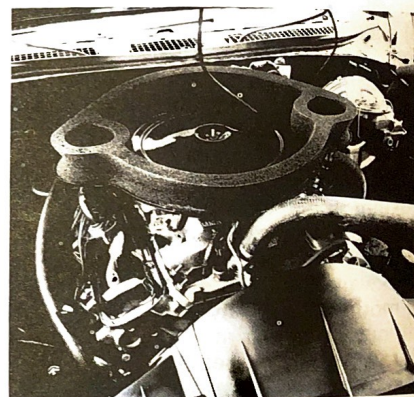
The standard engine for the GTO is a 350 horsepower, 400 cubic-inch V-8. A 455 cubic-inch rated at 360 horsepower is a new option. Pontiac's famed 366 horsepower Ram Air and 370 horsepower Ram Air IV performance packages are available on the GTO.

Transmissions include the standard three-speed manual, and as options an automatic transmission, Turbo Hydra-Matic and a four-speed floor shift.

The Tempest, LeMans and GTO models have been completely restyled. The front view reveals the familiar Pontiac split grille while the bumper, wraparound parking and side marker lamps and valance panels all have been restyled.

Horizontally mounted headlamps extend to the outboard ends, and the split grilles are surrounded by the wraparound bumper. The one-piece panel which is above the grille and houses the headlamps is made from Fiberglass-reinforced-plastic. This is another first for Pontiac engineers who have been the leading industry innovators in the use of plastic exterior applications.

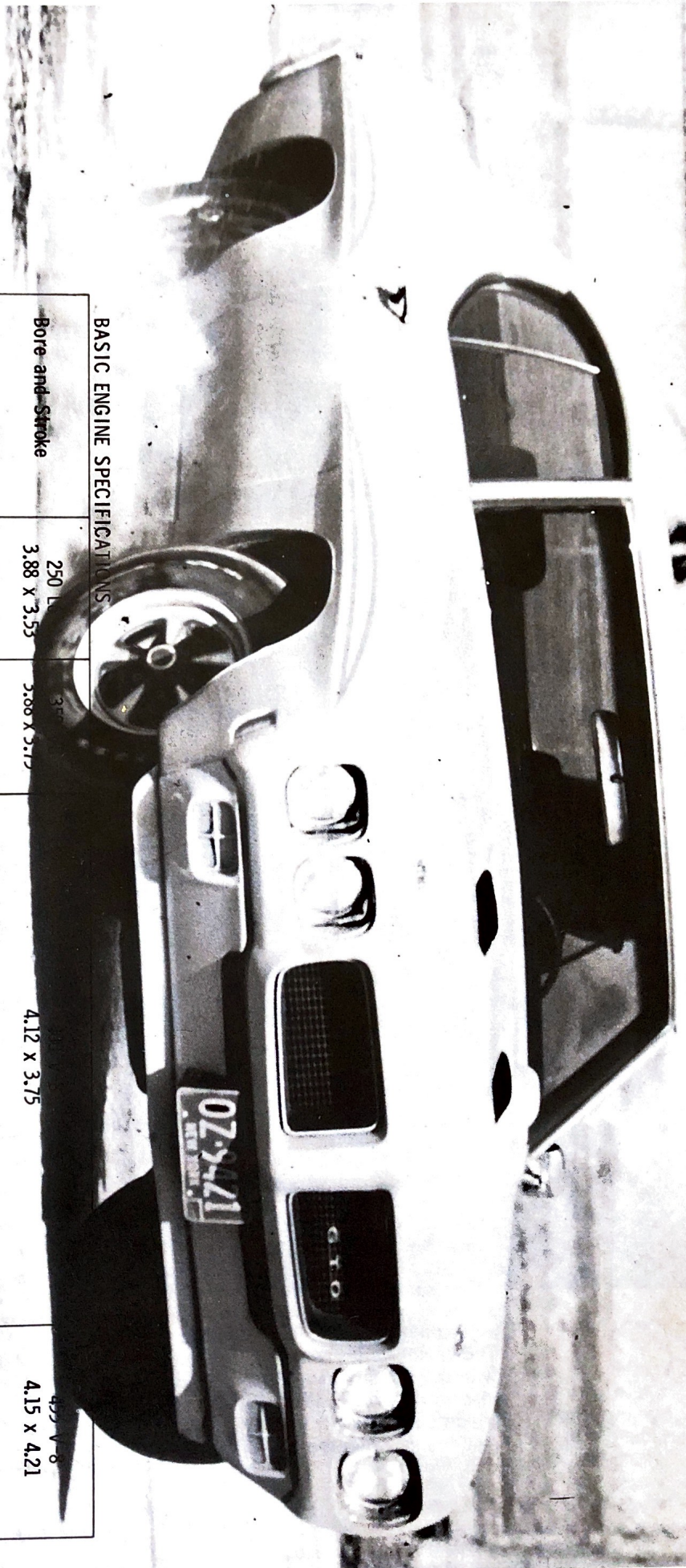
The GTO has its own distinctive front end highlighted by a newly-styled energy-absorbing



Endura bumper. The car's profile shows the fresh look of new fenders, doors and rear quarter panels. Tail lamps, which wrap around to serve as rear side markers, are mounted in a new bumper.

The wheelbase for two-door models is 112 inches, and 116 inches on four-door models. Four-door cars are 206.5 inches in overall length, while the two-door coupes and convertibles are 202.5 and the GTO is 202.9. All models are 76.7 inches wide and the Wide Track is 61 inches in front and 60 inches in the rear. Fifteen exterior colors are offered for 1970 . . . 11 of which are new—along with five color choices of Cordova tops and four for convertible tops.

A new trend in colors and redesigned instrument panels are combined with safety and comfort features inside the Tempest, LeMans, LeMans Sport and GTO. A new pad

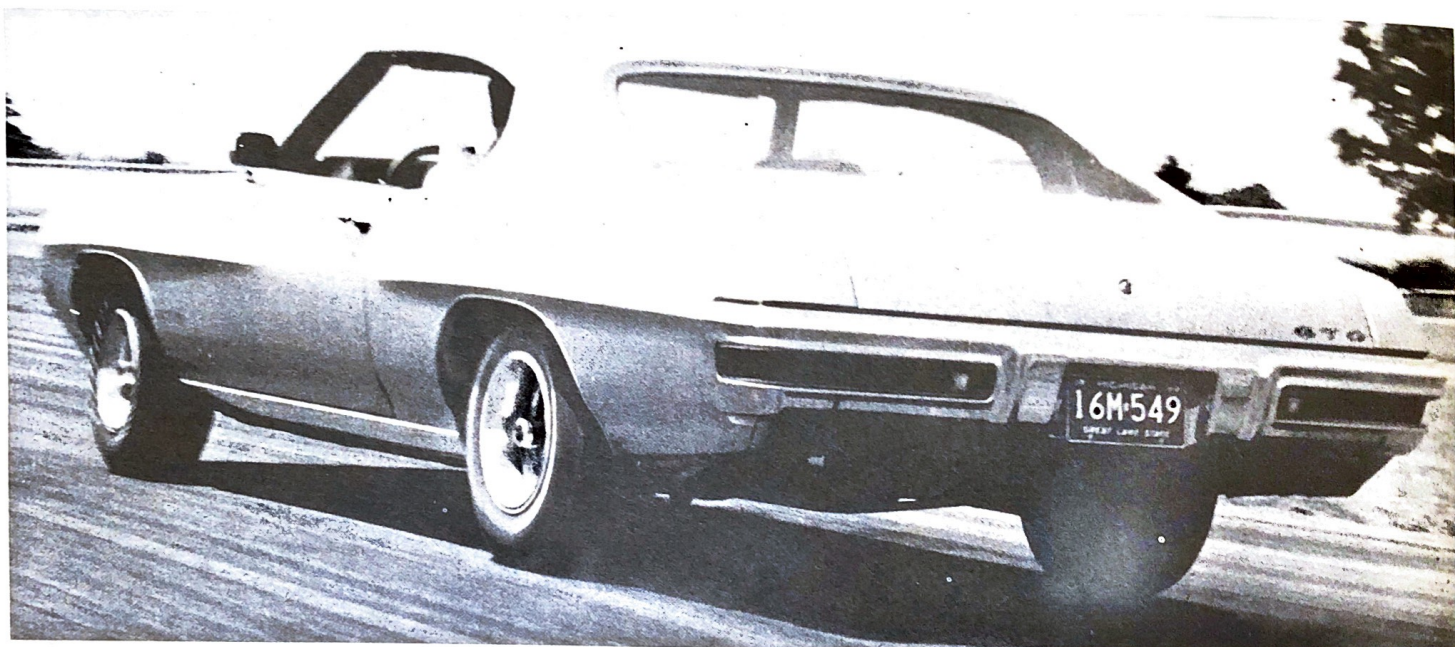


BASIC ENGINE SPECIFICATIONS

Bore and Stroke	350 V-8		4.12 X 3.75		4.15 X 4.21	
	250 L	350	400	455	400	455
Piston Displacement	250	350	400	400	400	455
Carburetor	1 bbl	2 bbl	2 bbl	4 bbl	4 bbl	4 bbl
Compression Ratio	8.5:1	8.8:1	8.8:1	10.0:1	10.25:1	10.0:1
Recommended Fuel	Reg.	Reg.	Reg.	Prem.	Prem.	Prem.
Horsepower Ratings						
Tempest	155*	255	265	330		
GTO					350*	366 (a)
Catalina		255 (b)	265	290* (c)	330	360
Executive			265	290*	330	360
Bonneville			265			360*
Grand Prix			265		350* (d)	370* (e)

*Standard engine.

- (a) 370 with Ram Air IV option.
- (b) Standard on all except convertibles and station wagons; not available on any others.
- (c) Standard on convertibles and station wagons; optional on other styles.
- (d) Standard on Model J.
- (e) Standard on Model SJ, optional on Model J.



assembly and a new wood grain trim plate give the instrument panel a new look. Instruments and controls are deeply recessed and are surrounded by soft vinyl padding.

The standard head restraints have a new slide catch designed to make adjustments with one hand easier. Those who order two-door models with the optional electric door locks also will have electric seat back locks which automatically unlock the front seat backs when the doors are

opened and lock them when the doors are closed. The lever or push button still is present for manual unlocking.

The new trend in interior colors is toward leather tones with considerable use of saddle, sandalwood, and dark brown. LeMans Sport and GTOs will feature new knit and expanded Morrokide trims on bucket and notch-back bench seats.

1971



GRACEFUL NEW styling blended with safety, comfort and driving convenience highlight Pontiac Motor Division's 1971 lineup. Pontiac's intermediate lineup for 1971 includes the T-37, LeMans, LeMans Sport and GTO.

All models have been restyled with new front ends and hoods. All, except the GTO, have a new front blade bumper. A fiberglass header panel between the hood and the bumper surround the dual headlights and grilles. The GTO front features a new wire mesh grille protected by a restyled Endura bumper. Long scoops that open at the front edge of the hood add to the distinctiveness of the GTO.

The 250 cubic-inch six-cylinder engine is standard on the T-37, LeMans and LeMans Sport. The GTO has a new 400 four-barrel regular fuel powerplant. The standard transmission on all except the GTO is the three-speed column shift. The GTO has the three-speed heavy-duty manual with floor shift.

Self-adjusting manual drum brakes continue as standard on all intermediates except LeMans station wagons which are equipped with power disc brakes. Power front disc brakes are optional on all other intermediates.

All four-door intermediates are



built on a 116-inch wheelbase and two-door models have 112. The available models are:

T-37: Two-door hardtop, two-door coupe, and four-door sedan.

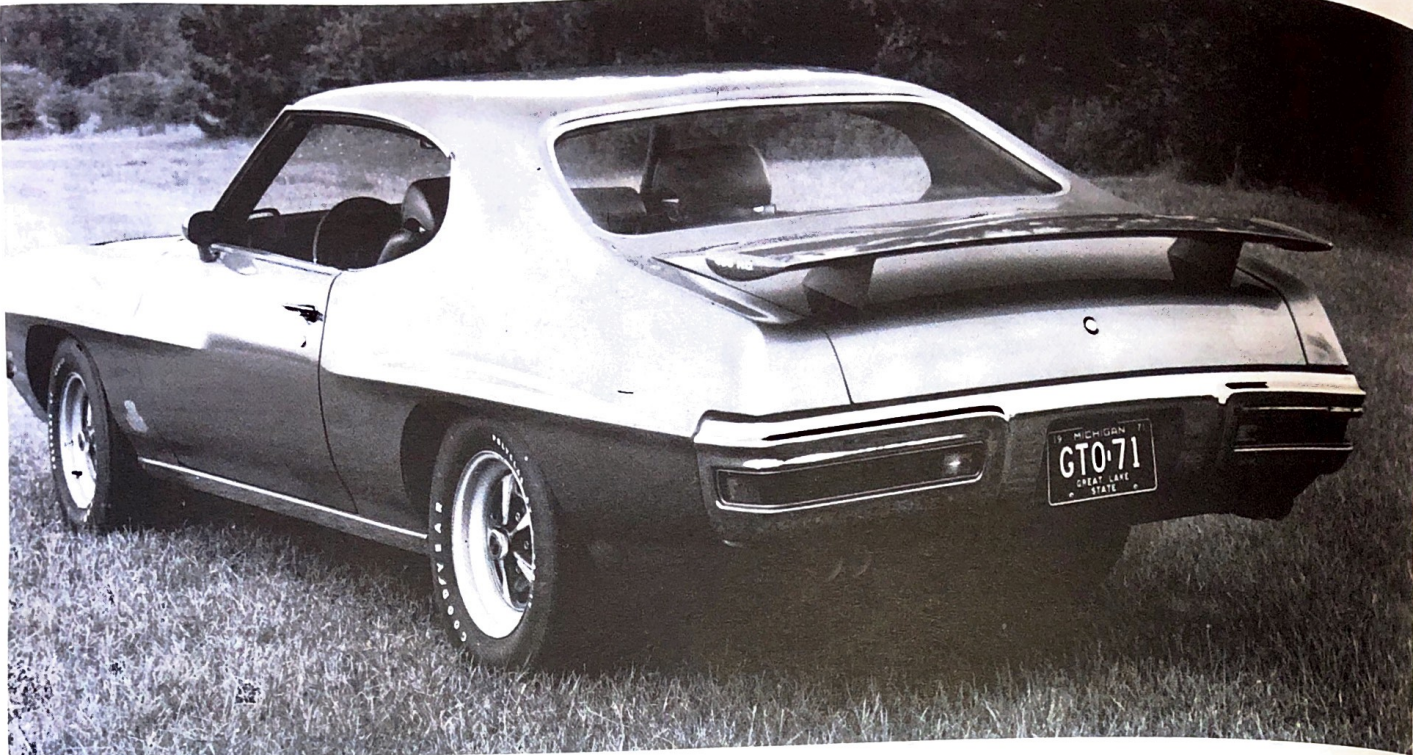
LeMans: Two-door hardtop, two-door coupe, four-door sedan, four-door hardtop, two and three seat station wagons.

LeMans Sport: Two-door hardtop, convertible and four-door hardtop.

GTO: Two-door hardtop and convertible.

Two special packages, the GT-37 and GTO Judge, offer special equipment and a sporty appearance.

The GT-37 option is available on two-door coupe and two-door hardtop T-37's with V-8 engines. The package includes a three-speed floor-shift transmission, dechromed Rally II wheels, G70-14 white lettered



tires, hood hold down pins, dual exhausts with chrome extensions, a larger stabilizer bar, vinyl body stripes and special GT-37 identification.

The Judge has the 455 HO four-barrel engine with functional hood scoops, a floor-shift transmission, dechromed Rally II wheels, blacked-out grille, full-width rear deck airfoil, Judge identification and special stripes.

All Pontiac Motor Division engines for 1971 have been redesigned to achieve the lowest possible emissions levels while at the same time they have been engineered to improve both driveability and performance.

The complete lineup of seven engines—ranging from a 250 cubic-inch six-cylinder to a new 455 cubic-inch HO V-8—operate on 91 octane low-leaded regular fuel.

Four of the engines are new for 1971. They are:

A 400 cubic-inch four-barrel that is standard on the Firebird Formula 400, GTO and Grand Prix.

A 455 cubic-inch two-barrel that is standard on the Bonneville.

A 455 cubic-inch four-barrel for the new Grand Ville and the Grand Prix SJ. This engine develops 325 horsepower at 4,400 rpm.

A 455 cubic-inch four-barrel HO to power the Firebird Trans-Am and the GTO Judge. This engine is rated at 335 horsepower at 4,800 rpm.

All 400 and 455 engines have a compression ratio of 8.2-to-1, except the 455 HO which is 8.4-to-1.

To maintain or improve engine performance, Pontiac engineers have taken the following steps:

New camshafts have been put into the 350 and 400 two-barrel engines for increased low end torque and peak torque.

On all four-barrel engines the secondary air valve opening time has been reduced to one second (from 2½ seconds) for faster response.

For improved starting and acceleration, the air capacity has been increased on all four-barrel manual transmissions and 455 HO engine applications.

All 455 four-barrel engines have larger valves to help peak torque as well as horsepower for better getaway and passing ability.

"All of our engines for 1971 comply with the strictest pollution regulations without sacrificing performance," said F. James McDonald, a General Motors vice-president and Pontiac's general manager.

To meet stringent Federal

standards, all 1971 Pontiacs will be equipped with the following features:
Fixed idle mixture limiters on all carburetors. The idle mixture is preset at the factory so that the mixture cannot be adjusted without breaking a seal.

Compression ratios have been reduced for operation on 91 octane low-lead content regular fuel.

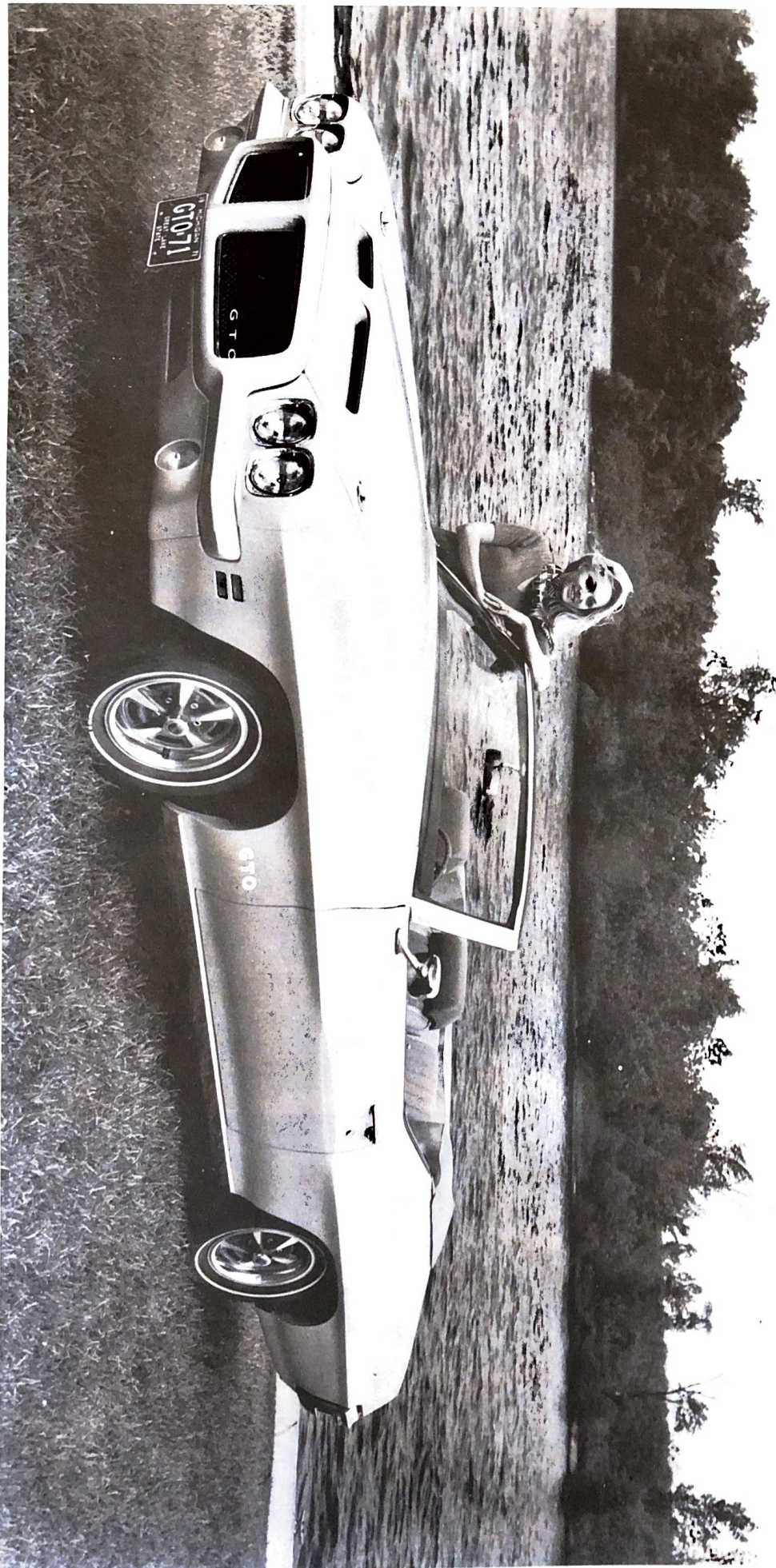
A new aluminum die cast choke housing is mounted on the intake manifold so that the choke coil senses engine temperature more accurately, causing the choke to turn off quicker.

A new fuel circuit has been added to the two-barrel carburetors on 350 manual, and 400 and 455 automatics

to eliminate surge without enriching the mixture at low-speed or part throttle.

The distributor cam lubricator previously based only on high rpm engines, is on all 1971's for precise timing at higher mileages.

An evaporative emission control system similar to the California unit will be on all Pontiacs.



1972



FOR 1972 THE PONTIAC model lineup ranges from the Grand Ville, the flagship of the division's fleet, to the Ventura II, Pontiac's mini full-sized car. All told, Pontiac offers a total of 32 models.

Smooth performance, driving ease and a wide choice of models highlight Pontiac's stylish intermediates for 1972. All eight models have new grilles combined with styling refinements.

The available models are:
LeMans—Two-door coupe, two-door hardtop, Sport convertible, four-door sedan, two and three-seat station wagons.

Luxury LeMans—Two-door hardtop and four-door hardtop.

The GTO and LeMans Sport will be offered as options on the LeMans series. The GTO, available on the two-door hardtop and coupe models, includes side splitters on the performance dual exhausts, an Endura front end, a distinctive hood with air scoops, new air extractors on the front fenders, and G70-14 black tires.

The Sport features front bucket seats, special interior treatment and exterior identification. It is available

on the LeMans two-door hardtop.

All four-door intermediates are built on a 116-inch wheelbase while two-door models have 112.

The 250 cubic-inch six-cylinder is the base engine on the LeMans and LeMans Sport while the Luxury is equipped with the 350 two-barrel and the GTO gets the 400 four-barrel. The

400 and 455 V-8s are optional on all intermediates.

A three-speed column shift transmission and 3.23-to-1 axle ratio are standard on all models except the GTO which has a three-speed floor shifter and 3.55-to-1 axle ratio. Turbo Hydra-Matic is optional on all and the two-speed automatic is





available on all except the GTO.

A special handling package is optional on all two-door intermediates except the Sport convertible. It includes fast variable-ratio power steering, G60-15 white lettered tires on 15x7-inch wheels, GTO high-rate springs, firm shocks, and 1½-inch front and rear stabilizer bars.

Two styling packages—the GT and Endura front end option—offer special equipment and distinctiveness.

The Endura option, available on all LeMans and LeMans Sports, includes the following GTO front end features: energy-absorbing bumper, grille, hood with scoops, headlamp arrangement, valance panel, parking

lamps and front fenders with air extractors.

The GT package is optional on the LeMans two-door hardtop and the Sport convertible with a V-8 engine. Included are a three-speed heavy-duty manual transmission with Hurst floor shifter, performance dual exhausts with side outlets, G70-14 white lettered tires and 14x7-inch Rally II wheels, special side striping, a GT decal on the deck lid and body colored outside mirrors.

A wide choice of eight engines ranging from the base 250 cubic-inch six-cylinder to the 455 HO V-8 are offered by Pontiac Motor Division in 1972. All operate efficiently on low-lead or unleaded regular 91-octane fuel and all are designed for improved durability, added

performance and smooth operation.

400 cubic-inch four-barrel is standard on the Firebird Formula 400, Grand Prix and GTO. This engine is optional on all other intermediates, the Catalina, Catalina Brougham and Safari. It has a net horsepower of 200 with single exhaust. Net horsepower with duals is 250. Dual exhausts are standard on the Grand Prix and GTO.

455 HO four-barrel is standard on the Formula 455 and Trans Am. It is optional on two-door LeMans, LeMans Sport and GTO. Net horsepower with standard dual exhausts is 300.

All 400 and 455 engines have a compressions ratio of 8.2-to-1, except the 455 HO which is 8.4-to-1.



1973



PONTIAC FOR 1973 features a new sporty intermediate, fresh new styling and continued engineering improvement in energy-absorbing bumpers and emission control. There are 33 models in the new Pontiac lineup.

The addition to the intermediate line is the stunning new Grand Am which incorporates classic styling with unique ride and handling characteristics. A distinctive body-colored front bumper and flexible rubber-like urethane front end panel combine functional styling with engineering to give an improved bumper system.

On most 1973 models, Pontiac has front bumpers which exceed the requirements of the Federal bumper standards by being completely self-restoring in a five-mile-per-hour barrier test.

The new bumper system on the front of all full-size and intermediate Pontiacs and the Grand Prix features a new energy-absorbing unit mounted to the frame that can

compress up to three inches and return to normal position when the force is removed. This unit utilizes heavy telescoping steel chambers, pressurized gas and hydraulic fluid to absorb the impact.

The new rear bumper on all Pontiac full-size and intermediate-size cars except Safaris is backed up with a high strength steel-boxed beam reinforcement. The bumper is supported with flexible steel bars to form a spring system.

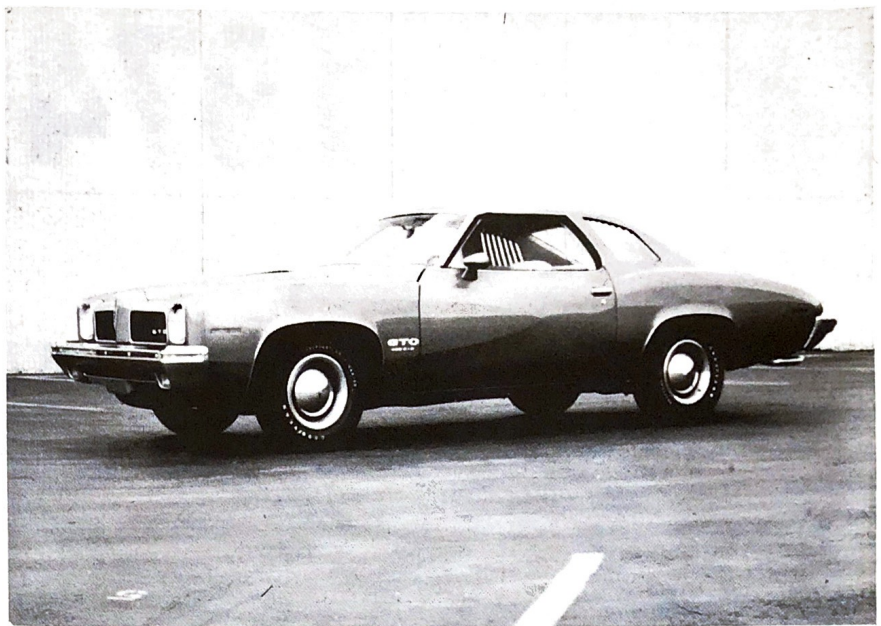
Extensive changes have been made on the 1973 engines to meet more stringent exhaust emission standards with no reduction in engine performance or driveability. In fact, overall driveability and fuel economy will, in most instances, be significantly better.

Also new for 1973 is a duct system directing cold air to the carburetor. This increases maximum engine power and allows greater spark advance with a consequent increase in fuel economy.



The intermediates have an all-new appearance with larger glass area and thinner corner pillars giving improved visibility all around while affording improved roof strength, tight body and glass fits and reduced wind noise.

The famous GTO Option is available again for 1973, on the LeMans and the LeMans Sport Coupe two-door Colonnade Hardtops. The total package, although significantly different from last year, remains readily identifiable to the performance-minded car buyer. Noteworthy exterior features include the blacked-out grille, newly designed twin hood scoops, G60-15 black sidewall tires, dual exhausts with bright extensions, moon hubcaps and GTO identification. (Available white-letter tires and wheel trim rings are shown.)



GTO OPTION

ORDER CODE 341—UPC CODE W62
(Available with LeMans two-door Colonnade Hardtop or LeMans Sport Coupe)

- Blacked-out grille
- Dual hood scoops
- Firm shock absorbers
- GTO identification
- G60-15 black tires
- Heavy-duty, extra-large, front and rear stabilizer bars
- Moon hubcaps
- Performance dual exhausts with chrome extensions
- 400 4-bbl. V-8
- 3-speed, heavy-duty manual transmission with floor shifter
- 15x7" wheels

GTO

Offered as an option (W62) on two series:

- a. LeMans two-door hardtop coupe—2AD37
- b. LeMans two-door hardtop sport coupe—2AF37

STANDARD FEATURES

- a. Manual heavy duty 3-speed floor shift transmission
- b. 400 cu. in. 4-bbl. V-8 engine
- c. G60x15 black sidewall tires
- d. Dual exhaust with bright extensions
- e. Black grille
- f. Hood scoops
- (NASA-type)—Non-functional
- g. Firm shocks
- h. Heavy duty, 1.25 diameter front and 1.00 diameter rear stabilizer bars
- i. 15x7" wheels
- j. Moon hubcaps
- k. GTO identification on grille, front fender, deck lid, and front door inner panels

MAJOR OPTIONS AVAILABLE

- Bucket seats in sport coupe (2AF37) only at no extra charge
- Ram Air Option available with 400 and 455 4-bbl. engines and standard with the optional 455 Super Duty (On hold pending acoustical development)

The new 455 Super-Duty engine is available on the Formula and Trans Am Firebirds, the LeMans coupes, Grand Am coupe and Grand Prix. This power plant provides excellent performance capability, improved driveability and cold weather operation, and improved durability during high rpm operation. (Only Firebirds were built with 455 SD option).

A unitized ignition system is standard on the Grand Prix SJ and is optional on all four-barrel engines except the SD 455 engine. This system provides for extended spark plug life, a maintenance-free distributor, hotter longer spark plug fire and better cold and damp weather starting. Unitized ignition combined with the maintenance-free battery (standard on SJ) and an integral alternator (standard on all Pontiac V-8 models) provide essentially a maintenance-free electrical system.

All 1973 Pontiac models will utilize computer selected springs. This procedure results in springs being selected specifically for a given vehicle according to body style, model and options.

1974



PONTIAC FOR 1974 highlights significant engineering improvements in energy-absorbing bumpers and a new Radial Tuned Suspension package while featuring new styling changes throughout the lineup.

There are 35 models in the lineup including 13 full size Pontiacs, two Grand Am and nine LeMans intermediates, four Firebirds, six Venturas and the Grand Prix. New for 1974 are two and three-seat Luxury LeMans station wagons and optional GTO.

All 1974 Pontiac Grand Ville, Bonneville, Catalina, Grand Prix, Grand Am, LeMans and Ventura models have energy-absorbing bumper systems on both front and rear to meet the new Federal bumper standards.

There are 38 engine offerings in the 1974 Pontiac lineup with all powerplants meeting the Federal

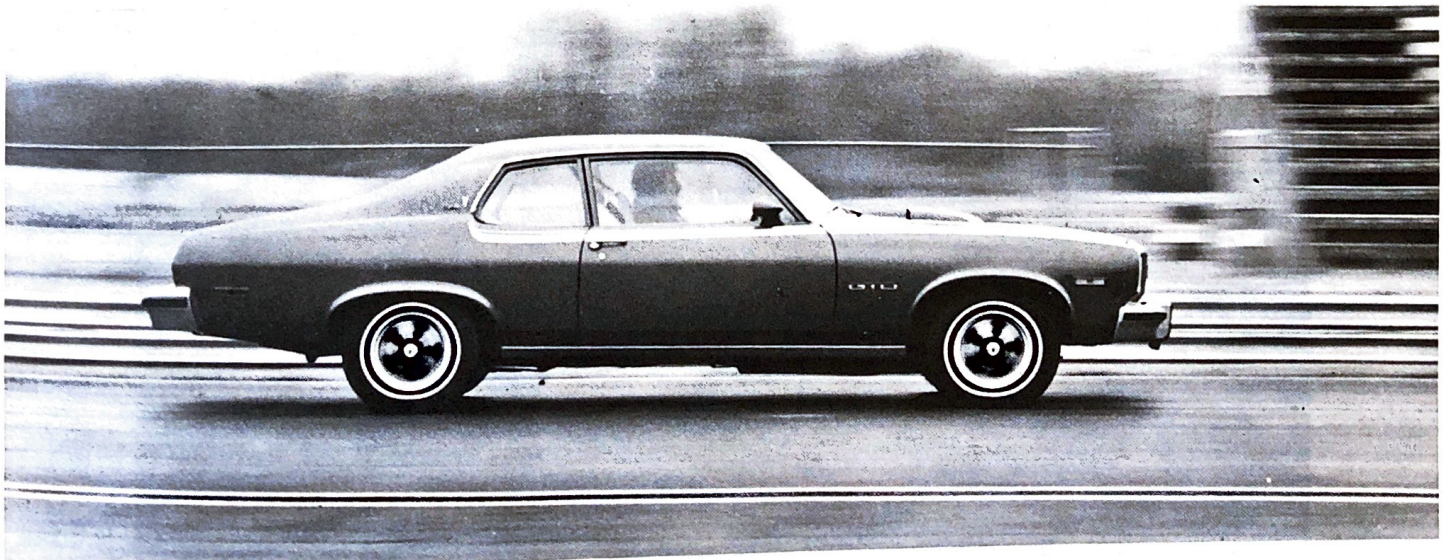
emission standards or the tougher California emission standards.

A new offering is the 350 four-barrel which is standard on the GTO and optional on the Ventura and LeMans series. The 455 Super-Duty engine is available on the Firebird Formula and Firebird Trans Am.

Steel-belted radial tires with a Radial Tuned Suspension system are available on all models and are standard on the Grand Am and the Grand Prix SJ. The package consists of steel-belted radial tires, a tuned suspension including Pliacell shock absorbers, stabilizer bars, tuned suspension bushings and jounce restrictors and special "RTS" identification on the instrument panel. The RTS objective is to give the Pontiac driver increased steering response with controlled vertical motion and a minimum of impact harshness. Improved roadability and

traction are the results of Radial Tuned Suspension.

The compact Ventura carries through distinctive Pontiac identification highlighting new twin ports on the grille that accent the sporty youthful look of this series. An exciting new option for 1974 is the GTO which is available on Ventura, Ventura Custom Coupes and Hatchbacks. GTO features include a three-speed floor shift manual transmission (except California), the new 350 cubic-inch four-barrel V-8 engine with dual exhausts, special suspension and Rally II wheels. Distinctive styling features are a specific black grille with parking lamps, outside sport mirrors, a shaker hood and GTO identification on the front, side and rear. The GTO option is being discontinued on the LeMans series. Venturas are built on a 111-inch wheelbase and are 199.4 inches long.



DRIVING THE 1965 GTO

In 1965, Pontiac increased the rating of the standard four-barrel engine to 335 horsepower but brought out a real goodie of an engine option. It was still 389 cubes, but a new cam that had 292 degrees intake duration, 302 degrees exhaust duration and more streamlined cast-iron exhaust headers added up to 360 big ones. And they meant it. Those weren't just paper ponies. In the May, 1965 issue of *Car Life* magazine, Roger Huntington took some of his famed accelerometer readings in a 360 horsepower GTO and found that the car was being propelled by 345 actual horsepower at the clutch. And the true torque reading was 420 lbs./ft. compared to the factory rating of 424 lbs./ft. By the way, that issue was the first time the word "supercar" was used to describe the new breed of big-engined intermediates.

In addition to the straight engine stuff, there was also a ram air, fresh air package offered late in the model year. To cure the braking problem—GTOs still used the pitifully small 9.5-inch Tempest drum brakes—Pon-

ac offered finned aluminum drums with harder organic linings. For still more abusive driving, they also carried over the metallic lining option.

They say that the '65 GTO was the fastest GTO ever. They may be right. The '65 body was still like the lean, taut original '64 body style. Fully loaded, the car weighed just over 3400 pounds. In '66, Pontiac made some improvements to the engine; they went to larger carbs on the tripower option. But already, the car was starting to grow in both size, weight and rear overhang. As a way of reducing weight, you could special order a '66 GTO with all the sound deadener and sealers removed. This saved a lot of scraping if you were going racing, but made for a leaky car that rattled on the street. It was to no avail. The '66s were up around 3650 pounds and climbing.

By '67, the big engine options and the tripower setup had been dropped and the car continued to grow in weight. By '68, despite the Ram Air IV, Ram Air V and 455 engine options that followed, it was all over for the GTO. The car had been replaced by

other cars as king of the street and the GTO was never again to regain that mystique of sheer power that it had once possessed.

One of the best parts of the whole scene in 1965 was prices. We thought they were high then, remember? In '65, the list price of a base GTO was \$2556. That's right, \$2556! A loaded GTO with the optional 360 horsepower engine, four-speed transmission, power steering, power brakes, metallic brake linings, rally wheels, Safe-T-Track limited slip differential, heavy duty suspension, seat belts, custom steering wheel, rally gauges including tachometer, tinted glass, padded dash and AM radio listed at \$3579, which means you could have probably bought the car for around \$2800. Now *that* was a bargain. Those were the good old days.

If you're a regular reader, you know that we've been reliving the good old days with a series of oldies-but-goodies road tests—tests of cars built during the heyday of the performance revolution. When we received a letter from Chuck Roberts of Hyattsville,





Maryland asking us if we wanted to test his car, it was like asking us if we wanted to spend a night in bed with Barbara Eden. A few phone calls between Hyattsville, Maryland and New York and it was arranged.

Chuck met us one Saturday at Raceway Park in Englishtown, New Jersey. His car was as he described it in his letter—mint. The '65 GTO was a metallic green with matching interior—one of the popular colors for '65s. It was a hardtop, a body style introduced midway in the model year to supplement the post coupe style. It had the 360 tripower engine, four-speed wide ratio transmission and 3.55 rear axle ratio with Safe-T-Track. Other options included the rally gauges, aluminum brakes, radio, and some comfort and convenience options. The car was not originally ordered with power robbing power steering or brakes, but did have

the optional ram air setup.

Chuck had added some things to make a great car even greater. The only change to the engine was a set of headers. In the rear suspension, Chuck added a rear anti-roll stabilizer bar from a '70 GTO and air shocks. In addition, the tires and wheels were not stock. The original redline 7.75 x 14 skins had long since gone the way of all flesh. Chuck was currently running G70-14 Mickey Thompson tires on mags at the front and Firestone G60-15 belted wide ovals on Corvette seven-inch steel wheels at the rear. Other than those changes and an accessory wood steering wheel, the car was absolutely original and the engine had more than 68,000 miles on it.

We decided to try for times that duplicated the efforts of an absolutely stock '65 Goat. So the headers were left closed. A few preliminary passes

immediately led to the observation that the 60-series fiberglass belted tires were what all '65 GTOs needed. We can remember standing near the starting line at Westhampton drag-strip and watching old Goats frying the skinny 7.75 x 14 redlines coming off the line.

Chuck's oldie but goodie had plenty of oats to spin the G60s and we were soon taking some acceleration times. Since he uses the car to commute to work, he never bothered to change the rear axle gearing to a ratio more suited to drag racing. As such, the car was only revving about 4600 passing through the traps—far from ideal from an all-out acceleration standpoint.

Initial times were in the 14.40 range with every run at 100 mph or better. After experimenting with starting line techniques, Chuck dropped the et down to a heart throbbing 14.05 at

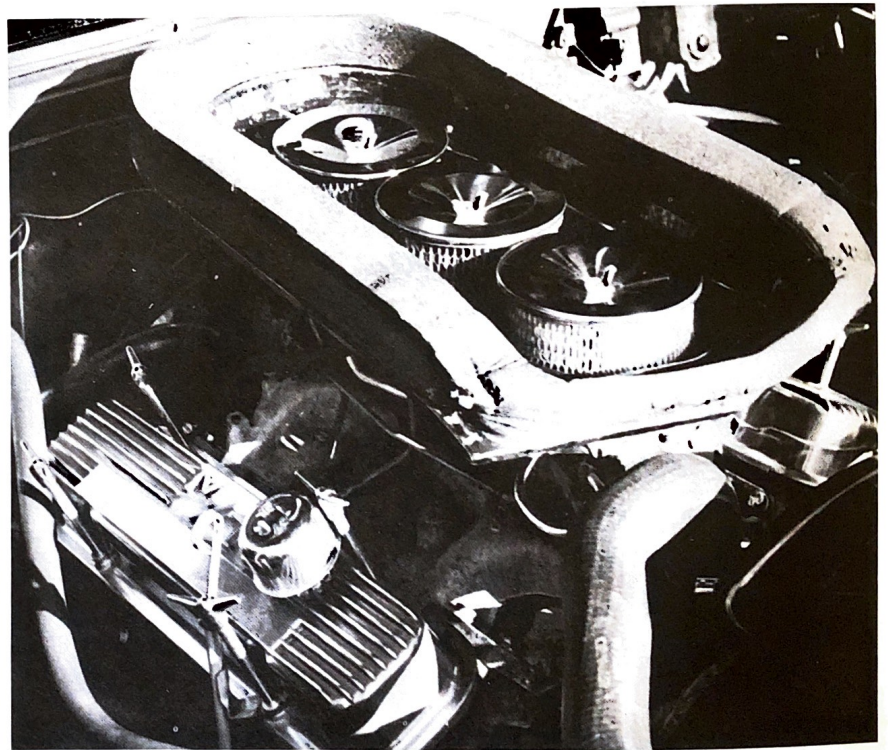
102.15 mph. We say heart throbbing because it's been a long, long time since we've tested a stock street machine that could turn ETs that low with trap speeds that high. With the headers open and 3.90s or 4.11s tucked into the rear end, you'd have a 13.50 street machine that could blow the doors off at least 75 percent of cars manufactured since 1968, when the emission control equipment went at it for real.

And don't forget the performance-per-dollar factor. Chuck's car didn't have power steering or brakes which means it listed for maybe \$3350 when new. You could have driven it off the showroom floor for less than \$3000 in most dealerships. Try to drive any car off the showroom floor these days for less than \$3000, much less one capable of 13-second elapsed times.

On the handling loop, the GTO didn't handle much like a stock Goat, mainly because of the raised rear via air shocks, rear sway bar and different size front and rear tires. However, we could fully appreciate why most GTO buyers opted for power steering. The incredibly slow 24-to-1 overall ratio made for five turns lock to lock and not the quick way around a road course. There was a fast manual option available which dropped the ratio to 20-to-1. Still, the best option was the 17.5-to-1 power steering setup unless you were buying a Goat strictly for drag racing.

One thing that had not diminished over the years was the braking efficiency of the aluminum front drums. They dissipate heat much faster than cast-iron drums and are much harder to fade. The metallic lining option was not available if you ordered the aluminum drums because of wear problems. And the metallics were a little touchy when cold.

Driving Chuck Roberts' GTO was a pleasure. It's been so long since we've driven an intermediate with engine response. The choking smog controls have all but eliminated throttle response so it was almost with sur-



prise that we were punched back into the bucket seat when we kicked open all six barrels of the Rochester carbs.

The low moan emanating from under the hood quickly grew into a loud, throbbing shriek around 6000 rpm and we knew it was time to shift. Ah, performance as it should be.

Go ahead. Accuse us of living in the past, of being reactionary. We don't care. We don't mind admitting that we wouldn't mind going back in time to the late '50s and early to mid-'60s when performance meant performance and the supercar was king.

PONTIAC PERFORMANCE HISTORY

1955-1972

PONTIAC'S glory story begins, like so many other Detroit sagas, in 1955. The year of Pontiac's first V-8. Yes, just like Chevrolet, although Chevy led the V-8 pack with a 1917 "bent Eight." There are actually quite a few parallels between the Pontiac and Chevrolet performance evolution and certainly the performance history of both marques begins in 1955.

It seems slightly incredible now, through hindsight, that neither Pontiac nor Chevrolet had a V-8 engine before 1955 (except the 1917 Chevy). But Chevys and Pontiacs, especially Pontiacs, were not thought of as a "young man's car" and a big, rip-roaring V-8 engine was never deemed a necessity.

Pontiac was quite content with its pre-'55 image of being a staid, almost stodgy manufacturer of solid, well-built cars. Not much performance, but plenty of utility. Simple chassis components, well-proven Six and Eight cylinder engines, extra quality where the price would allow and aggressive merchandising. About the most exciting thing about the Pontiac car was the Indian perched up on the hood! The car didn't excite many people but it did make a lot of money for General Motors. The stockholders liked the Pontiac Division very much.

The first V-8, at 180 horsepower at 4600 rpm from 287 cubic inches, was *not* meant to be a hot performance option. The engine was only developed and offered because 1) Pontiacs were getting too big and too heavy to be pushed around by straight sixes and eights; and 2) everybody else was jumping on the V-8 bandwagon. Still, at 180 horsepower, the '55 Pontiac V-8 transformed the rather dry, old Indian into a lively performer. Zero-to-60 mph times dropped about five seconds with the new V-8 installed.

Yet, the turnaround was the personification of the too little too late syndrome. By '56, all of Detroit—or so it seemed at the time—was hot and heavy into racing and performance. All types of racing. NASCAR stocker racing. Pan American road racing, drag racing. Even with the engine bored out to 317 cubes for '56. Pontiac couldn't really compete with the big boys—and knew it. Yet they couldn't resist dabbling in the performance arena.

For the Daytona Speed Weeks in February, 1956, Pontiac engineers designed an optional engine package around

the 317 cube V-8. It had dual 4-barrel carbs, solid-lifter camshaft, 10-to-one compression ratio and some other goodies. Horsepower of this engine was rated 285 at 5100 rpm. Cotton Owens and Ed Kretz drove it to speeds of 132 mph on the sand, then had mechanical problems in the Grand National race. The car had potential but was also lots of trouble.

June, 1956: Enter Semon E. "Bunkie" Knudsen. In June, Knudsen took over as general manager of Pontiac Motor Division and it's never been the same since!

Knudsen had a theory. *You can sell a young man's car to an old man but you can't sell an old man's car to a young man.* Knudsen immediately committed Pontiac to building "a young man's car." . . . Build a young man's car and sell it to everybody!!

It was too late to do anything about the '56s, but he swung into action for the 1957 model year. Another enlargement of the V-8, now out to 347 cubic inches, brought with it more power. The dual quad option was dropped. The hot assembly line setup for '57 was a *new, triple 2-barrel carburetion option* that upped the rating of the hottest regular production option to 290 horsepower. There were more special racing options for '57 too, under Knudsen, who believed in racing as a way to build a youthful, performance-oriented image. A hot camshaft with solid lifters, higher 10-to-one compression ratio and other goodies coaxed 317 horsepower at 5200 rpm out of the engine.

Pontiac swept house at Daytona in 1957. Their rocket-ship-sided cars averaged 136 mph over the sand course with John Zink driving. Cotton Owens won the Grand National race. Both triumphs came over a factory team of Chrysler 300s: the hottest road cars out of Detroit, at the time.

The year '57 was significant for a few reasons other than the racing victories. The fact that Pontiac offered one high performance option to the general public and held back *the hottest special racing parts for over-the-counter, dealer installation* set a policy which many of the other companies later followed. By keeping the hottest racing stuff for over-the-counter sales and dealer installation, you eliminate the assembly line slowups that occur when special equipment is installed. You also eliminate special service problems at

the dealership level. Other factories copied this plan for many years.

Rochester engineers had offered their fuel injection setup for use by other GM divisions early in 1957. Chevrolet quickly snapped it up for use on the Corvette. Knudsen was all for offering the fuel injection setup as an option across the board, but Pete Estes, then Pontiac chief engineer, vetoed that plan. He felt that there would be too many service headaches because dealership personnel were still inexperienced in most high performance work. Finally, Knudsen and Estes decided to build 1500 special fuel injected cars. The new model was called the *Bonneville*. All 1500 were convertibles and featured real leather seats and other luxury appointments in addition to the fuel injection setup. Needless to say, these '57. Bonneville convertibles are collector's items today.

As a publicity gimmick, one of these Bonneville convertibles was outfitted with a set of leather bucket seats and was shown around during Daytona Speed Weeks in 1957. This was the first time bucket seats were ever seen in a full-size American car. They were an immediate sensation. Knudsen ordered buckets as standard in all '58 Bonneville. But the production people didn't know how to build them in quantity and the buckets were reduced to an option. Still, many '58 Bonneville buyers specified the bucket seats and this is how we came to have bucket seats in large cars!

Nineteen-fifty-eight saw the expansion of the high performance Bonneville lineup into a 2-door hardtop as well as the convertible. The styling was kind of funky, even for '58, but Pontiac stylists felt that rocketships on the sides of cars were the hot setup then.

The tripower street option was continued on the new, larger 370-cubic-inch block and rated 300 horsepower at 4600 rpm. This was with 10.50 compression ratio and a hot hydraulic camshaft. The four-barrel version of this engine was rated 285 horsepower at 4600. There was also a fuel injection option listed for the street engine. The fuelie rated 310 horsepower at 4800 rpm, but according to Pontiac sales records, no '58 fuel injection engines were actually built.

The racing options for '58 were impressive. The single 4-

barrel engine for NASCAR competition rated 315 horsepower at 4800 rpm and the tripower engine with all goodies went to 330 biggies. This was enough power to blow everything into the weeds at the '58 Daytona Speed Weeks. One Poncho hit 146 mph on the beach that year and then Paul Goldsmith won the Grand National race.

Pontiac also listed an engine consisting of all the good racing stuff including the solid lifter cam but topped off with the Rochester fuel injection setup. This combo listed out at 338 horsepower at 4800 rpm. Although none was actually ever built, it has been legal in NHRA competition because Pontiac did list the combination for that year.

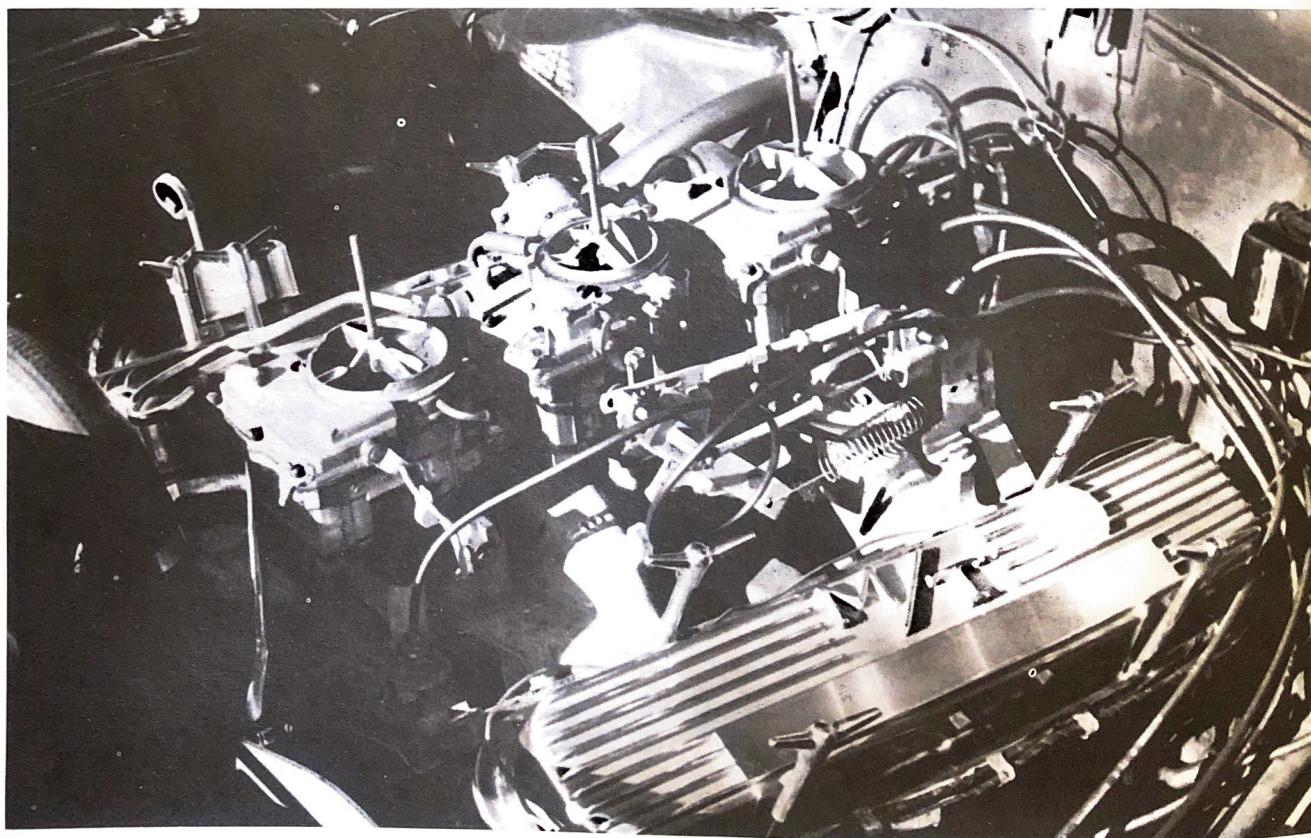
Nineteen-fifty-nine was the first year of the all-Knudsen Pontiac. It showed in the clean styling, absence of rocketships and even more performance. It was also the first year of the *wide track "look."*

It was also the first year that the term "Super Duty" was used to distinguish the competition engines with all their dealer-installed options from the more mundane but nevertheless, spirited assembly line production engines.

A little more stroke on the '59s yielded 389 cubic inches. The production engines were rated 300, 315, 330 and 345 horsepower, the first two at 4600 rpm, the second two at 4800 rpm. The 315 and 345 horsepower engines had the tripower carburetion, the 300 and 330 engines a single Carter AFB. Other differences included the camshafts and exhaust manifolds. Compression on all these engines was 10.50-to-one except the 300 horsepower engine which was 10.00-to-one.

The Super Duty '59 engines consisted of special four-bolt main blocks; special heads with larger valves; either tripower or single 4-barrel intake manifolds made of lighter weight aluminum; no heat risers to the manifold; high compression forged pistons; special, high-flow exhaust manifolds and hot, solid lifter cams (actually Isky E-2 grinds). All this stuff had to be purchased over the parts counter and installed separately. No special horsepower ratings were released for engines with all this special equipment. They were still rated 330 and 345 horsepower, depending on the carburetion.

The most impressive of 1959 victories for Pontiac was the



winning of the Daytona 500, the first one held at the new 2½-mile banked oval track. Fireball Roberts drove the Catalina to victory and Smokey Yunick was the top wrench—a formidable combination.

A slight raise in compression for '60, to 10.25 and 10.75-to-one, raised all the horsepower ratings by three on the street engines. They now rated 303, 318, 333 and 348 horsepower, respectively. The racing parts were continued virtually unchanged for '60, but horsepower ratings were assigned so that the cars could compete in NHRA drag racing competition. The ratings were 348 horsepower with the single 4-barrel and 363 with the tripower.

Engines weren't the only good stuff offered in 1960. Pontiac had a wide selection of heavy-duty springs, shocks, hubs, wheels, gears (everything from a 2.56 to 6.14), limited slips, steering components, etc. It was the most complete list of equipment in the industry. To top it all off, they offered the Borg-Warner T-10 four-speed transmission with floor shift. Previously, only Chevrolet had offered a four-speed.

A buyer could literally custom build his '60 Pontiac on the order blank. He could specify mild or wild engines, custom bucket seat interiors, special rear axle gearing, transmissions, heavy-duty suspension, aluminum wheels and drums. This was the realization of another of Knudsen's philosophies. Have a standard model for the mass market but have long lists of options so that people can tailor their car to their own tastes. In 1960, this was radical thinking in Detroit. No other company had anywhere near the list of options that Pontiac had.

It got results. Pontiac moved into third place in sales. (They were number six when Knudsen took over.) They

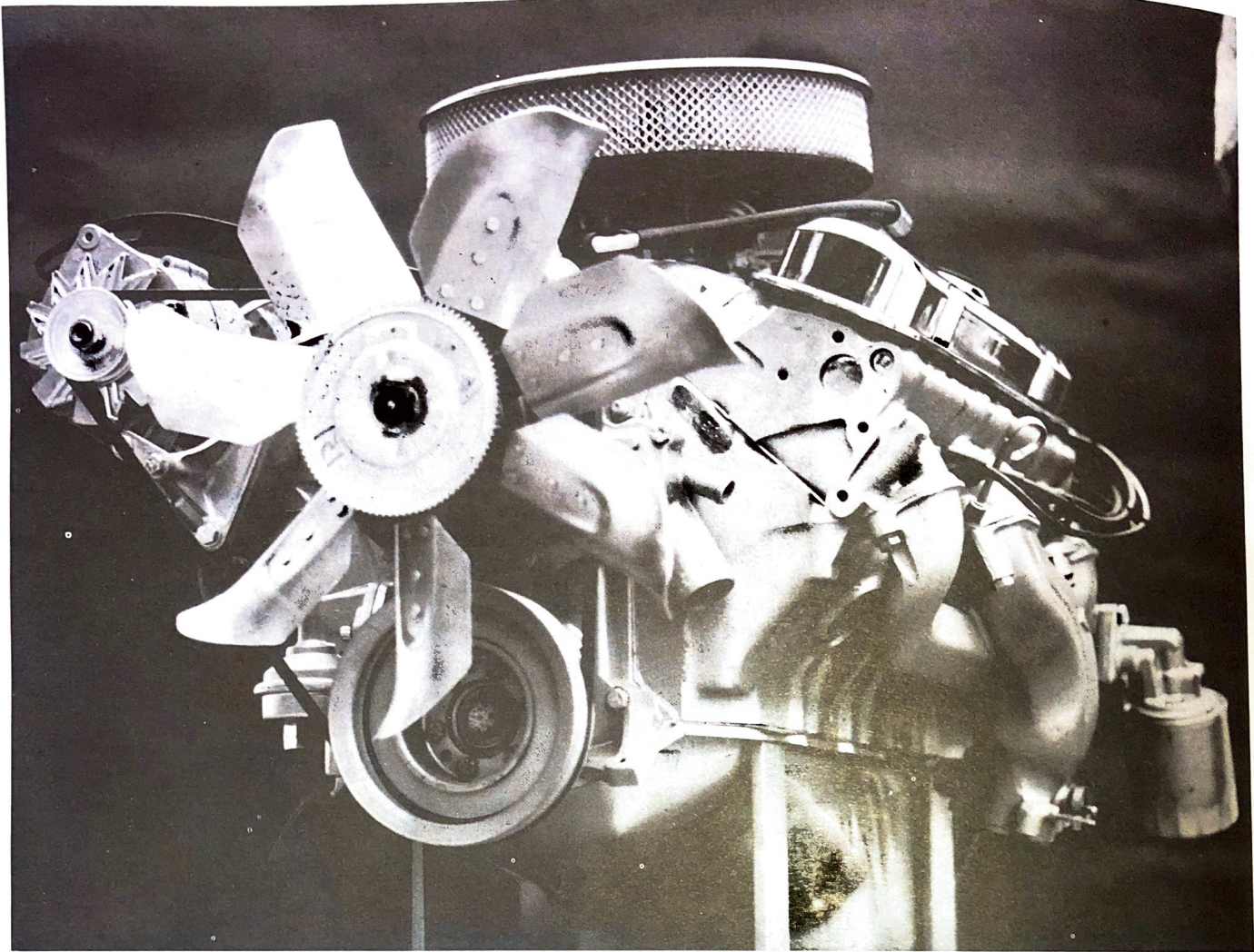
again won almost everything in sight. Fireball Roberts turned top qualifying time of 151.56 mph at Daytona. At the NHRA Nationals in the fall, Jim Wangers drove the Royal Pontiac four-speed Catalina to victory in the new Super Stock class. His times of 14.14 at 102.04 wiped out all the other cars in the class. His nearest competition was another Pontiac!

In May, 1960, Mickey Thompson went on his incredible speed binge at March Air Force Base, California setting numerous national and international records in all sorts of classes, all with Pontiac-powered streamliners. He was to assault the record books again and again in the next few years with all kinds of machines including a Catalina sedan, streamliners of every description and, of course, the famous *Challenger* streamliner which went over 406 mph at Bonneville.

At the beginning of the '61 model year, the only change was a quarter point more compression on the Super Duty packages, although there were a couple of new camshaft grinds from *Malcolm McKellar*, who figured heavily in the development of all the early high performance pieces but who is especially known for his legendary camshafts. Ratings were raised to 368 horsepower at 5600 for both the tripower dragstrip version and the single 4-barrel NASCAR version. (Both actually put out over 400 horsepower with everything blueprinted.)

This was also another little trick Pontiac played in those days. While all the other Detroit manufacturers were putting super-inflated horsepower ratings on their engines, Pontiac's ratings were always very conservative. They either reflected the true output of the engine or, in special instances, actually underrated the engine.





Remember, this was before factoring of engine ratings. NHRA simply used the advertised horsepower rating and advertised shipping weight to determine classifications. By underrating their engines, Pontiacs always enjoyed favorable classification and could run against engines putting out sometimes only half the actual power. It doesn't matter how you play the game. It's the victory that counts.

However, the winds of defeat were starting to blow around Wide Track Boulevard. Ford's '61 super stock engine was 390 cubes and 401 horsepower. It was doing the job to the 389/368 Pontiacs. In addition, Chevrolet had just introduced their 409 and Dodge and Plymouth were using the big Chrysler 413 engine in the smaller Dart and Fury bodies. Pontiac had to do something.

They did something. Just prior to the 1961 NHRA Nationals at Indianapolis, Pontiac introduced a new 421-cubic-inch engine. It was rated a ridiculously low 373 horsepower and the only people who could get them were the Mickey Thompson crew. The engines were so new that NHRA had to make a special class for them—Optional Super/Stock. Other cars in the class were Chevy's new dual quad 409/409 and Ford's new 406/405. As it turned out, Hayden Proffitt in Mickey Thompson's Catalina blew off everyone with a 12.55-110.20 blast, which was unheard of in 1961. Even a 13-second stocker was looked on as something incredible. By comparison, Lloyd and Carol Cox won the S/SA class with a time slip reading 13:80-105.63 with their 368 horsepower 389.

The new Super Duty 421 was basically a poked and

stroked Super Duty 389. Bore was now 4.093 and stroke 4.00. The number ten McKellar camshaft was used along with a new dual 4-barrel intake setup on a high rise aluminum intake manifold. Compression was 11-to-one.

For '62, Pontiac's most successful year in super stock racing, the factory was forced to go the assembly line route by the new NHRA ruling which outlawed all the so-called dealer-installed performance options. Now everything had to be real production options right off the assembly line.

By this time, Bunkie Knudsen had moved over to the general managership of the Chevrolet Division and Pete Estes had taken over as Pontiac boss. He was all for the idea of the assembly line super stocker.

The price was stiff. The Super Duty 421 cost \$1334.24 over the cost of the standard Catalina V-8. A mandatory option was the 4-speed trans for another \$234. So the costs of super stock racing were high even 11 years ago. It was still cheaper than buying all the stuff separately though.

Few people realize that there were *two special Super Duty engines in 1962*. Both were available only in the Catalina series, although some guys bought Catalinas, then fitted Grand Prix grilles to their cars. It came under the heading of "mild customizing" which was allowed under NHRA rules.

The Super Duty 389 was for NASCAR racing and was rated 385 horsepower with one 4-barrel carb on an aluminum intake manifold. Other than the bore and stroke, both the 389 and 421 were basically the same engine and used

many similar parts. Both had 4-bolt mains, high capacity fuel pumps, heavy duty clutch, special front harmonic balancer, heavy duty bearings, dual point distributor, etc.

The 389 had split flow exhaust headers made of cast iron. The 421s came through with the same headers cast in aluminum to save weight. If you drove too long with these aluminum headers, you burned holes in them. They were meant only for short dragstrip blasts, preferably of less than 13 seconds duration. You may be wondering why all the fuss about some exhaust manifolds which were just going to be ripped off for a set of headers, anyway. (This was before steel tube headers were being used extensively.) All the factories were working hard on efficient exhaust scavenging.

Cylinder heads were the same for both the Super Duty 389 and 421, actually holdovers from the '61 engine. They used 1.92-inch intake valves and 1.66-inch exhaust valves and had large ports. These were a lot better than the standard heads but not as good as the '62 ½ heads with still larger ports and 2.02- and 1.76-inch valves. The new heads also used 1.65-to-one rockers which really boosted breathing capacity.

The Super Duty 421 with the 11-to-one compression, number ten McKellar and dual quads rated 405 horsepower at 5600 rpm. In one early road test of the engine in a Catalina 2-door hardtop, Roger Huntington took some accelerometer readings to determine the *actual output of the engine at the clutch*—465 horsepower and 510 lbs./ft. of torque and this was with the early heads! This is fantastic output even by today's standards.

Since late 1960, Pontiac had been offering some lightweight aluminum body parts for over the counter sale. In '62 they made the lightweight body parts part of the 421 Super Duty package on the Catalina. The lightweight parts

included the hood, both front fenders, front and rear bumpers, brackets, fender shields and other bits and pieces. Late in '62, Pontiac also released an aluminum case 4-speed with special aircraft quality steel gears that made the box almost bulletproof. They also released a small hood scoop for the aluminum hood.

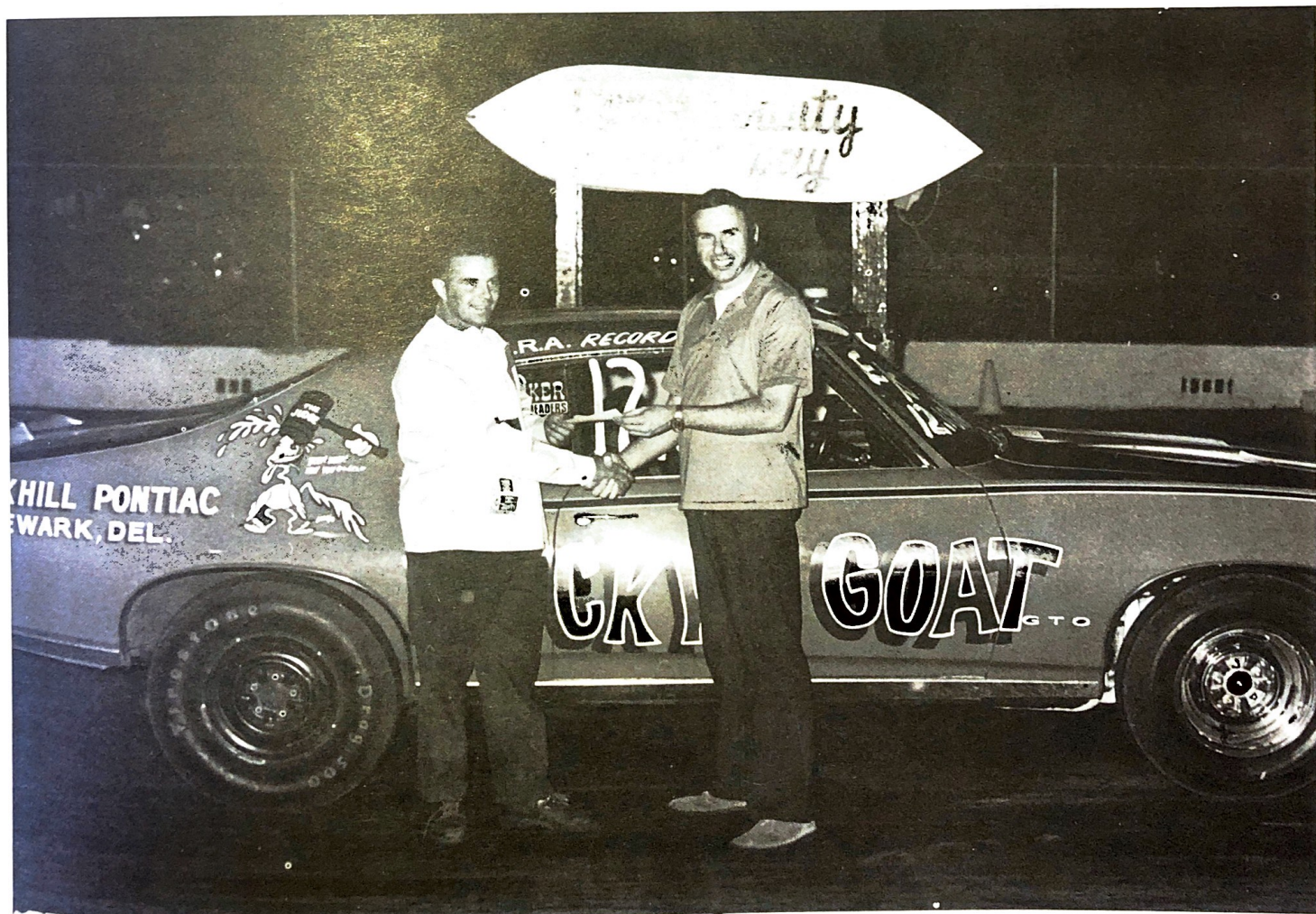
With the Super Duty 389, a 3.42 rear axle ratio was standard. With the 421, you got a 4.30. If you didn't like these ratios, Pontiac's option book listed anything from a 2.56 to a 6.14.

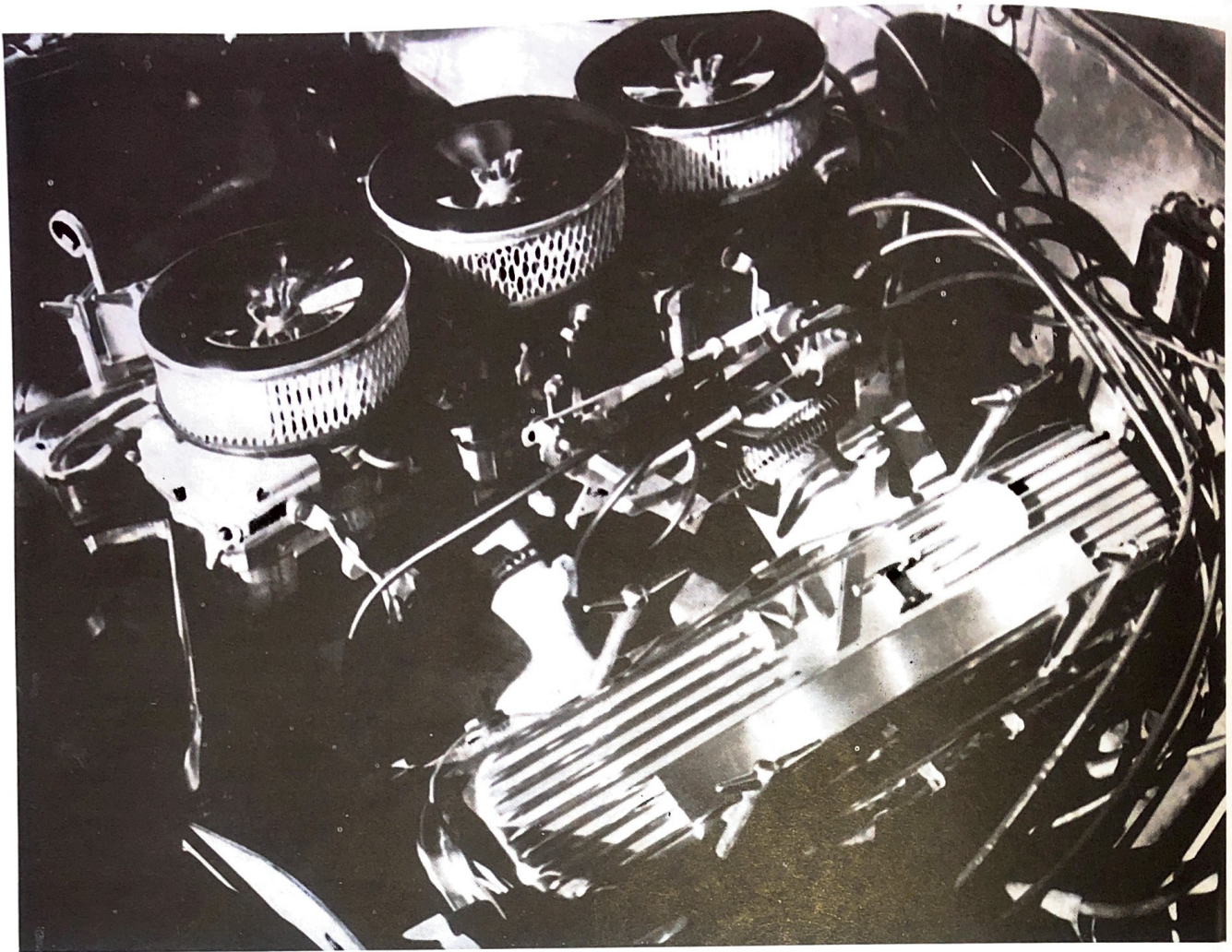
About halfway through the model year, the Super Duty 389 was phased out and replaced by a single 4-barrel version of the 421. The 4-barrel 421 was rated 385 horsepower and nothing could touch it on the NASCAR superspeedways. Fireball Roberts and other Pontiac drivers cleaned house easily that year.

The '62 Super Duty 421 Catalina was undoubtedly the high point of Pontiac's performance history. On NASCAR tracks, the single 4-barrel version ran all over the opposition. On dragstrips, the Royal Pontiac 421 was turning 12.38s at over 116 mph with the big 3700 pound Cats. The '62 was also the most popular from a sales standpoint. Almost 1500 Super Duty packages were built in 1962.

On the street scene, the new Grand Prix was the style-setter for '62. Buckets and console were standard. Engine options again ranged up to the 348 horsepower tripower engine. Many buyers specified the 4-speed transmission.

In 1963, Pontiac made further improvements on the Super Duty package. The car had gotten bigger and heavier and just wasn't competitive even with the aluminum front end. Pontiac engineers put the Catalina on a crash diet and came up with the famous "Swiss cheese" Catalinas. Not only was the complete front end and rear bumper aluminum, but the entire chassis had huge holes drilled





all along its length to further cut down weight. Plexiglass windows were a dealer installed option.

In the engine department, the 421 Super Duty was also refined. New cylinder heads had the same valve sizes but larger ports. New valve springs and lighter valves let the engine rev higher. A new transistor ignition was added and the dual 4-barrel intake manifolds was made slightly higher to give more ram effect. Two different sets of exhaust headers were offered. On drag engines, the aluminum headers were continued. But since they melted at high temperatures, the factory also had available a set of stamped, welded steel headers for the NASCAR boys. This was the first time tubular steel headers were offered off the assembly line.

There were actually three Super Duty engines in 1963. All were 421s. The single 4-barrel NASCAR engine with 12 to 1 compression ratio rated 390 horsepower. The dual quad 421 with 12-to-one compression was rated 405 horses. The super Super Duty drag engine included special 13-to-one pistons to bring the engine up to 410 horses.

In the spring of 1963, the infamous GM ban on racing took hold and only a few of the Swiss cheese Catalinas were built. Production of the racing 421 engines also ceased. Royal Pontiac ran their Swiss cheese car all year in B/FX class and won all the laurels there.

A new twist was added to Pontiac's '63 street engine lineup. Or maybe we should say twister. A street version of the 421. The old 425-A Trophy engines of 333 and 348 horsepower were dropped. In their place were detuned versions of the 421 with a single 4-barrel and tripower.

These engines had hot hydraulic camshafts, 10.75 compression and long branch exhaust manifolds. The 4-barrel rated 353 horsepower at 5000 rpm and the tripower setup was called 370 horsepower at 5200 rpm. The tripower street 421 was the strongest street engine available in 1963 by far, although it never did much on the dragstrips in the lower stock classes.

By '63, Pontiac product planners knew that without the racing successes to count on, and with the big Pontiacs growing heavier by the minute, their hard won position at the top of the performance image heap was going to crumble fast.

Enter the GTO. The GTO is said to have been the brainstorm of Jim Wangers. Wangers, the guy who drove the Royal Pontiac drag cars so often, was the Pontiac account executive at MacManus, John and Adams, Pontiac's advertising agency. He was also influential in product planning circles. He knew the image would need a boost and decided to drop the big Bonneville 389 engine in the new intermediate Tempest series, add on heavy duty chassis components and a flashy name. It wouldn't be a racing car, so frowned upon in the GM executive washroom. No, this would be a high performance street machine. There's a big difference, one that Ford Motor Company never learned in all their racing years.

Pete Estes, the Pontiac boss, and John DeLorean, then Pontiac chief engineer agreed that the thing could work. And in 1964, the GTO was born. Not only did it take everyone by surprise, it flabbergasted everyone. It also started a legend and a whole new breed of car that was to completely dominate the automotive industry until the insur-

ance-safety-emissions blitzkrieg of 1971 killed the supercar.

The '64 GTOs were offered in a convertible or coupe. A hardtop was added later in the model run. Standard engine was a 389 of 325 horsepower with a single 4-barrel. Optional was the same engine with tripower and a 348 horsepower rating. Other orderable goodies included 4-speeds, suspensions, axle ratios, the whole Pontiac list.

Needless to say, the car was an instant success. An initial order called for building 5000 GTOs to test the market. By January, the factory already had firm orders for 10,000. At first, the GM bigwigs were going to kill the project. That is, until they saw the cash register start ringing. If the GTO could sell that many units, the brains behind the ledger books decided to let it go.

There was a 2+2 package for the Catalina that year including the street 421 engine as an option. But after the advent of the GTO, the market for full size performance cars faded fast. The 2+2 was a model through 1967 and even offered the 421 (then 428) as standard equipment. But not many were sold. Everybody wanted a GTO, the fastest street machine yet from Detroit.

Wangers was a marketing genius and knew how to promote. He sold GTOs *plus* GTO shoes, GTO after-

shave lotion, GTO sweat socks and a hundred other GTO things. He even produced a rock and roll song—*Little GTO* by Ronnie and the Daytonas. The words of the song tell the GTO story:

*Little GTO, you're really look-
in' fine,
Three deuces and a 4-speed, and
a 389.
Listen to her tachin' up now,
Listen to her wind.
Gonna turn it on, wind it up,
blow it out,
Gee Tee Oh!*

Copyright Buckhorn Music, Inc. BMI.
All rights reserved.

In 1965, Pontiac increased the rating of the standard 4-barrel engine to 335 horsepower but brought out a real goodie of an engine option. It was still 389 cubes, but a new cam, more streamlined exhaust headers and tripower added up to 360 horsepower. In addition to the straight engine stuff, there was also a Ram (fresh) Air package offered late in the model year. In addition to the engine options, there was the usual list of other Pontiac goodies including metallic brake lining and aluminum front drums.

Many say that the '65 GTO with all the hot stuff was the fastest drag-

strip Pontiac ever. They may have a point. Royal Pontiac and some other dealerships had their '65s going very low 12s with ease.

Again, the weight problem was beginning to creep around. The '66 GTO was heavier with more and more luxury features being added all the time. As a way of reducing weight, you could order a '66 GTO with all the sound deadener and sealers removed. This saved a lot of scraping if you were going racing—and many GTO buyers were. But it also made for a leaky car that rattled on the street. Still, the '66 was ruler of the street. Not much could touch it. The engine was virtually unchanged. The 360 tripower engine got some larger Rochester 2GC carbs at all three stations and the ram air package was continued. But the '66 weighed almost as much as the old '62 full sized Catalinas.

In '67, there was another performance cutback and the tripower option was dropped on the GTO. You could still get the ram air package around a single 4-barrel engine and some of the power was made up by going to 400 cubic inches. They still called the engine 360 horsepower. On the full size Pontiacs, the 421 had been slightly overbored to 428 cubes and the top option was now 376 horsepower at 5100 rpm. This was with the long branch exhaust manifolds and hot cam from the



GTO power pack.

Nineteen-sixty-seven was also the first year of the Firebird, Pontiac's entry in the ponycar marketed that had been started three years before by the Mustang. The Firebird continued Pontiac's tradition of offering basic models, then letting the buyer build up the car via the option list on his own specs. All the hot GTO stuff was offered in the Firebird although the top engine option was called 345 horsepower so as not to tarnish the GTOs image as the Pontiac performance leader.

By '67, the ram air packages had developed into something really special around Pontiac. It was another instance of Pontiac leading the industry. They had discovered the 10 percent boost in power with cold air before anyone else and exploited it to the fullest. Not only was the ram air package a status symbol around the drive-in, it really worked because it included specific internal engine parts that were completely different from the standard engine packages.

For instance, the ram air cam had 301 and 313 degrees duration for intake and exhaust whereas the standard GTO engine had 273 and 289 degrees duration. The optional high performance GTO engine cam was 288 and 302 degrees. Better exhaust manifolds graced the ram air engines as did lighter weight, swirl-polished valves and other goodies. The new '67 heads with much larger 2.11 intake valves helped the breathing too. Still, Pontiac played the horsepower rating game. The high performance GTO engine for '67, called the HO engine, rated 360 horsepower at 5100 rpm. The ram air engine rated 360 horsepower, too, but at 5400 rpm. Despite the identical horsepower ratings of 360, obviously, the ram air engine was much stronger. Yet, both engines ran in the same class according to NHRA rules. It was things like this which finally forced NHRA to factor horsepower ratings.

We can personally attest to how strong the '67 Ram Air GTO was because the staff here at CARS Magazine ran one all year in open competition. The car was originally set up and prepared by Royal Pontiac, then sent to New York where Motion Performance put the final tune on the car and maintained it all year. Driven by CARS editor Marty Schorr, the car racked up an impressive number of wins in the B/SA class at many strips all over the east

coast.

The GTO grew a little more luxurious in 1968 and heavier. The top regular production option was the 360 horsepower HO engine. The limited production ram air engine was continued without change. Not much attention was paid to the GTO's engine compartment for '68 because the body style was all new and that's where all the money was spent.

There was also a new Grand Prix for '68 with new engine options for it. The new Grand Prix was beautiful, a true luxury/personal performance car if you so specified the SJ option. In addition to the heavy duty suspension, wide oval tires, etc. you got a 428-cubic-inch engine rated 390 horsepower at 5200 rpm.

We remember testing one with a 4-speed transmission and full Royal Bobcat tuneup. The car was a mind-blower on the street because it could run with 90 percent of the supercars around and this was a full luxury car with power everything.

The 1969 car and engine lineup was almost unchanged at the beginning of the model year. The HO engine was now called the Ram Air III because it had open scoops on the hood. The rating was now 366 horsepower at 5100 rpm. Midway through the model year, Pontiac made two changes. First, they added *The Judge* to the car lineup. The Judge was a gimmick-ridden GTO with a wing on the back and bright orange paint and stripes. This was at the height of the popularity of *Rowan & Martin's Laugh-In* TV show and we imagine the name sounded good at the time. Through the miracle of hindsight, now, we all know that the name and the car were lead balloons.

A more important mid-year change was the introduction of the Ram Air IV engine to replace the early ram air package. The Ram Air IV engine rated 370 horsepower at 5500 rpm (still on the 400 block). It had a 308/320 camshaft, superbef throughout, light valves and new heads with round exhaust ports for much better breathing. This engine was also optional on the Firebird as were all Pontiac's 350 400-cubic-inch engines.

Another goodie in late '69 was the Firebird PFST. This was an experimental suspension package on the Firebird that dramatically increased the handling capabilities of the Bird. It also proved to be the prototype of the Firebird Trans-Am package. We remember testing one of these PFSTs and the cornering power and overall handling of the car was su-

perb as on all later Trans-Am Firebirds.

In 1970, Pontiac turned its attention to the handling of the GTO. A much needed rear sway bar was added for increased evasive capability and the suspension was tightened down another peg to offset more weighty luxury items. The engine lineup was the same as for '69 with the Ram IV being the top option.

The Firebird Trans-Am became the hot setup for the sporty car set in '70 and there was a Formula 400 with the Ram IV engine as an option for the acceleration crew.

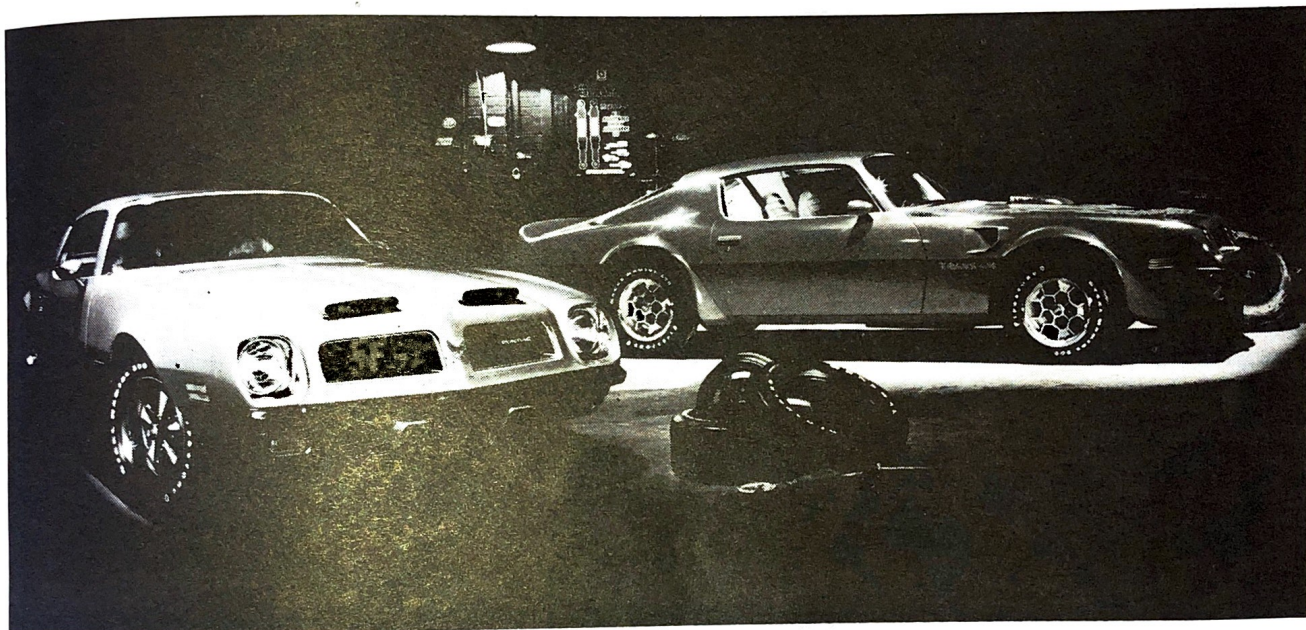
On the '70 engine scene, Pontiac announced a 303 solid lifter engine rated 290 horsepower for use in the Trans-Am Firebird. *This was at the height of factory participation in the Trans-Am road racing series* and Pontiac was thinking of jumping in with both feet. The 303 was a de-stroked 400 Ram Air IV engine but with a solid lifter camshaft and some other special items. The engine was never produced except for a few experimental units.

Nineteen-seventy also saw the announcement of a new Ram Air V engine for optional installation on GTOs and Firebirds. The Ram V was almost a completely new engine although many of the parts interchanged with earlier engines. The heads featured round intake and exhaust ports for super top end breathing. The aluminum high rise intake manifold mounted a 780 cfm Holley 4-barrel. The camshaft was a 308/320 degree unit but worked with solid lifters for higher revs. All this plus the engine had special beefed rods, 4-bolt mains, extra webbing etc. for increased high rpm durability. None of these engines were ever installed on the assembly but it was possible—and still is—to purchase a whole Ram Air V engine.

For '71 and '72, the high performance 400 options were dropped from the GTO and Firebird lineup. In their place was a new 455-cubic-inch engine which turned out to be merely a bored and stroked 428. Top horsepower rating for the low compression 455 engine in 1971 was 335 at 4800 rpm. In '72, Pontiac had a 455 HO option with a lot of the old ram air goodies chocked into the 455 block. With the new net horsepower ratings, the output was 300 at 4000 rpm. Our Firebird Trans-Am road test with the 455 HO engine proved to us that the HO was the strongest street engine available last year.

TOPCAT TUNING FOR STREET & STRIP

Here's the low-bucks way to turn on pre-smog and smog engines from the 389 to the 455



Generally speaking, there are four keys to better performance: Ignition, Carburetion, Valve Train and Compression. For an engine to put out maximum horsepower, the ignition must be calibrated and total timing must be right there; jetting must be rich enough; the valve train must be modified for extra rpm; compression must be as high as class rules and pump gasolines allow. These are the four basics.

The easiest way to handle all the above mentioned mods, plus a few minor ones not outlined, is to install a TOPCAT bolt-on horsepower kit. These kits are available for all Pontiacs, and are guaranteed to add 10 percent additional rear wheel horsepower. These kits come complete with ignition advance parts, correct range spark plugs, special points and condenser, carburetor jets, super thin head gaskets, blocked heat riser intake manifold gaskets, rocker arm locknuts, car-

buretor heat spacers, valve cover and valley cover gaskets and step by step supertuning and installation data.

To get a better idea of what it's all about, follow us through on these instructions for Topcatting a 400-inch Pontiac engine. You will note that while the heads were off, a progressive angle valve job was performed to take maximum advantage of the super tuning.

DISASSEMBLY

First, disconnect the battery and drain the radiator. Then rotate the engine to Number One Top Dead Center and carefully remove the distributor. Unbolt the intake manifold (and pushrod cover on some engines) being careful not to allow any foreign matter to get into the engine. Remove all rocker arms (discard nuts) and pushrods. It's important that all the pushrods be kept in their original order so they may be replaced in their own loca-

tions. Disconnect the exhaust pipes from the cast iron headers.

HEADS

Now it's time to do a little head work. Loosen the head bolts and remove the head assemblies with manifolds attached. Carefully clean both the head and block surfaces to avoid nicks that might cause gasket failure when the heads are re-installed. At this time it's advisable to have the valves done as even brand new engines have valve seats which are not concentric and bent or out of round valves. When doing the valves always replace the factory seals with PC #1711 Teflon seals. Check all valve springs on an accurate spring tester and replace the low ones. Reassemble the heads, making sure to shim the valves to the correct installed height (the distance from the bottom of the spring seat—1.586 inches plus or minus .030 inches).

Next, spray or brush gasket surfaces

with a light coat of gasket sealer, install the thin gaskets and torque down the heads to the specifications supplied in the kit.

Install the pushrods and rocker arms in their respective locations, making sure no dirt falls on the lifters and camshaft surfaces. Coat the pushrods and rockers with a thin coat of oil.

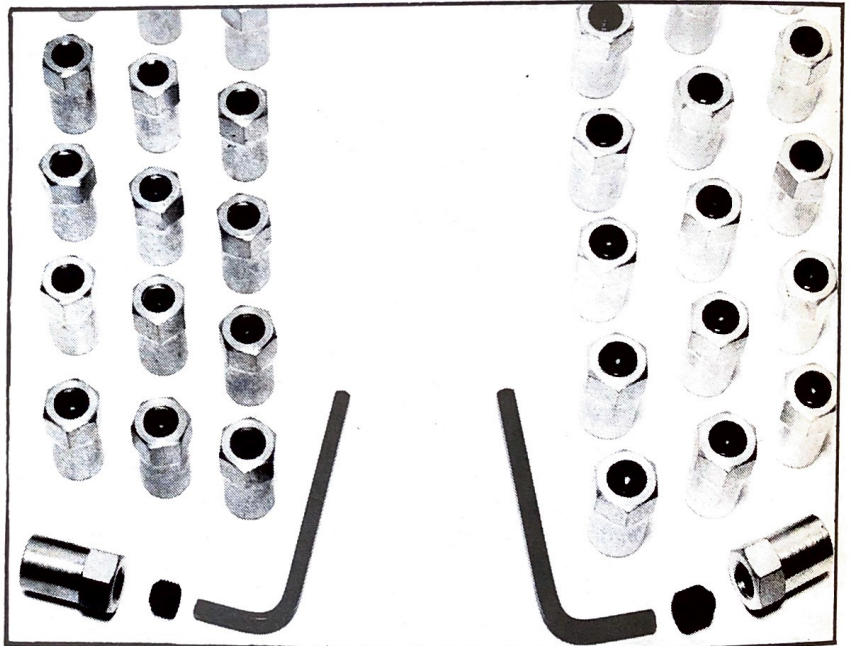
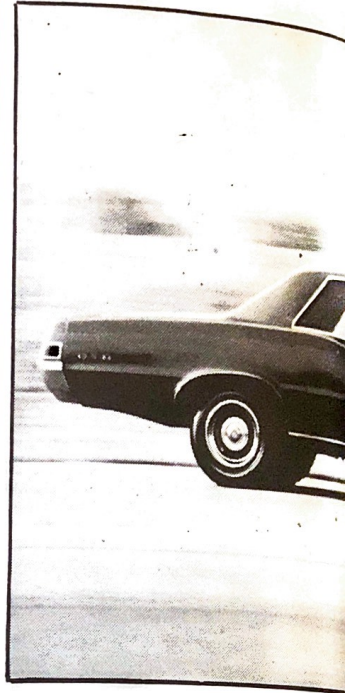
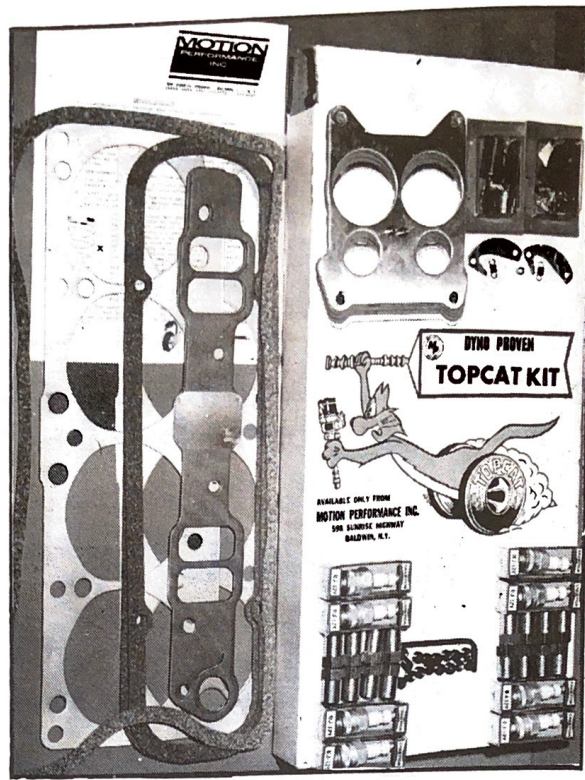
VALVE SETUP

At this time it's wise to make a cold valve adjustment with the engine off. Turn the engine to Number One (first cylinder on driver's side) and adjust the following lifters—Exhaust: 1, 3, 4, 8, and Intake 1, 2, 5, 7. Rotate the engine one complete revolution, which will bring Number Six to Top Dead Center. Adjust Exhaust: 2, 5, 6, 7, and Intake 3, 4, 6, 8. Turn the locknuts supplied in the kit down until all slack is out. Continue tightening 1/2-turn and snug up the Allen head key locking screws. You will be able to see the lifter seat start to move downward when making a 1/2-turn adjustment.

Replace the pushrod cover and intake manifold gaskets with the ones supplied in the kit. The special blocked heat riser gaskets should *only* be used in warm temperatures as low temperature operation with these gaskets results in poor low speed characteristics.

IGNITION

At this point the distributor should be modified with the parts provided in the kit. Remove the stock weights, springs, and advance limiter bushing (located under the weight plate) and replace with those supplied in the kit. Install the special Mallory 7500-rpm point set and condenser, making sure the points mount flush with the mounting plate. Place a drop of Lubriplate on one of the eight high spots of the distributor cam. Set the points at .020 inches or preferably set with a dwell meter at 28 to 30 degrees. This next step is super critical if maximum output is to be expected. Run the distributor in an accurate distributor machine to determine the exact amount of built-in mechanical advance. This is the only accurate method of checking exact total advance. For the record, total advance is the sum total of the built-in mechanical advance in the distributor added to the initial crankshaft degrees (the amount you set with the timing light). For example, if you have a 12 degree curve in the distributor, it is equivalent to 24 crankshaft degrees. Take the 24 crank



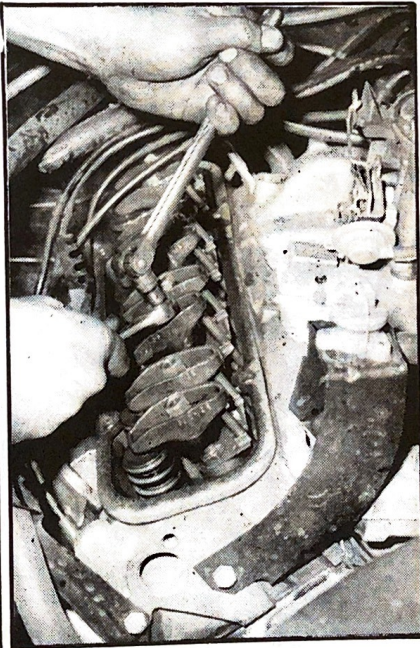
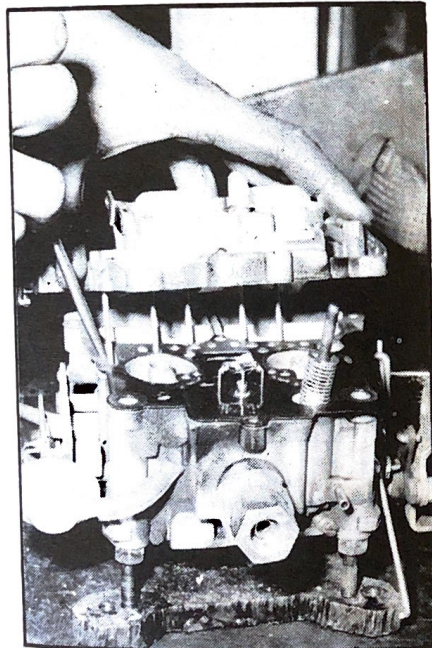
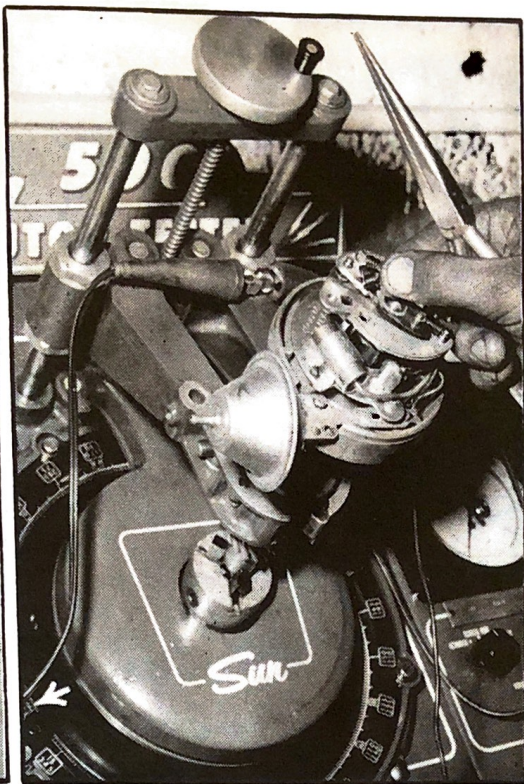
degrees and add to it the amount of initial timing you set with the light. A Ram Air '67 GTO takes from 28 to 32 degrees advance plus 10 to 12 initial advance, for a total advance of 38 to 44 degrees.

Now you should rotate the engine one complete revolution to Number One Top Dead Center and replace the reworked distributor. The rotor should be in the same position as when first

removed.

CARBURETION

Remove the carburetor from the manifold and place on a work bench. Never attempt to modify a carburetor while it is on the car. Remove all the screws, including the two inside primary barrels. Remove the two clips which hold the accelerator pump actuating rod and choke link. Remove the



small screw that holds the metering rod lever in between the flaps of the secondary air valve and lift both the lever and the two metering rods out of the carburetor.

Now lift the top of the carburetor from the main body very carefully. Lift the gasket and the white plastic block from the primary assembly out of the well in which it's mounted. Insert the broad blade screwdriver in the

slots in the jets. Gently tap the top of the screwdriver to break the fit and remove the jets. Install new custom M/P metering rods to richen up the secondary system.

Bolt in the custom-calibrated jets furnished in the Topcat kit and reassemble the carburetor reversing the procedure. Before bolting on the top of the Quadrajets, grind or file 1/8-inch from the top of the accelerator pump

plunger (for a better fuel shot). When replacing the pump actuating rod, always insert it in the hole closest to the carburetor body.

You will note that on the choke side of the Quadrajets there is an adjustment screw which controls the tension on the secondary air valve. The adjustment screw itself is locked by an Allen head screw. Loosen the Allen head and tighten or loosen the adjusting screw 1/4-turn at a time until desired throttle response has been achieved.

Generally speaking, if full throttle starting produces a hesitation, tightening the screw will eliminate the condition. Do not over tighten as too much tension will not allow the air valve to fully open. On the other hand, not enough tension usually causes a hole or flat spot on acceleration. Always tighten the locking screw after adjusting the tension screw.

FINISHING TOUCHES

Now everything should be bolted up, with the heat spacers placed between the carburetor and the manifold. Fresh oil and filter should be added at this time along with a more sensible 160-degree thermostat.

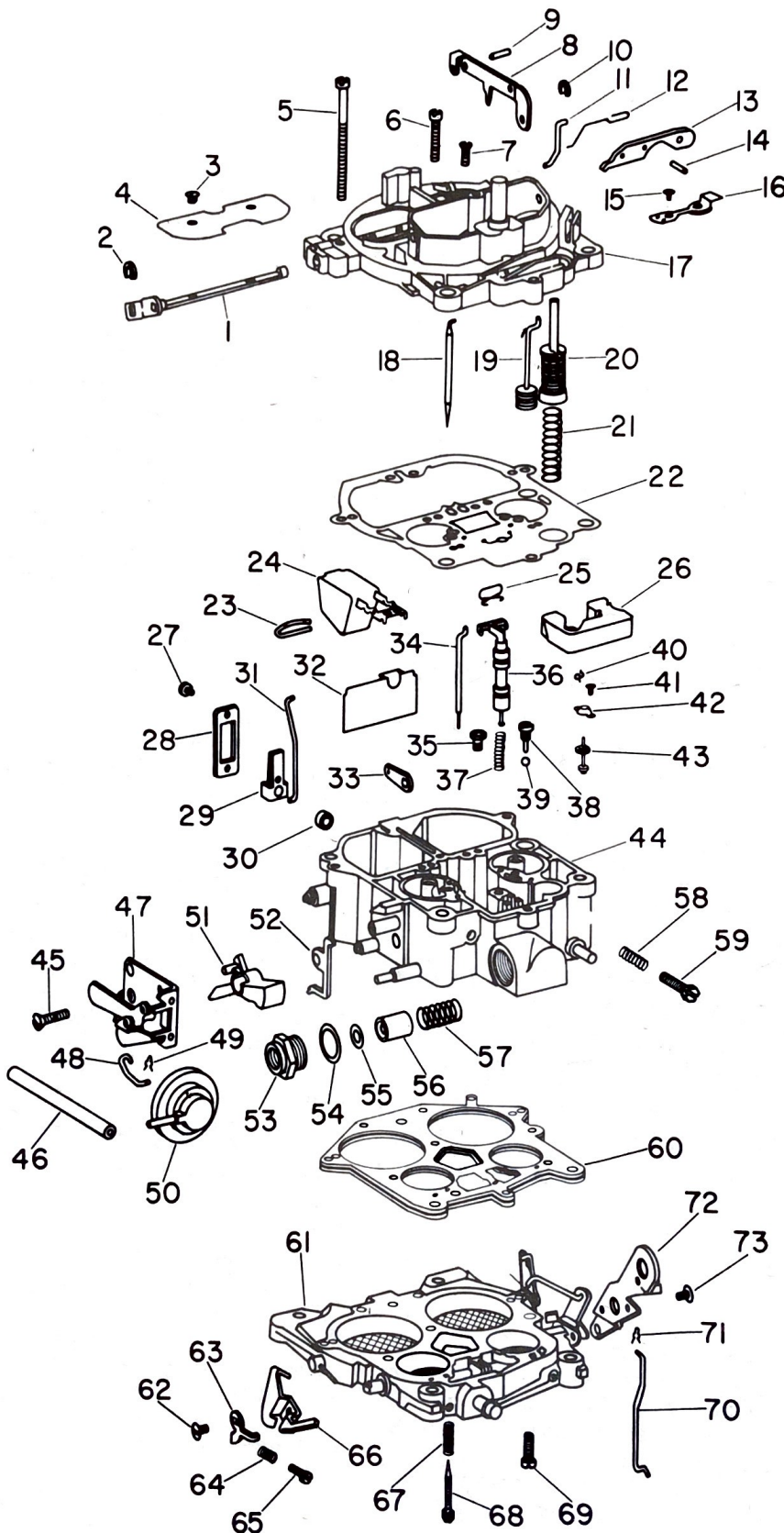
Start the engine and when normal operating temperature has been reached, back off one locknut at a time until a clicking sound is heard. Slowly tighten the locknuts until the clicking stops. At this time loosen the locknuts 1/4-turn, tighten the Allen head screws and then tighten the locknuts again until the clicking stops. This is zero degree lash and will account for a free 500 rpm with the stock hydraulic lifter valve train. Always install the correct range plugs included in the kit after adjusting the valves. For track use, one heat range colder plugs should be used.

Before cleaning up, plug the PCV valve at the carburetor by cutting the hose and inserting a 3/8 x 1-inch bolt. Plug the distributor vacuum advance line at the carburetor with a 1/4-inch bolt. The distributor should be run with full centrifugal advance.

That's the secret for making a stock Pontiac really turn on without sacrificing one bit of street tractability. You will probably note that the extra performance picked up will cause the stock suspension a little grief. In order to take advantage of the horsepower-increasing mods, it would be wise to install a Super-Bite suspension setup consisting of bars, shocks, spacers, possibly Air Lifts and hardened bushings if slicks will be run.

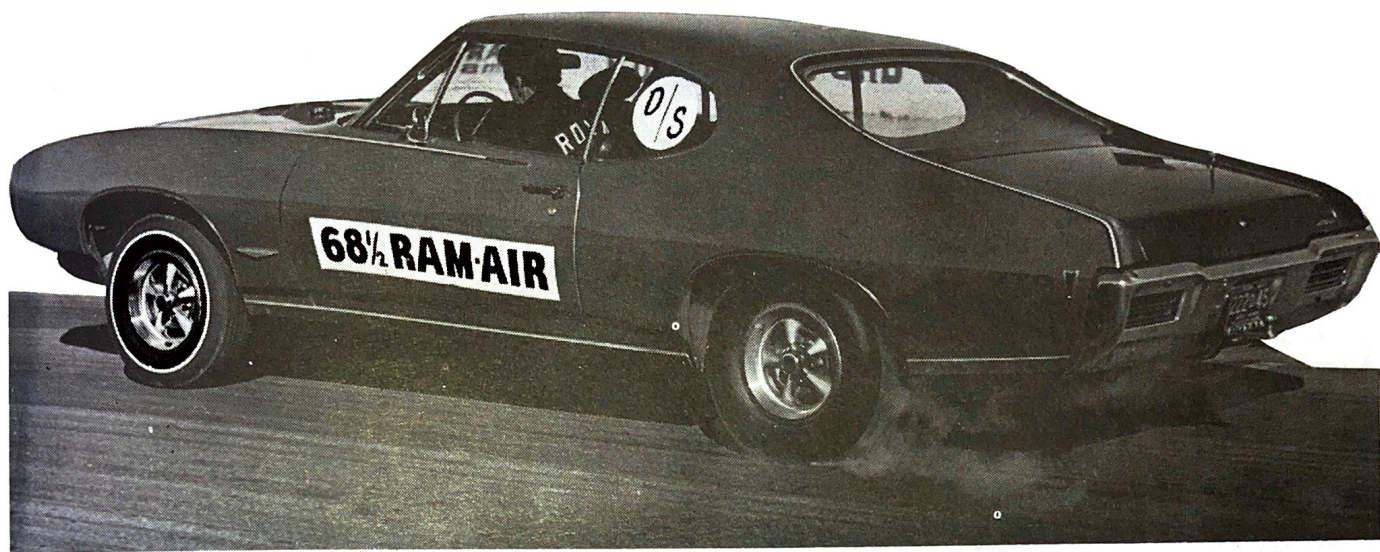
TYPICAL EXPLODED VIEW - MODEL 4MV QUADRAJET

PARTS



1. Choke Shaft & Lever Assy.
2. Clip - Choke Rod (Horseshoe)
3. Screw - Choke Valve (2)
4. Choke Valve
5. Screw - Air Horn (4)
6. Screw - Air Horn (3)
7. Screw - Air Horn (2)
8. Lever - Dashpot Actuating
9. Roll Pin - Dashpot
10. Clip - Rod (Horseshoe)
11. Rod - Air Valve
12. Lever - Idle Vent Valve
13. Lever - Pump Actuating
14. Roll Pin - Pump Lever
15. Screw - Idle Vent Valve
16. Valve - Idle Vent
17. Air Horn Assembly
18. Metering Rod - Secondary (2)
19. Dashpot Assembly
20. Pump Assembly
21. Spring - Pump Return
22. Gasket - Air Horn
23. Hinge Pin - Float Assy.
24. Float Assy.
25. Spring - Metering Rod - Primary
26. Insert - Float Bowl
27. Screw - Cover Attaching (2)
28. Cover - Idle Compensator
29. Idle Compensator Assy.
30. Gasket - Idle Compensator
31. Rod - Choke
32. Baffle - Float Bowl (Right & Left)
33. Lever - Intermediate Choke
34. Metering Rod - Primary (2)
35. Jet - Primary (2)
36. Power Piston Assembly - Primary
37. Spring - Power Piston
38. Retainer - Pump Discharge Ball
39. Ball - Pump Discharge
40. Pull Clip - Float Needle
41. Screw - Retainer Attaching (2)
42. Retainer - Float Needle Assy.
43. Float Needle & Diaphragm Assy.
44. Float Bowl Assy.
45. Screw - Control Attaching
46. Hose - Vacuum
47. Vacuum Break Control Bracket Assy.
48. Rod - Vacuum Break
49. Clip - Rod
50. Vacuum Break Control Assembly
51. Cam - Fast Idle
52. Lever - Secondary Lock-out
53. Filter Nut - Fuel Inlet
54. Gasket - Filter Nut
55. Gasket - Fuel Filter
56. Filter - Fuel Inlet
57. Spring - Fuel Filter
58. Spring - Idle Stop Screw
59. Screw - Idle Stop
60. Gasket - Throttle Body
61. Throttle Body Assy.
62. Screw - Cam & Fast Idle Levers
63. Fast Idle Lever
64. Spring - Fast Idle Screw
65. Screw - Fast Idle Adjusting
66. Cam Lever
67. Spring - Idle Needle (2)
68. Idle Needle (2)
69. Screw - Throttle Body (3)
70. Rod - Pump
71. Clip - Pump Rod (Hairpin)
72. Throttle Lever - Primary
73. Screw - Lever Attaching

The Ram Air Mystique



The hot dope on the '68 $\frac{1}{2}$ Ram Air and the '69 Ram Air IV supercars

If there's any secret to the new modifications, it's *exhaust breathing*. Pontiac engines have had pretty decent breathing on the intake side for a long time; but the engineers figured it was time to clean up the exhaust side. The new cylinder heads feature huge *round* exhaust ports that are 36 percent larger in area and much straighter clear into the valve. Also the two center exhaust ports are no longer "siamezed" into one large manifold port. They are separate ports that go into separate holes in the exhaust manifold. This not only reduces interference between the gas flow from the two ports, but the "tuning" effect of bouncing pressure waves in the exhaust header tubes is much more effective when the exhaust pulses from separate cylinders are completely split. (Remember Olds got much this same effect by putting deep "blocker dams" in the center exhaust ports of their '68 Force Air 4-4-2 engine.) The new Ram Air exhaust manifolds are actually the same layout as the former design; but the ports that mount to the head are made round and split in the center to fit the head ports. This was a pretty decent manifold to begin with.

Otherwise the new cylinder heads are not changed much. Valve sizes are the same—2.11 inch diameter on intakes and 1.77 on exhausts—and intake ports are the same size and contour. Apparently the intake side wasn't the big problem. The combustion chambers are opened up a little around the edge of the exhaust valves to further help breathing. Compression ratio remains at 10.75-to-1.

But this isn't the whole story on breathing. Look at the new hydraulic camshaft. Timing and lift are changed entirely. Intake duration is extended from 301 to 308 degrees, while the exhaust duration is lengthened even more from 313 to 320 degrees. And the all-important intake-exhaust overlap is drawn out from 76 to 87 degrees. (Actual timing is 42-86 intake and 95-45 exhaust.) And the valve lift has been increased radically from .413 to .480 inch. Essentially what this does is to increase the mid-range torque of the engine but without sacrificing at the top because the exhaust breathing is improved so much. The higher overlap permits the outgoing jet of exhaust gas to help suck fresh fuel-air mixture from the intake valve at

high revs. The higher lift is dynamite in the mid range. This overbalances the effect of the longer intake duration—which tends to *reduce* mid-range torque—and we actually get a net increase in the mid range. Meanwhile the longer intake duration helps the top end. So does opening that exhaust valve 95 degrees before bottom center. This relieves all exhaust pressure in the cylinder before the piston starts up on the exhaust stroke. Result: A fat bulge in mid-range torque and top-end both.

It's a tremendous new camshaft. And it represents a kind of new cam design philosophy at Pontiac. They've always been conservative on lift and duration. This is their wildest one yet. It will be interesting to see how it feels on the street, where low-speed action is felt. The idle is bound to be rougher. Incidentally, this is Pontiac's first camshaft that has been designed entirely on the computer. The lobe profile has no straight lines on it; as before. Valve opening and closing accelerations are smooth, gradual curves, calculated to reduce the inputs that previously triggered valve gear vibration and spring surge. This new valve gear is very stable up to over 6000

rpm.

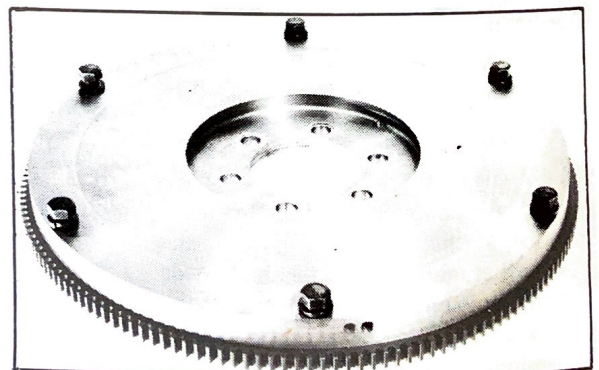
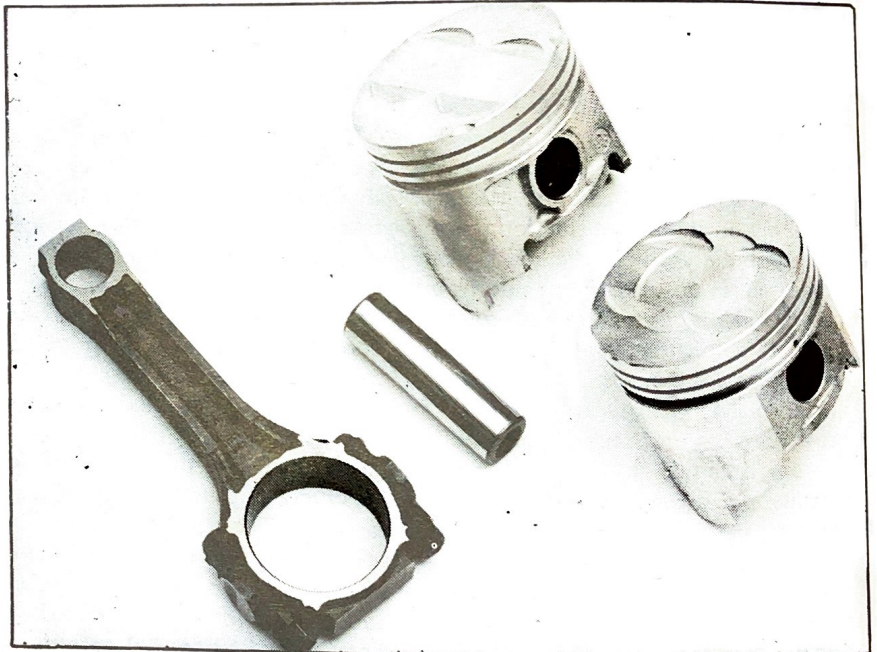
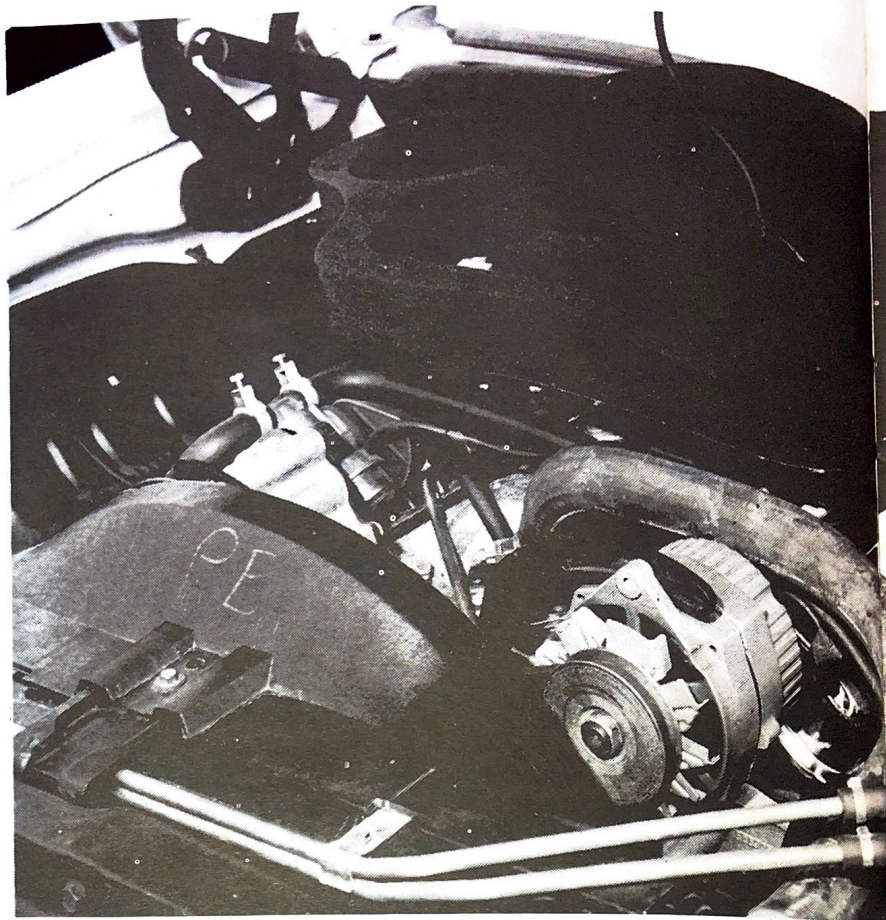
In fact this problem of extending the useable rev range on the new engine is a story in itself. Pontiac engineers have been using dual valve springs and dampers for some time, in an attempt to control spring vibration or "surge" that limits revs. For the 1968 Ram Air engine they increased total spring pressure (with valve open) to 280 pounds. With spring surge controlled, this raised the maximum useable revs (with lifter plungers adjusted out) from about 5800 to 6200 rpm. Now these same springs, with the valves being opened farther by the cam, give a total pressure of some 310 lbs. at full open! This is one of the highest figures in the industry for a street engine.

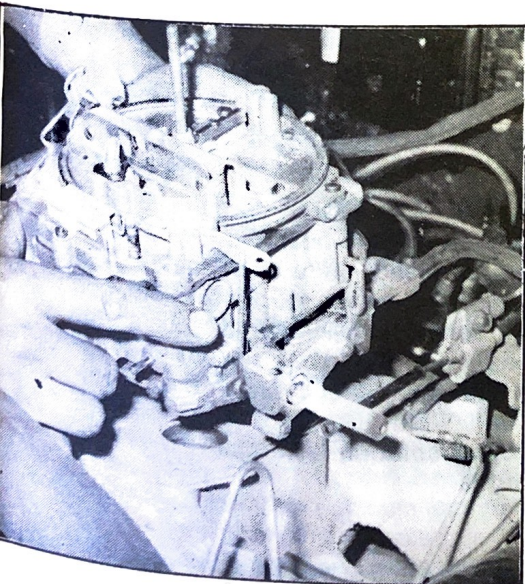
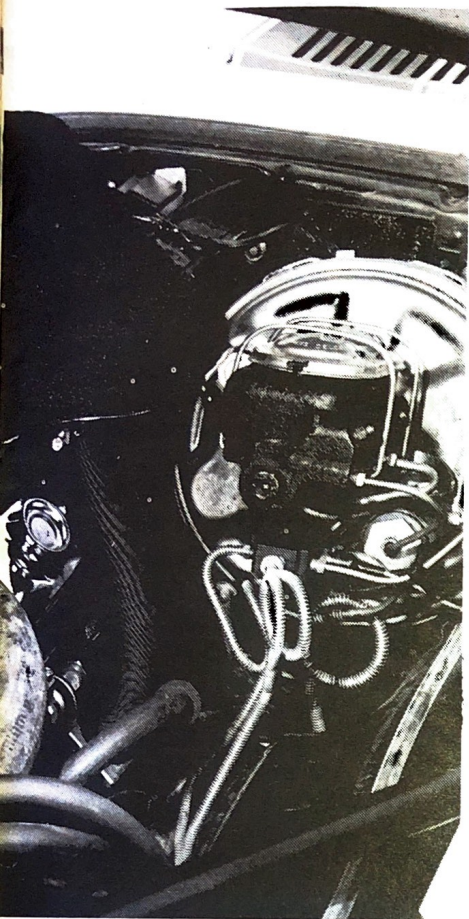
And of course this kind of spring pressure brings on other problems, like bent pushrods. Accordingly new pushrods are supplied that are 1/32-inch larger in diameter, to prevent bending. Another very important move for raising revs is lightening the valves. The new valves have their heads "tuliped", or hollowed out, on the under side to reduce valve weight from 3 to 6 grams. That's only three or four percent of the total valve weight; but it makes it possible for a given spring pressure to control the valves from "floating" at higher revs. The lighter valves plus the higher spring pressure plus the changes in cam acceleration rates and contours have combined to add another 150 to 200 rpm to the useable rev range of the engine.

And speaking of durability at high revs, another important addition to the new Ram Air engine is forged (impact extruded) pistons. There are two vital advantages: One, any forging is inherently tougher, and more ductile than a casting. It can absorb more impact and deflection before breaking. This is just what you want in a high-output engine. Also with the finer, more even grain flow of a forging you can reduce the *weight* of the part a lot without reducing the strength. The new forged pistons are 50 grams lighter than the old Ram Air cast pistons—and they're still stronger. And of course the lighter weight means less reciprocating inertia force in the engine and lower bearing loads. This is important when you realize that inertia forces increase as the *square* of rpm. They're more than twice as high at 6000 rpm as at 4000.

RAM AIR SWAP TIPS

The straight scoop on installing '68½ and '69 Ram Air IV heads and cam-





shafts in earlier engines.

The '68½ and '69 cams are the same part—9794041 and sell for \$85.00. There is, however, a substantial difference in the actual valve lift, since the '68½ raises the valves .420 inches while the '69 has a .520 lift. The difference is in the rocker ratio. Pontiac rocker arms come as a complete package that includes the rocker, a ball, and the heavy duty push rod. The part number of the ball and rod is 9794325 and 16 of those total up to \$28.00. Of course, with the '69 Ram-Air IV rocker you will also need the corresponding rocker studs. They, too, screw into the earlier model heads, but offer added stiffness and strength. Now if a little is good, more is better, only that isn't always so. For instance, these rockers cannot be used with some wild lsky high-lift cam, or you go into coil bind.

Should you install the new cam and rocker assemblies into a '67 or '68 car, you will also have to use push rod guide plates which are notched deeper and wider. The guide plate number is 9794042 and at .60¢ each for four of them, it hardly pays to use the grinder. Even if you use the smaller and more flexible early-style pushrod, the guides would still have to be notched in for the larger rocker motion. You might as well go first class with a complete valve train. If you own a four-speed car the '69 Pontiac cam will work best with split overlap. The automatic on the other hand seems to run faster by two or three car lengths when you install a 6° offset advance key. This gives you more low and mid-range power and better ET's. Since we are on the subject of figures, the '68½ to '69 cam has a 308 degrees intake duration with 42 and 86 degrees intake opening and closing points. The overlap is 87 degrees.

To go with the cam, you should use the latest in hydraulic lifters, number 5232675. They cost \$3.85 each, just .20¢ more than the regular lifters and are well worth the money. You set these lifters at zero lash, turning the adjustment nut in until the push rod is just free to turn and the lifter is quiet. With this type of setting locknuts must be used to keep the adjustment from loosening up.

There are two heads for the Ram-Air. The '68½ heads carry part number 9794040 and cost \$75.00 each bare. The chambers in the new heads have been opened up to improve smog control. And the flame gets through faster and so less timing is required. For in-

stance, a '67 GTO takes 42 degrees of spark advance to run right while a Ram Air IV is satisfied with 32 to 34 degrees, of which 9 degrees are initial advance. One common mistake that guys with '67's make is to try the same 42 degrees advance on a '68 and then the pistons cave in.

The '69 Ram Air IV heads, part number 9796721 cost the same as a '68½, but there is no comparison in performance. The intake ports are taller and give a better shot at the valves. The only complication is that the '69 heads also call for a '69 intake manifold. Here, you not only gain power but also save weight since the manifold is aluminum. A separate cast iron exhaust crossover which carries part number 9796614 can be discarded for race applications. However, a car driven in the street during the winter does need manifold heat. If you don't intend to use the crossover, make a set of plates that have the same thickness as the flange of the intake manifold. Those plates will cover the exhaust crossover passages in the head, and will also allow the intake manifold to be fastened with the stock retainers. The new aluminum intake manifold will fit all GTO's on down to the first one back in '64. The intake gaskets from '65 to '68½ are the same, and the new '69 intake gaskets carry part number 9796613 and sell for \$1.50.

When bolting in a set of '68½ or '69 heads, keep in mind that they take longer head bolts in three places at the tall bosses. These bolts are a ¼-inch longer than the other ones and if you don't use them, stripped threads are likely. Also, make sure the water connections are tightened, before the head bolts. When you install the '68½ or '69 heads on a '67—400 or 428—cubic inch engine, use the '67 head gasket. It will offer a better match for the valve chamfers in the block and you'll avoid blowing head gaskets.

PARTS

1969 PRICES

'68½ Heads — 9794040 . . .	\$75.00 ea.
'69 Heads — 9796721	\$75.00 ea.
Intake valves — 9794021 . .	\$ 3.00 ea.
Exhaust valves — 9794019	\$ 4.50 ea.
'68½ valve springs:	
Inner — 9794044	n/a
Outer — 9794045	n/a
'69 valve springs:	
Inner — 9796789	n/a
Outer — 9796790	n/a
Camshaft — 9794041	\$85.00
Lifters — 5232675	\$ 3.85 ea.
Harmonic balancer — 9794058	\$13.75
HD Oil pump — 9794275	\$21.00

High Performance Street Guidelines

Pontiacs are potentially one of the fastest and most reliable cars on the street. The engine is designed for best output at street driven rpm and is very responsive to the correct application of tuning adjustments and bolt-on performance parts. The following discussion is meant to acquaint the enthusiast with some aspects of setting up a Pontiac for high performance street use.

Ignition

The distributor advance curve is very important to good street performance. It is mandatory to maintain the vacuum advance feature for good throttle response and decent gas mileage. Therefore, do not use aftermarket distributors (most do not have a vacuum advance feature). Reprogram your stock distributor with an H-O Accuracy Kit. Use a name brand set of spark plugs at stock gap setting. Use a radio-noise suppressive wire set, such as #AK-31. The stock ignition coil is O.K. so long as it is mounted away from direct engine heat (put it on the fire-wall); stock mounting is on the intake manifold and the heat will cause internal shorts in the coil. For best results, use the #AK-30 coil. You can eliminate tune ups, fouled plugs, high speed miss and other associated problems by installing an MSD capacitive discharge ignition. Avoid trick magnetic or optical trigger systems which replace the points; they will only give you a problem when you do not need it.

Carburetor

The stock Rochester Quadrajet is a very sophisticated carburetor. It uses an air valve secondary design for variable flow capacity up to the full rating of 750 cfm (800 cfm on 455 SD). It provides smooth transition through all modes of operation and good low and mid range torque by virtue of the small primary throttles. H-O prefers to reject the stock Quadrajet with the Power Kit rather than replacing it. The QJet must have an adequate fuel supply that can usually be provided by the stock fuel pump, so long as an electric booster pump such as #CF-17 is installed in the fuel line back by the tank.

Rocker Arm Ratio

All stock Pontiac engines except 1969-70 Ram Air IV are equipped with 1.50:1 rocker arms. All stock Pontiac cams except #HC-57(9794041) have less than .410" valve lift on both intake and exhaust valves. All stock Pontiac heads will show a flow improvement if the lift is increased from about .400" to about .450". Some high performance heads such as the high port Ram Air IV and 455 HO/SD will show a flow improvement above .450" valve lift. The most performance will be extracted from your particular engine if you increase the valve lift so that the intake/exhaust flow through the engine is balanced. This may require 1.65:1 (High Lift) rockers on the intake, the exhaust, or both valves, depending upon application. See the Guidelines chart or the High Lift Kit listing in the catalog for specific recommendations.

Intake Manifold

Be very hesitant to change your intake manifold. In most cases, the stock cast iron manifold (including EGR versions) will provide superior street performance compared to any aftermarket aluminum intake. However, the 1975-78 intake manifolds have a restricted secondary opening and should be replaced with a 1972-74 version, or 1968-72 version with #IM-52 adapter plate. Most late model emission equipment will not fit the earlier manifolds.

A good high performance intake manifold is the Pontiac aluminum version with separate cast iron exhaust crossover. However, as of the date of this catalog, several versions of this manifold have been discontinued by the Pontiac factory. It is likely that all versions will be unavailable in the near future as the factory discontinues parts for earlier engines (1972 was the last model year for any Pontiac aluminum manifold). Because of this fact, H-O no longer lists any of these intake manifolds in our catalog. The part numbers for the Pontiac aluminum manifolds are in #TD-01 book.

Compression Ratio

Virtually all compression ratio reductions in Pontiac engines were achieved by the factory with a larger combustion chamber volume, not a piston change. Therefore, the way to increase the compression ratio of a late model engine is to change heads, not pistons. It is not possible to mill low compression heads enough to significantly raise the compression ratio. One other advantage of changing heads on 1973-78 engines (except 1973-74 455 Super Duty) is that all pre-1973 4bbl heads have larger 1.77" exhaust valves compared to the 1973-78 1.66" valves. Cylinder head identification data and a compression ratio chart of the head & CID combinations are contained in #TD-01 book. If you want to identify a cylinder head, buy #TD-01 book so that you will not have to call H-O.

One instance where you will have to change pistons when you also change heads is if you use a 1967-70 400/428 4bbl head on a 455 engine. The resultant compression ratio with stock 455 pistons is about 11.5:1. This compression ratio is too high for a street driven engine subjected to today's low octane gasoline. While there are cylinder head combinations which will yield 10:1 c.r. on a 455 (see #TD-01 book), another solution is to use H-O #FP-76 forged dished pistons.

Headers

The standard Pontiac exhaust manifolds are fairly restrictive. When headers are substituted, a noticeable performance gain results. For a strictly street high-performance engine, it is better to use a slightly small tube header rather than err on the large size. For a street & strip application try to get a header close to the optimum size for your setup. See the header sizing chart in the competition section. Be aware that all headers, regardless of brand, will hang below the bottom of the frame to some extent and may cause a ground clearance problem. Some Pontiac heads are not manufactured with the full complement of six bolt holes for the exhaust manifold. All tubing headers require all six holes on both sides for a leak-proof fit. Check your heads prior to starting a header installation. If all bolt holes are not there, the heads will have to be removed and the missing holes drilled and tapped.

Gear Ratio

With the impact of stiffer national emissions laws in 1971, the Pontiac factory was forced to select rear gear ratios on the basis of least grams of pollutant per mile. When a new national speed limit of 55 mph was adopted in 1974 and the emphasis put on economy and mileage in 1975, rear gear ratios have been even more poorly matched to the engine from a high performance standpoint. It is a well known hot rodding fact that a lower rear gear ratio will do wonders for your Pontiac's acceleration, but the question is: What ratio?

For maximum street and strip performance, the "ideal" rear gear ratio is one that matches the engine torque peak rpm with the normal cruise speed in top gear. This results in maximum acceleration for passing and great standing start performance. If you are following the performance buildups in this section, select your rear gear ratio from the listing in the guidelines summary chart, depending on the desired cruise speed.

Camshaft

Stock Pontiac cams except 9794041 (Ram Air IV) are based on 1964 camshaft designs and are not computer optimized. To increase duration beyond 273°, Pontiac added constant maximum lift dwell, rather than designing a new profile. This is why all Pontiac stock cams have nearly the same lift of .407" @ 1.50:1 rocker ratio. Camshaft design has progressed dramatically in recent years due to the process of using computers to "optimize" the profiles. All of H-O's High Lift series cams are based on the latest computer-derived designs for the best valve train dynamics. The cam duration, lift and lobe placement are specifically chosen to work best in Pontiac engines. A change to the correct H-O cam for your application will result in a noticeable performance gain. See the High Performance Guidelines chart or the listing in the camshaft section for specific applications.

Valve Train

H-O does not offer prepackaged camshaft "kits" because each application is a little different. Use the following guidelines for selecting your own valve train "kit" components.

(a) New lifters should ALWAYS be used with a new cam to prevent premature wear. Use old or even slightly used lifters at your own risk. H-O High Performance hydraulic lifters #VL-11 should be used in most applications where the camshaft is properly matched to the intake/transmission/gearing combination. If a more radical than recommended cam is selected, use Rhoads variable duration lifters #VL-21. Rhoads lifters will provide a substantially smoother idle than conventional lifters, improve low speed power, raise idle manifold vacuum (important for proper carburetor power system and power brake function) and provide expected camshaft duration and lift performance at higher rpm. H-O has tried and sold these lifters in several hundred installations and they have worked as advertised.

(b) All stock 1967-77 Pontiacs except Ram Air IV are equipped with hardened steel 5/16" pushrods with matching guideplates. Chromoly 5/16" pushrod set #PR-14 may be substituted with no modifications for increased reliability. 11/32" hardened steel pushrod set #PR-15 with matching guideplate set #PR-22 may be used with screw-in rocker studs and unmodified heads if 1.50:1 rocker arms and a cam with less than .460" valve lift is used. If the pushrod guide holes in the head are opened up or if you are using Ram Air IV or 455 Super Duty heads, you can use 11/32" pushrods with any cam or rocker ratio. Pushrod set #PR-17 should be used with Pontiac Ram Air IV or H-O #VL-12, VL-13 or VL-14 lifters. Use chromoly 11/32" pushrod set #PR-16 for racing or super reliability in a street engine.

(c) Rocker arm ratio selection for engines with non-stock cams and other non-stock parts can be tricky. You may have to buy a full set High Lift Kit and experiment yourself with intake only, exhaust only and all valves to determine the maximum performance setup. Regardless of the rocker ratio, you should use grooved rocker balls if the oil system is restricted, high rpm is expected, or extra reliability is desired in a more or less stock engine.

(d) Stability Kit (7/16" rocker studs) should be used whenever the side loading on the stud is significantly increased. High Lift rockers with stock cam and valve springs generally do not require 7/16" rocker studs, unless the engine is a Ram Air, High Output or manual transmission-equipped GTO. 7/16" rocker studs are not mandatory with #HC-01 cam, stock springs and 1.50:1 (stock) rocker arms. 7/16" rocker studs are highly recommended for any other setup using a wilder cam, stronger valve springs or High Lift rocker arms.

(e) The stock valve springs used in all engines except Ram Air IV and 455 Super Duty will accept up to about .460" valve lift without danger of coil bind. If the spring is shimmed, the maximum valve lift is reduced by the shim thickness. The valve springs can be replaced without removing the head with H-O #HW-77 tool. Most Pontiac heads have a stepped inner spring boss that is .775" diameter. This is larger than the inside diameter of many aftermarket spring sets purported to fit Pontiacs. Although these aftermarket springs could be fitted by machining the spring boss with H-O #HW-78 cutter, this problem can be avoided by using H-O valve springs. It is strongly recommended that #VS-12 valve springs be used in place of #VS-11 springs if the actual valve lift is over .500". Although #VS-11 springs will accept up to .550" lift, they are prone to breakage and reduced tension at lifts over .500". The heads must be removed and the spring seat machined to accept the increased installed height of the #VS-12 spring.

(f) You may have to check the clearance between the bottom of the retainer and the top of the valve stem guide or seal. Most stock setups have about .500" allowable travel. If #VR-12 retainers are used, the allowable travel of the retainer (not spring) is increased by .050" with the same installed height. If the valve springs or retainers are changed, it is good policy to also change the keepers. Use standard duty keepers for stock installations, heavy-duty keepers for high performance and super duty keepers for racing. The oil control o-rings #VT-10 should be changed if the retainers are removed. Teflon intake valve stem seals #VT-11 are the best available and will fit almost all stock Pontiac heads without machining the guide boss. Seals are not needed on the exhaust valves because the positive pressure in the exhaust port will force any oil up the valve stem.

Oil System

The oil system is the lifeblood of your engine and it should be upgraded whenever extra performance is planned. The following H-O parts are strictly bolt-on and are easily installed for extra oil system "insurance."

(a) The stock oil filter housing contains a low pressure bypass valve which allows unfiltered oil to enter the engine under many conditions. This unfiltered oil may contain dirt or metal particles which can score the bearings or crankshaft journals. The H-O Full Flow Kit replaces the stock housing and filter with a modified housing that eliminates the bypass valve and uses a dual stage filter for 100% filtering. The Full Flow Kit has saved many street and race engines from bearing damage.

(b) Trans Am Firebirds and other Pontiacs with improved suspensions suffer from oil starvation on hard right hand turns. The stock oil pump pickup is located to the right of center of the oil pan sump and can be uncovered during a hard right hand turn because of the inertia forces on the oil. When the pickup is uncovered, the pump is pumping air, not oil and the pressure drops drastically. Lack of oil will

wipe out the engine bearings and ruin the engine. The H-O Oil Pressure Saver is a one and a half quart capacity pressurized oil reservoir that automatically injects extra oil into the bearings whenever the system line pressure drops. The "Saver" is strictly bolt-on, fits with all accessories and can be installed on any Firebird in minutes. It is a transitory device, but will solve the oil starvation problem for the average enthusiast.

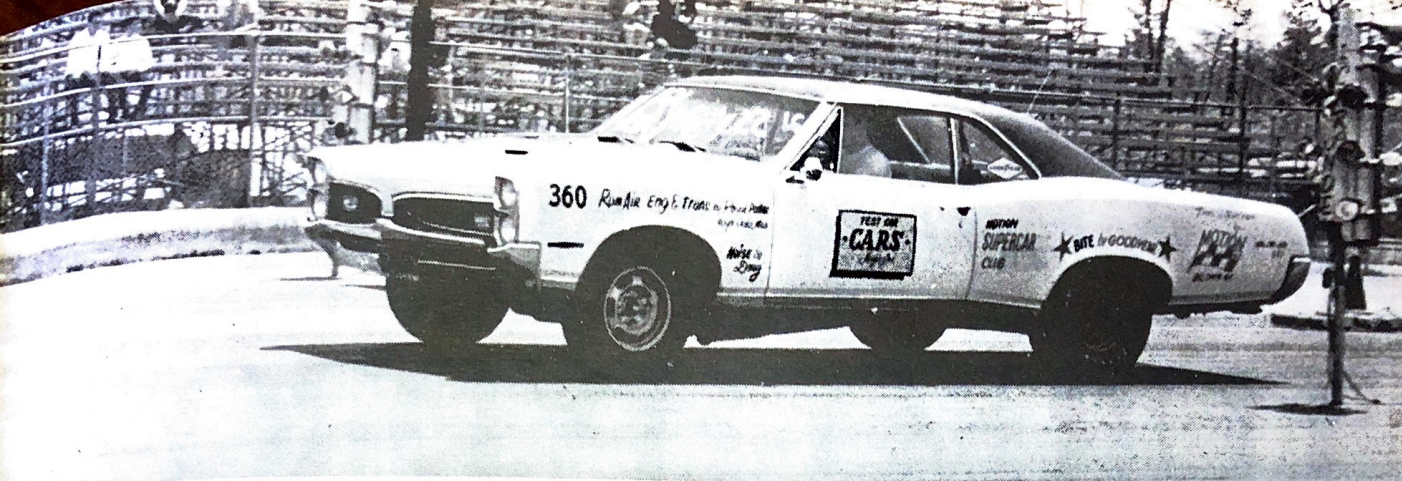
The following H-O oil system parts are more difficult to install, but should be seriously considered because they can be bolted on during an engine overhaul. All are highly recommended for a total oil system upgrade.

(c) A good oil pump is mandatory for any high performance application. Some stock engines such as the 400 H.O., Ram Air III, IV & V, and 455 H.O. & Super Duty are equipped with good oil pumps. All other engines are equipped with standard duty pumps which are marginal for high performance use. The H-O #OS-11 oil pump is the equivalent of the Ram Air IV & 455 H.O. high volume, 60 psi pump. It is recommended for all street and many racing setups. It is easier to change the oil pump during an overhaul when the engine is out of the car than when the engine is still in the car. While the engine is being overhauled, it is good policy to change both the pump and driveshaft. The H-O #OS-16 heavy duty driveshaft is made to our specification and recommended for all applications. H-O #HW-68 is a heavy duty stud mount for the oil pump and is recommended for all high performance and racing applications.

(d) Most 1973-76 engines are equipped with a baffled oil pan. If yours is not, a change to the H-O #OS-41 baffled pan will improve oil control during hard cornering and stopping. Use the same year pan gasket as the year of the block. The pan is easy to change with the engine out of the car, but more difficult with it still installed.

(e) The 1970-73 engines were equipped with a 4/5 length windage tray, and the 1974-78 engines have no windage tray. A windage tray reduces oil-induced drag on the crankshaft at high rpm and helps prevent oil aeration. The H-O #OS-91 windage tray is a reconditioned used 1965-69 original equipment full length tray. These early trays are no longer available from Pontiac, but are the best factory windage trays ever made. H-O #HW-67 is a kit for mounting the early tray on late model engines which do not have mounting bosses on the main caps.

(f) If the engine is overhauled or assembled from scratch, the oil gallery plugs should be replaced with H-O Plug Kit #HW-51. You may need H-O #HW-70 tool to extract the stock square-hole plugs. This kit eliminates the possibility of blown out oil plugs and will reduce camshaft and distributor wear by directing more oil to that area. This plug kit does not alter the oil distribution in the engine as does the H-O Restrictor Kit #OS-21 which is for racing only.



Pontiac 400 Basic Blueprinting

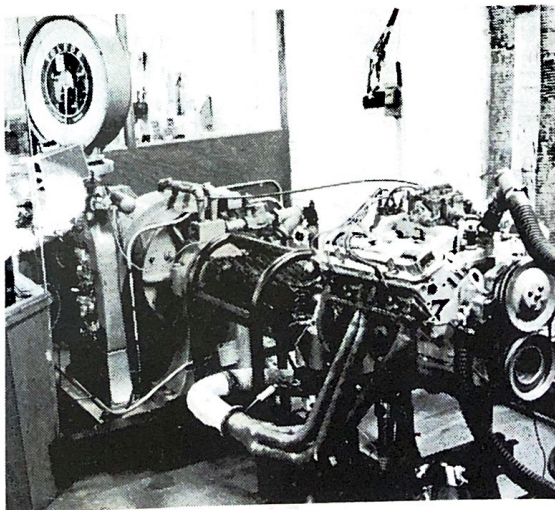
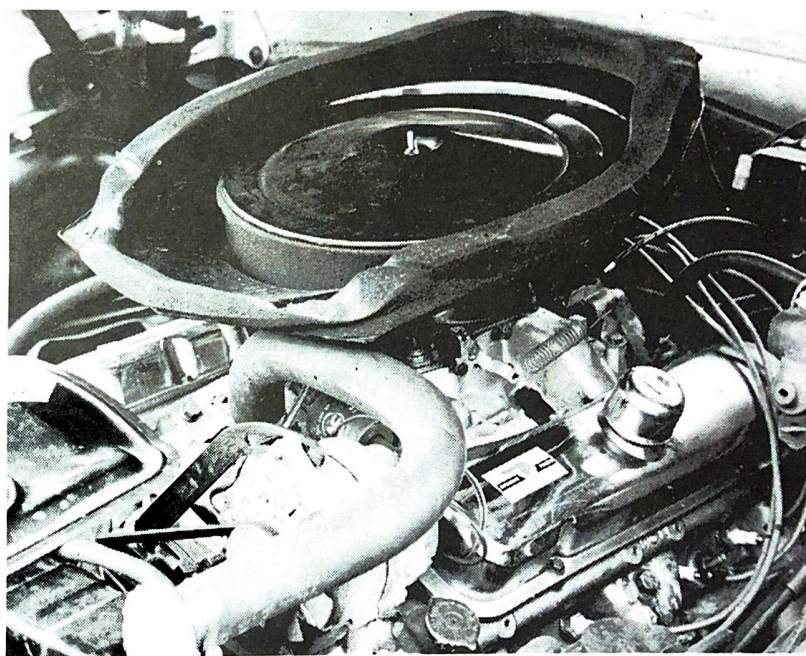
Quickie tips on setting up a hard-charging GTO stocker

QUICKIE TIPS

CAR
360 hp GTO

ENGINE

4.1224-inch bore
3.754-inch stroke
Zero deck clearance
3.25-inch rods
.0025-inch rod clearance
.0035-inch main clearance
.027-inch rod side clearance
Morraine 400-A main bearings
Beefed oil pump
Ram Air camshaft
301-degree intake duration
313-degree exhaust duration
76-degree overlap
2.113-inch intake valves
1.773-inch exhaust valves
Chrome and moly-coated rings
.019-inch gap-compression
.035-inch gap oil
65-cc combustion chambers
42 degrees total advance at 2500 rpm
Phase III CD unit



TURNING ON THE TURBO-HYDRO

Here's what it takes to turn on the super beefy Model 400 auto shifter using Oldsmobile parts and pieces. Modifications range from mild to wild

A. Street Package – Quick Shifts

1. Rework spacer plate
 - a. Open 2nd clutch feed orifice to .110" dia.
 - b. Open 3rd clutch feed orifice to .125" dia.
2. Replace 2nd clutch wave plate with flat plate P/N 8623150.
3. Replace 3rd clutch wave plate with flat plate P/N 8625197.
4. On steps 2 and 3 be sure there is adequate clutch pack clearance.

B. Semi Bonzai – Hard Shifts

1. Open 3rd clutch feed to .180" dia. in spacer plate.
2. Replace 2nd clutch wave plate with flat plate P/N 8623150.
3. Replace 3rd clutch wave plate with flat plate P/N 8625197.
4. Replace forward clutch wave plate with flat plate P/N 8625197.
5. On steps 2 through 4 be sure there is adequate clutch pack clearance.
6. Remove the following 4 ball checks:
 - a. RND
 - b. 3rd clutch
 - c. 2-3 Dr (2 balls)

NOTE: DO NOT remove modulator/intermediate and reverse/low ball checks.

7. Remove front accumulator spring and install piston upside down in valve body.
8. Remove center seal from forward and direct clutch drums.
9. Plug reverse clutch feed in center support with 1/4" dia. cup plug.
10. Rework 1-2 accumulator system as below:
 - a. Remove trim spring at bottom of the valve body bore.
 - b. Install 1/4" dia. copper tubing .95 long for 1 valve or .82 long if there are 2 valves. This should block the valve(s) out against the plug.
11. Install modified governor to get a higher W.O.T. RPM.

C. Full Bonzai – Maximum capacity, hard shifts, shifts only at W.O.T.

1. Items 1 through 10 on Semi Bonzi plus:
 2. Block vacuum modulator valve in by installing a 5/16" dia. ball in the neck of the modulator can.
 3. Plug reverse boost with 1/4" dia. cup plug in the pump cover.
 4. Vent reverse boost with 1/16" deep flat on large O.D. land of boost valve.
 5. Install 30.4 lb. pressure regulator spring. (1.372 checking height)
 6. Remove detent solenoid.
- NOTE: No vacuum or electrical connection is needed.
7. Install modified governor to get a higher W.O.T. RPM.

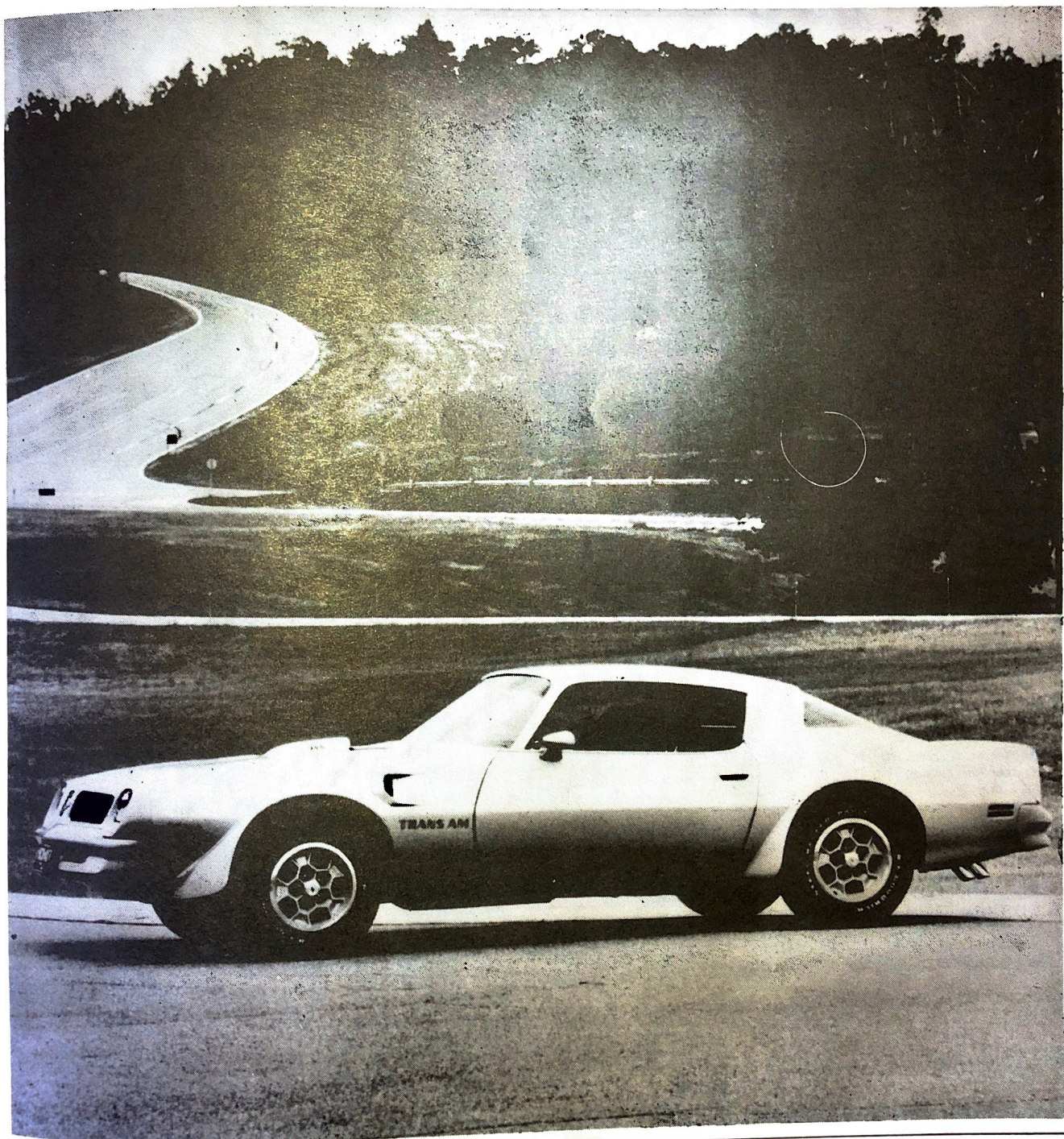
D. **Manual Shift** — Low = 1st. Intermediate = 2nd. Left in drive it's 2nd gear start and shifts to 3rd at 20 MPH.
(For use with package B or C)

1. Block detent valves apart with 5/16" dia. copper tubing .41" long.
2. Remove 1-2 modulator — regulator valves and spring.
3. Plug 1-2 valve body bore vent with 3/16" dia. cup plug.
4. Electrical connection not needed for manual shift package.

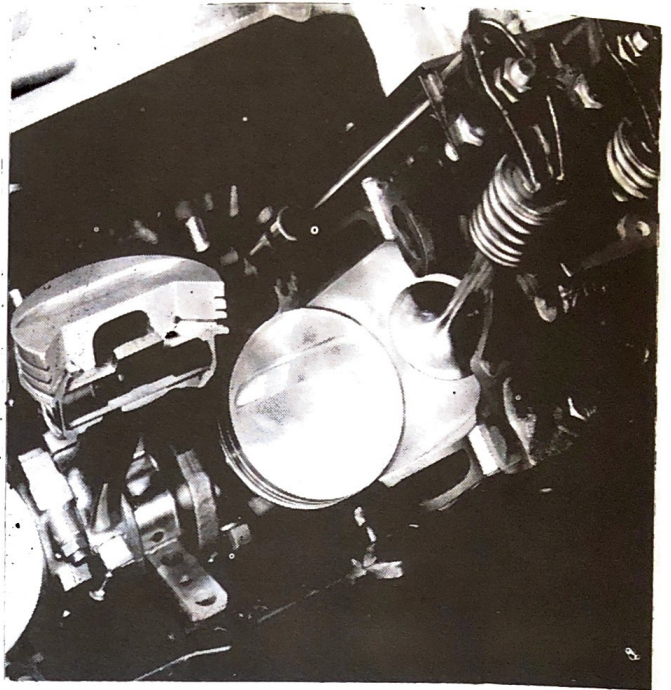
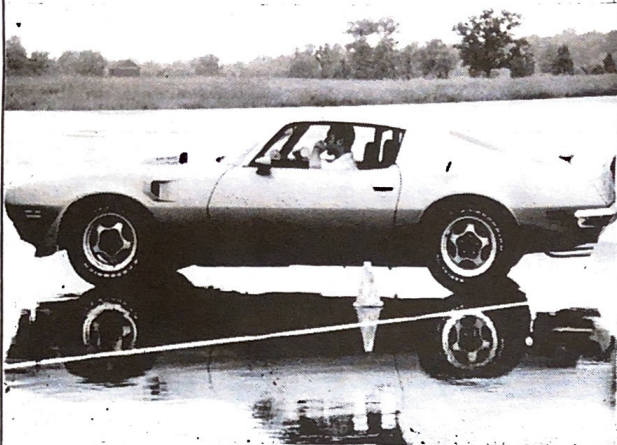
NOTE: Packages B, C and D should be reworked only by an accomplished transmission technician.

Low range can be engaged at any speed with packages C and D.

Additional welds at outer corners of converter weld nuts are recommended for speeds over 6000 RPM.



The straight poop on the Super Dynamite street motor that everyone wants



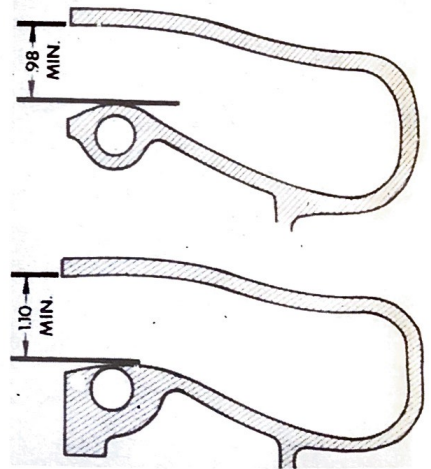
PARTS LIST FOR SD-455 ENGINE

AUTOMATIC TRANSMISSION

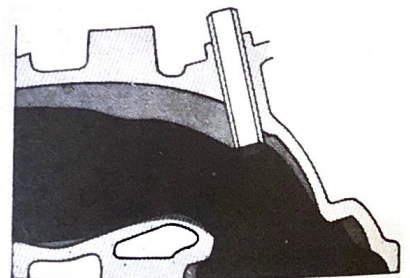
Engine Part No.	487587
Type 8.3 C. R. 455 S D Auto	
Cylinder Block	491948
Camshaft	493323
Crankshaft	490164
Flywheel Assy.	487651
Pressure Plate Assy.	
Driven Plate Assy.	
Rod Assy.	485225
Piston and pin	493163
Ring package for 1 piston (std.)	491212
Cylinder Head	485214
Exhaust Valve	493142
Intake Valve	485222
Seal - Intake Valve	9790618
Spring - Valve Inner	493144
Spring - Valve Outer	493145
Cylinder Head Gasket	488575
Valve Lifter	5232265
Rocker Arm Cover	490028-29
Rocker Arm Gasket	9797580
Oil Pump Assy.	480246
Oil Pump Drive Shaft	9794305
Dip Stick Tube - Upper	9795830
Intake Manifold	494419
Distributor Assy.	1112205
Carburetor Assy.	7047346
Idle Stop Solenoid	1997432
E G R Valve	7040175
Exhaust Manifold L. B.	490803
Exhaust Manifold R. B.	490802
Spark Plugs	5613302

MANUAL TRANSMISSION

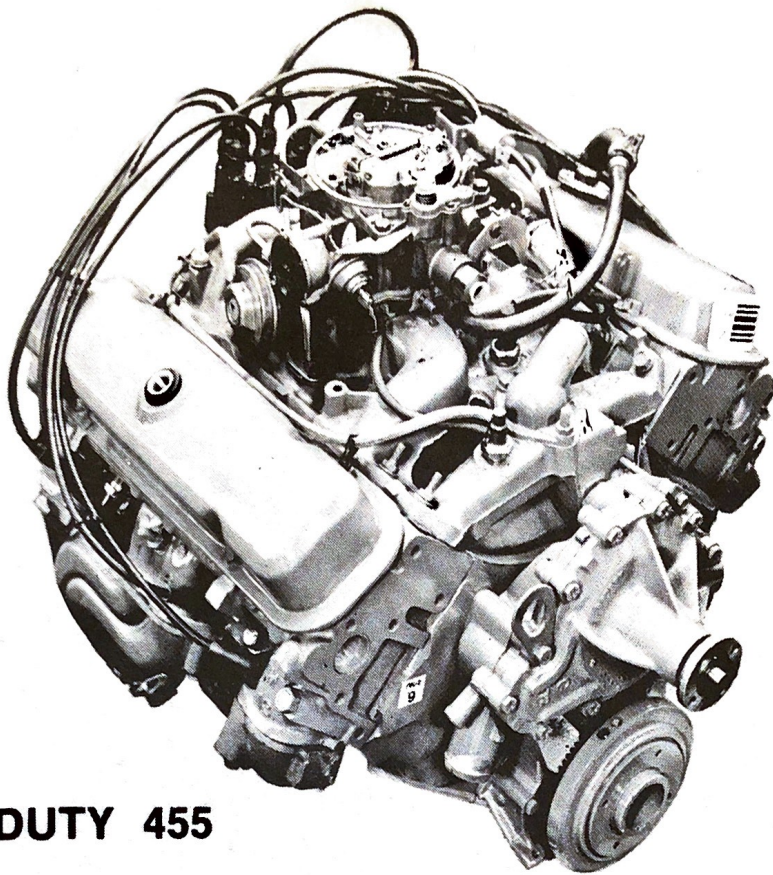
Engine Part No.	487583
Type 8.3 C. R. 455 S D Manual	
Cylinder Block	491948
Camshaft	493323
Crankshaft	490164
Flywheel Assy.	9779234
Pressure Plate Assy.	3884598
Driven Plate Assy.	482034
Rod Assy.	485225
Piston and Pin	493163
Ring package for 1 piston (std.)	491212
Cylinder Head	485214
Exhaust Valve	493142
Intake Valve	485222
Seal - Intake Valve	9790618
Spring - Valve Inner	493144
Spring - Valve Outer	493145
Cylinder Head Gasket	488575
Valve Lifter	5232265
Rocker Arm Cover	490028-29
Rocker Arm Gasket	9797580
Oil Pump Assy.	480246
Oil Pump Drive Shaft	9794305
Dip Stick Tube - Upper	9795830
Intake Manifold	494419
Distributor Assy.	1112205
Carburetor Assy.	7047339
Idle Stop Solenoid	1997432
E G R Valve	7040175
Exhaust Manifold L. B.	490803
Exhaust Manifold R. B.	490802
Spark Plugs	5613302



Above, super-duty intake port is below the production port. Below, the dark area shows 455 HO port and the lighter area is for the 455 SD motor.



ANATOMY OF A



SUPER DUTY 455

Pontiac's Super Duty 455 engine returns in 1974 as an option on the Formula 455 and Trans Am Firebirds.

The engine, which features 6000 RPM capability and excellent durability during high RPM operation, operates on 91 octane fuel.

Some of the Super Duty 455 component highlights include:

Block: Reinforced main bearing webs, four-bolt malleable iron bearing caps and screwed-in oil plugs.

Crank: Nodular iron.

Rods: Forged steel, 7/16 diameter bolts.

Pistons: Forged aluminum, moly-filled 1/16 compression rings, improved oil ring design.

Oil System: 80 PSI, heavy duty oil pump, large distributor drive gear, oil pan baffling.

Cylinder Heads: Constant cross-section porting, exhaust valve inserts, special alloy valve guides, push rod tubes, no interconnection between exhaust ports.

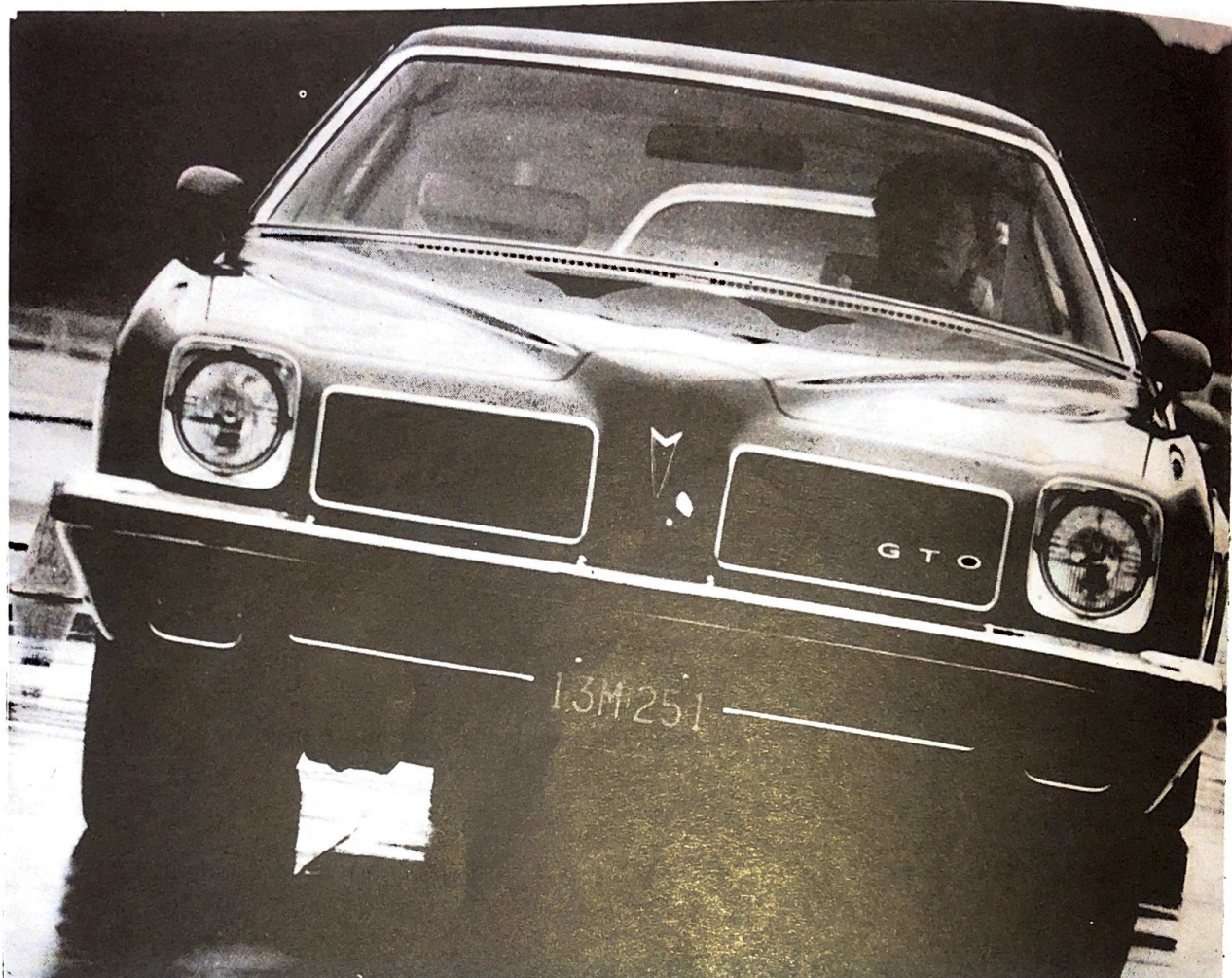
Valve Train: 0.387" lift camshaft, high RPM lifters, swirl polished valves, large 1.77 diameter exhaust valves, 2.11 diameter intake valves.

Exhaust System: Cast iron exhaust headers, 2½ diameter exhaust pipes, 2¼ diameter tail pipes.

Intake System: Special cast iron intake manifold, Q-jet carburetor with larger primary venturi for increased flow capacity, large capacity air cleaner with cold air induction through grille (shaker scoop is non-functional).

455 SUPER-DUTY

DYNO-TUNING THE 455 GTO



While specifications shown here are recommended for all low-compression Pontiac big-block models from 1972 to 1976, the actual car that went through the dyno-tuning was a 1973 GTO equipped with the four-barrel 455 low-compression engine, Turbo-Hydro, 3.23 rear gearing, full power and air conditioning. With stock 60-series tires and closed exhausts, the showroom stock GTO clocked 89.57 mph in 15.87 seconds. After tuning it clocked 95.80 mph in 14.94 seconds. To achieve this performance increase the only areas touched were the ignition and carburetion.

IGNITION

The stock single-point distributor

was retained and modified for more efficiency and a quicker advance curve. The stock RFI shield was removed and the circuit breaker hold-down screws were crimped. The stock points were replaced with Mallory 102X models and the limiter bushing was deleted. Light tension advance springs and special lighter and reshaped advance weights were installed. These weights, springs and points are available from most speed shops. Initial timing was set at 14 degrees and with 11 degrees advance works out to 36 degrees total timing at 2000 rpm. Dwell was set at 29 degrees and all vacuum lines and spark retard switches and controls were blocked and/or re-

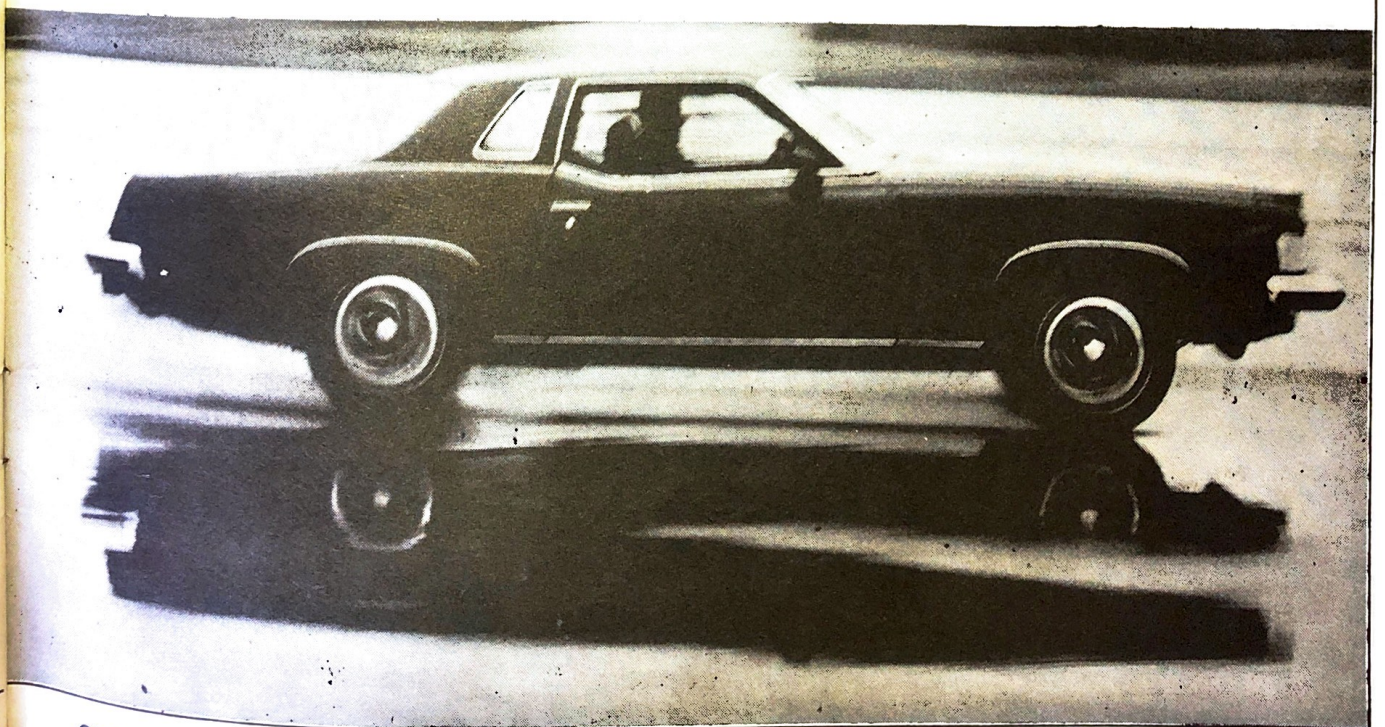
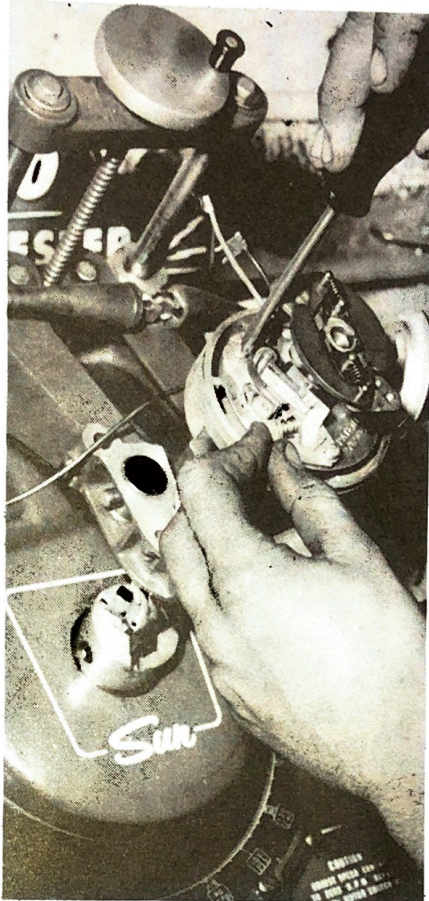
moved. New AC-R45TS spark plugs gapped at .032-inch were installed.

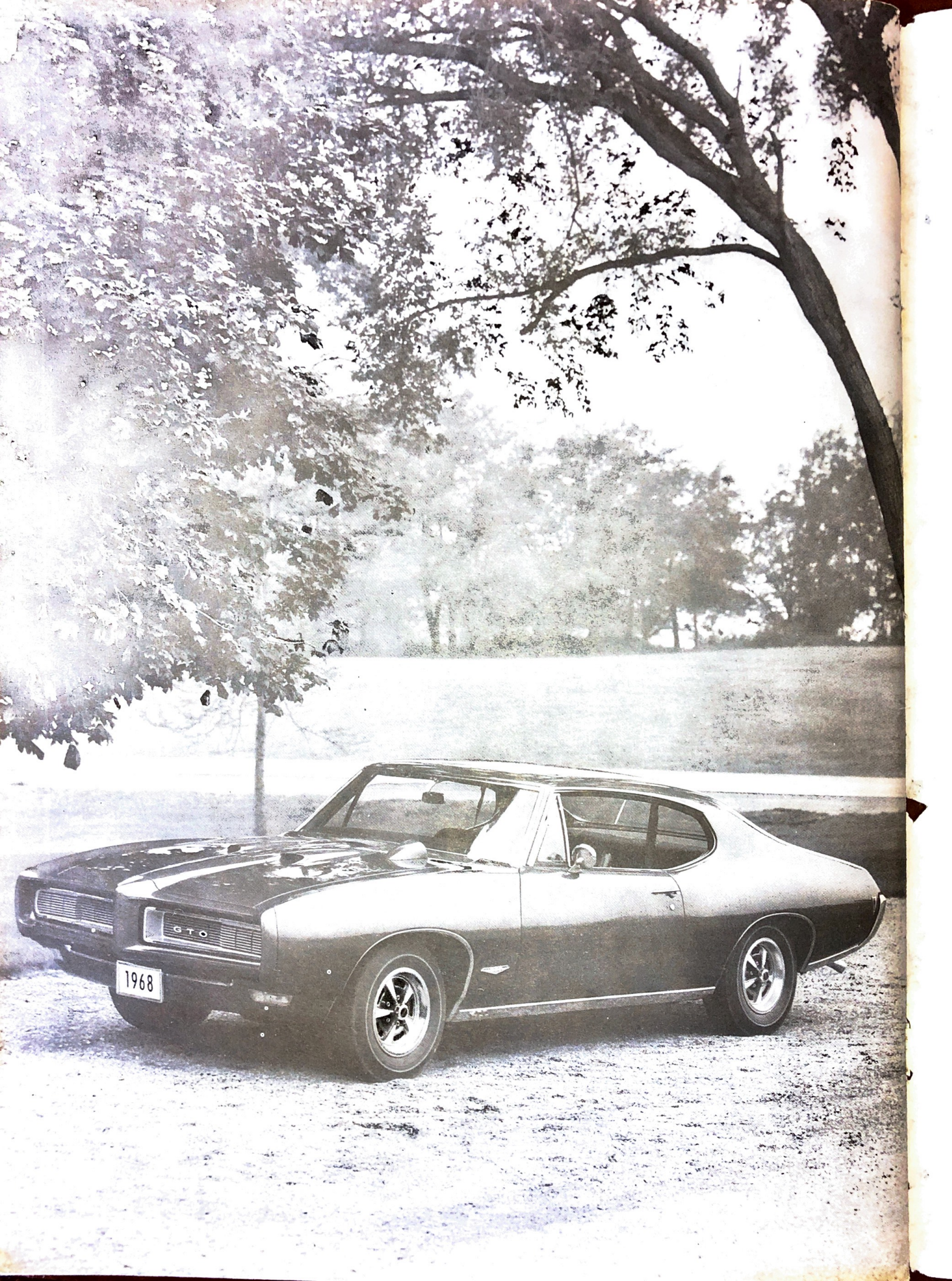
CARBURETION

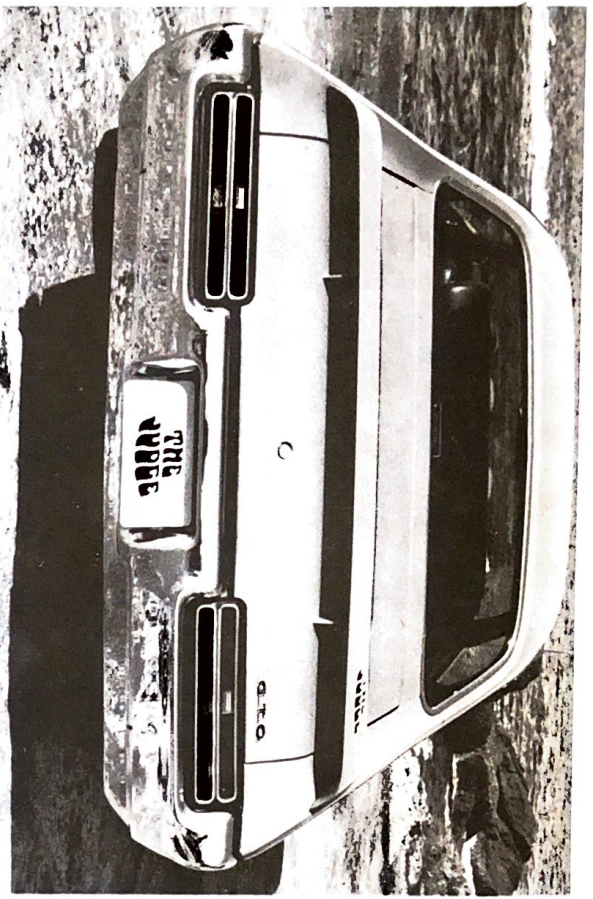
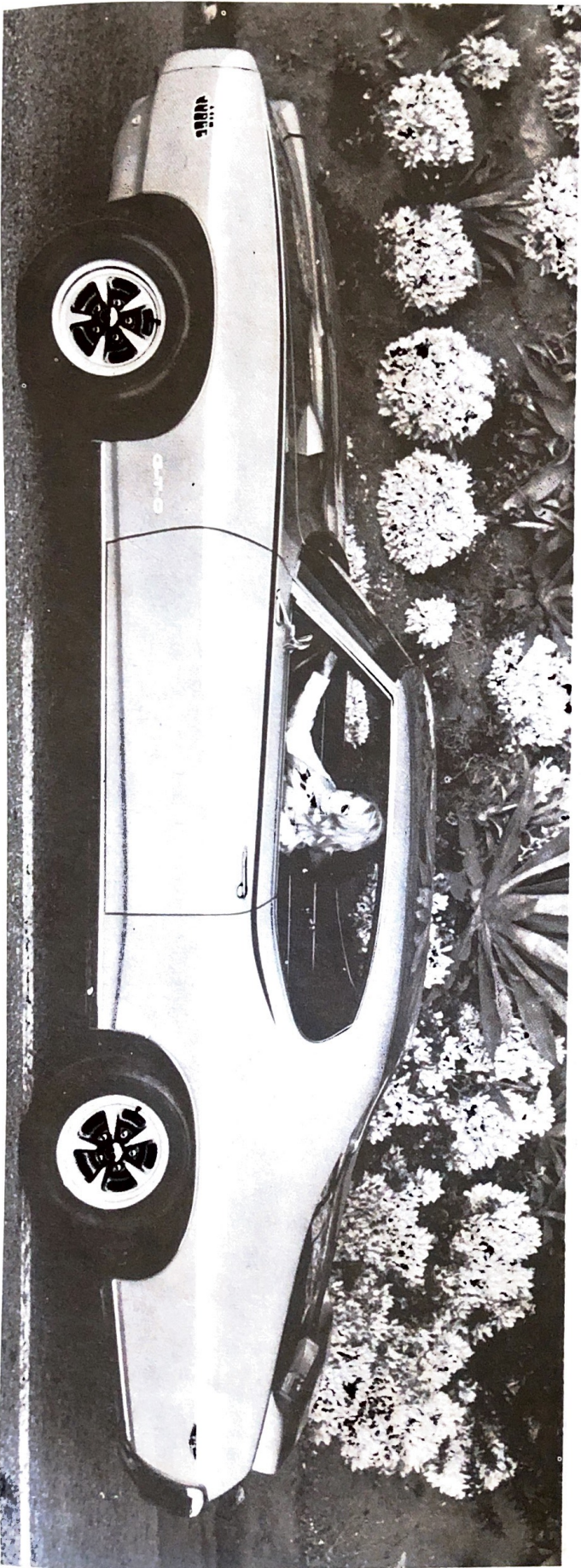
To start you must break off the plastic safety nuts on the idle mixture screws to permit fine adjustments. The air valve lockout lever and air valve dashpot actuating rod must also be removed. We replaced the stock .071-inch primary jets with richer .074-inch jets and installed richer .045-inch secondary metering rods. Floats were set at 11/32-inch. We also cut 5/32-inch off the accelerator pump rod to get a better pump shot. To finish it off we adjusted the Allen screw on the secondary air flap to allow it to come in sooner.

SMOgger

Here's how to breathe some life into the detuned big-block used in late-model Pontiacs







Maximum performance

U-DO-IT ENGINE BOOKS

CHEVY • FORD • MOPAR • PONTIAC • OLDS

