

We've all heard about the coming of "The Judge." And in keeping with the performance demands of young enthusiasts, it's about to make a second debut. Only this time it's with its own "Executioner"—a 400-inch tunnel port powerplant. You might call that a "life sentence" for other super-cars. In addition, The Judge's sister cars, such as the Firebird 400 and the GTO, will also house the big-inch takeoff on Pontiac's Trans-Am combatant.

Pontiac's chief engineer, Steve Malone, has been keeping the white shoe polish on the windows of the engineering building that faces Wide Track Boulevard. And looking back over the past few months, we've been teased into thinking that a newly designed, competitive engine would soon be released by the "youth group" at Pontiac Motor Division.

"Will it be an overhead cam engine?"

"Will it be a SOHC or DOHC type?"

"How many carbs? Or will it be injected?"

You're all wrong. It'll be a tunnel port 400-cubic-inch beefed-up, aluminum-manifolded, single-carbureted "rat chaser." Production is slated

for May availability, and your local Pontiac dealers should be able to handle all orders.

Sounds good, huh? But let's hear a bit more about this so-called "Indian uprising."

By way of comparison, the basic block configuration is somewhat similar to the current Ram-Air IV 400-incher. However, the main web area is beefed for added strength, and four-bolt mains are incorporated for maximum strength. The lifter galley has also received the beef-up treatment, and strengthening ribs are incorporated in a crossover pattern. Material selection for the forged steel crankshaft is SAE 4615. Main bearing journals are cross-drilled for additional lubrication. Connecting rods are of

a new design, and much heavier through the beam and cap area, although the forging material is of high-quality SAE 4340. Stock production methods for a pressed pin fit are retained but easily remedied with the addition of aluminum bronze bushings. This decision has been left up to the discretion of the individual.

Piston design, though relatively new, somewhat resembles the '69 Z/28 unit; the difference is in the pop-up configuration. Overall compression ratio for the new slugs and head combination falls somewhere in the 11.0:1 range. These pistons are of the cam ground slipper variety, constructed of forged aluminum and tin plated. As a note of

interest, some of the better engine builders are removing the tin plating by means of "glass beading." Current ring combinations are standard: Top compression ring is the regular 3/32-inch width with a barrel face and moly coating; second compression ring is of the same basic design, but has a tapered face and a reverse twist. Oil control is handled by two chrome rails and a stainless steel expander.

"Are you sure it's not going to be a DOHC-type engine?"

Pretty sure. These photos show no provision for the extra cams. The cam timing specifications are identical to those of the Ram-Air IV package. We're told, however, that

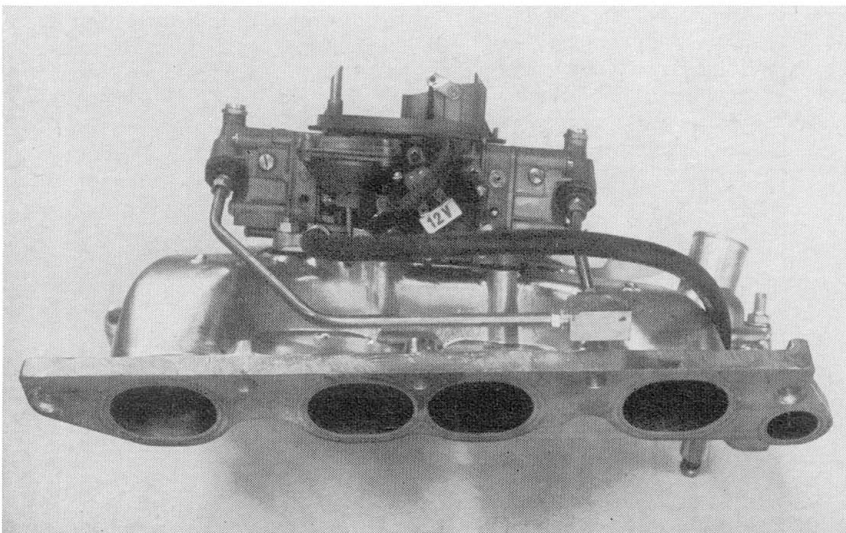
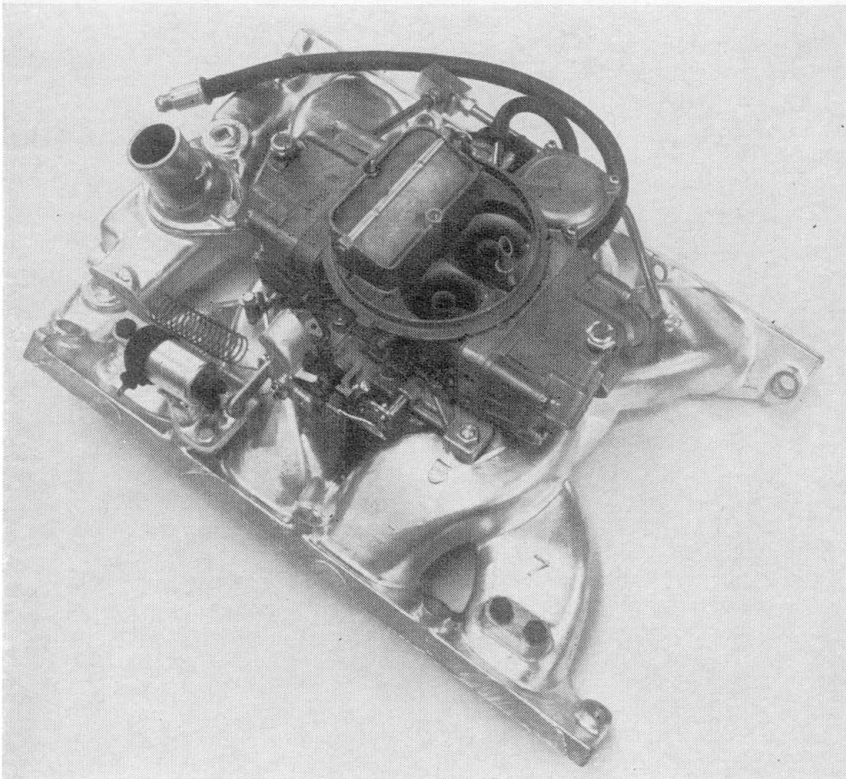
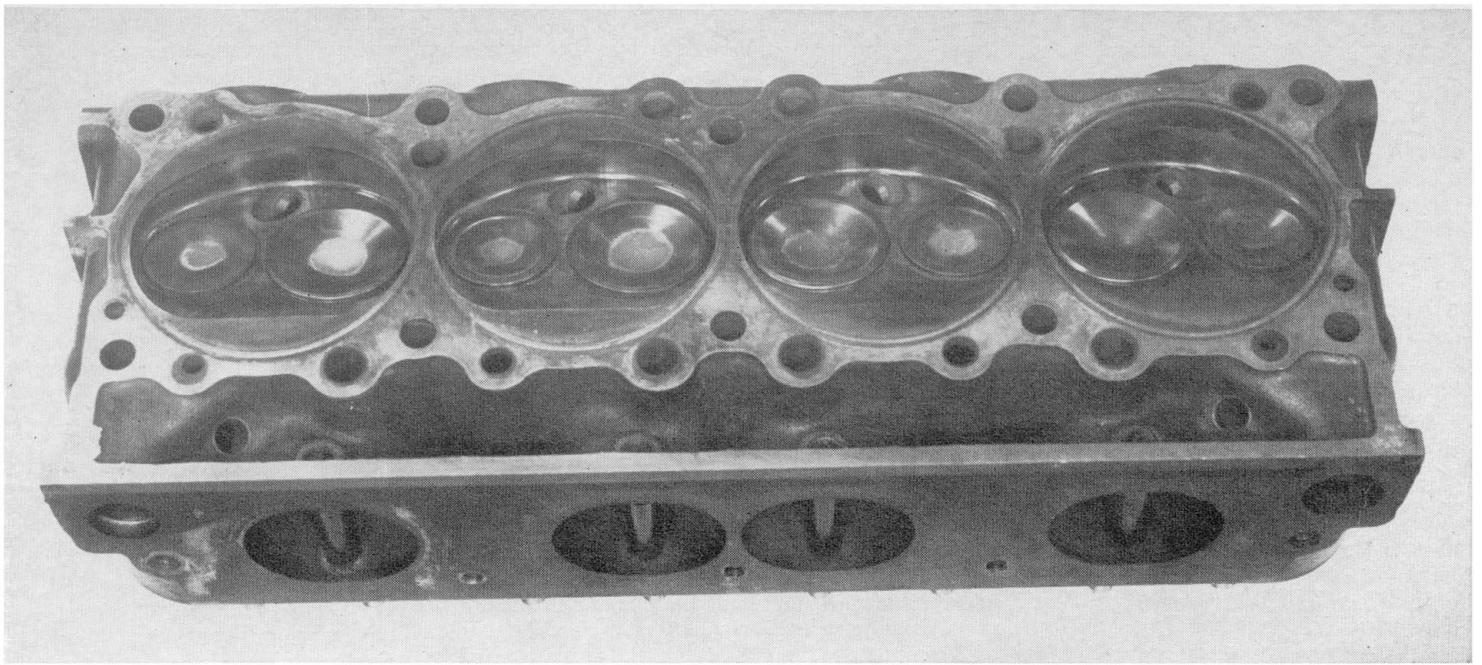
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Pontiac is brewing a big pot of trouble for the Brand-X super-cars. Wanna know the ingredients in The Judge's recipe?

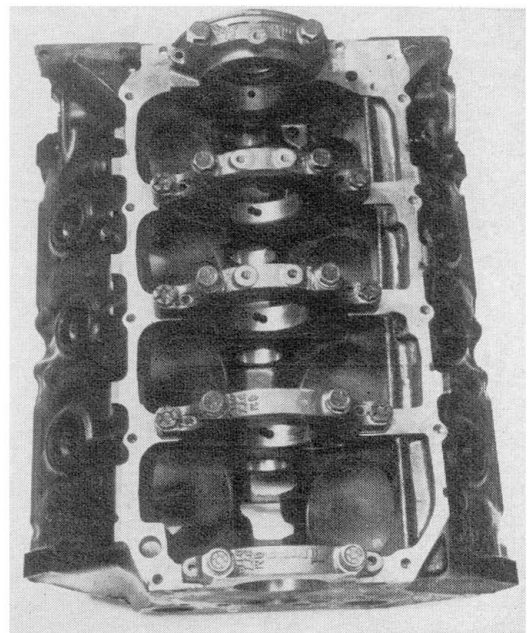
By John Dianna



PONCHO'S TUNNEL PORT FOUR-OH-OH!



TOP — A hearty view of Pontiac's new tunnel port head shows the finely machined combustion chambers and the new tulip-shaped valves. Plug position has been relocated for better flame propagation. Steel tube inserts guide the pushrods in correct valve geometry. Intake ports are huge and, though seemingly oval at the head intersection, are truly round through the port runners. **LEFT** — The 800 cfm Holley seems to be quite adequate on the aluminum free-flow manifold. Manifold intake runners lend themselves to a high-rise plenum design. **BELOW LEFT** — Side view of the carb/manifold combination shows not only the dual feed fuel lines, but hugeness of intake ports as well. **BELOW** — Strength was the prerequisite for casting this new block. Extra beef started in the main web area and was carried onto the four-bolt main caps. Only the three center main caps are of the four-bolt design; the front and rear mains retain the standard two-bolt pattern. Lifter bosses also received added beef.



photography: J. M. Zeleznik

PONCHO'S TUNNEL PORT

the cam in the tunnel port engine actuates mechanical lifters rather than the limited-travel hydraulic types used with the Ram-Air IV. The engine's valve system operates on 308 degrees intake duration and 320 degrees exhaust duration. Total valve lift at zero clearance (lash) is .520-inch. We could take the uneducated guess — in relation to camshaft, heads, and piston/rod relationship — that somewhere in this combination, volumetric efficiency is on the rise.

"If this new engine isn't going to be a DOHC-type, then what will it be?"

A runner, m'boy, a runner. You might as well forget about the cammer engines, at least for the present. Pontiac's latest creation for the public is the tunnel port-type head,

so let's examine their new design concept.

By comparison, the size of the intake valve is increased to 2.19 inches, and the exhaust valve is held to 1.77 inches. However, an outstanding feature on the tulip-shaped valves that deserves mention is the chrome-plated, hollow valve stems. Valve weight is cut considerably with this process. Heads are made of cast iron (Motown wonder metal). Why cast iron? It could be due to lower costs or maybe its ability to maintain correct combustion chamber temperatures. Whatever the case, there was no evidence of aluminum heads on the shelf. Even so, the cast iron heads show a minimum of valve shrouding and a re-designed plug angle/location. The machined combustion

chambers show fine quality control and should increase air/fuel flow considerably. Overall engine and head design lead one to think of volumetric efficiency-plus. Intake port size is huge and, although oval-shaped at the head intersection, the ports flow into a relatively round runner with a direct attack on the centerline of the cylinder. Same theory holds true for the exhaust port design. Dyno reports show that a lack of low pressure areas under the valves constitutes rather free-flowing head characteristics. Proportionately, cast iron exhaust manifolds are also of the free-flow design. For a streetable package, these massive units show quite a performance increase over the restrictive standard-production manifolds currently on the market and are, admittedly, the next best choice to individually tuned headers.

"If it's not a cammer, will it be injected?"

If you consider an 800 cfm Holley an injector, then it's injected. The intake manifold is cast of aluminum and sports a single four-barrel carburetor. Maximum efficiency is obtained from the free-flowing manifold between the 5000- and 7000-rpm range. This is due to runner lengths, which are restricted because of underhood space. Keep in mind that this is a production performance engine, not one of a fifty-unit special going to select customers only. This is the real thing, available to anyone with cash or credit.

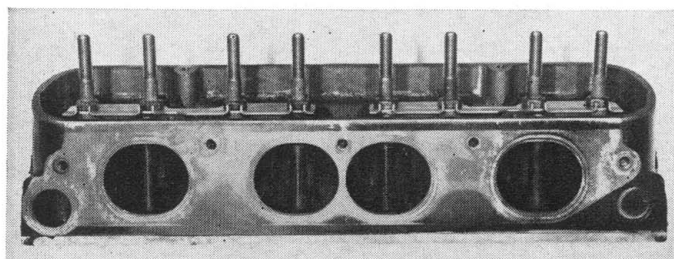
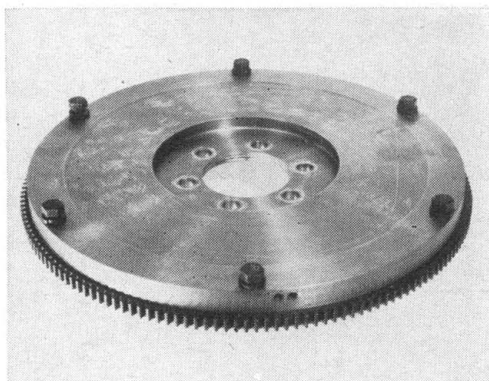
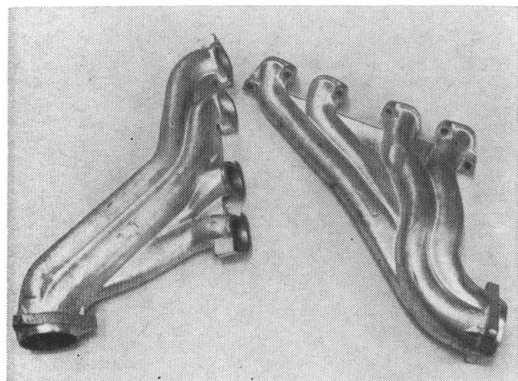
"How 'bout options?"

Boy, just a minute ago you were speaking of DOHC jobs, and now you want air conditioning. However, if "cool-pak" and other convenience packages are your bag, you have only two alternatives. Either have your girl friend put an ice cube in a glass of water and blow in your direction, or buy a Judge convertible and take a trip to Alaska in the winter.

"If I can't get a DOHC, then what kind of power will this engine put out?"

We expected you to ask that question. We asked about the horsepower output on this engine too, but we didn't get an answer. However, we did manage to peek at a dyno sheet, which tells us you can expect about a 1.25-horsepower-per-cubic-inch ratio. Now, that shouldn't be too hard to figure out. And it's fair; we didn't come right out and tell you (or did we?).

It's an interesting approach Pontiac is taking on the performance image. Mr. Malone surrounds himself with bright young-minded engineers, and as a result, comes up with performance packages that not only perform well but are equally good-looking. Competitionwise, Pontiac is on the upswing. Care to predict on the Trans-Am circuit this year? How 'bout drag racing? Many new Ponchos look very promising. NASCAR, Grand National circuit? No comment. No matter how you add it up, Pontiac is out to make big noise. And who knows what's lurking in one of those dark little dyno rooms. A cammer? You can be sure of that, but you can't be sure of the release date. So will a tunnel port do for now? ■ ■



ABOVE LEFT — By design, the cast iron exhaust manifolds are relatively free-flowing. Productionwise, these units are the next-best items to an all-out, individually tuned exhaust system. ABOVE RIGHT — A steel billet flywheel is used in place of a cast iron wheel, and should relieve many minds when thinking in terms of clutch scatter. LEFT — Intake view of the head design shows the direct attack on the intake valve. Air/fuel flow is greatly increased with the newly designed heads. Screw-in rocker-arm studs are also used to contain pushrod guide plates located under the studs — quite a design.

400-inch Pontiac "Tunnel Port" Engine Specifications

Bore.....	4.120-inch
Stroke.....	3¾-inch
Compression ratio.....	11.0:1
Cam lift (at "0" clearance).....	.520-inch
Cam duration (intake).....	308 degrees
Cam duration (exhaust).....	320 degrees
Intake valve diameter.....	2.19-inch
Exhaust valve diameter.....	1.77-inch
Pistons.....	Forged aluminum
Crank.....	Forged SAE #4615
Rods.....	Forged SAE #4340
Rocker arm ratio.....	1.65:1
Miscellaneous:	Four-bolt main caps, 80-lb. oil pump spring, steel insert pushrod guides, 800 cfm high-performance Holley 4-barrel carburetor, mechanical lifters