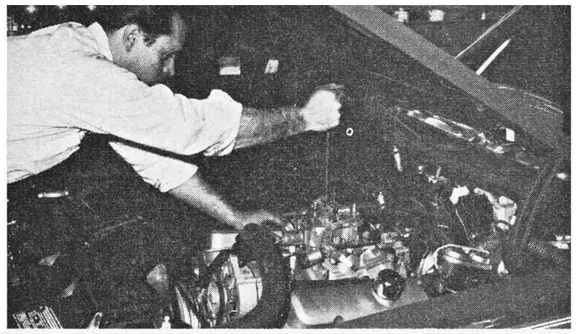

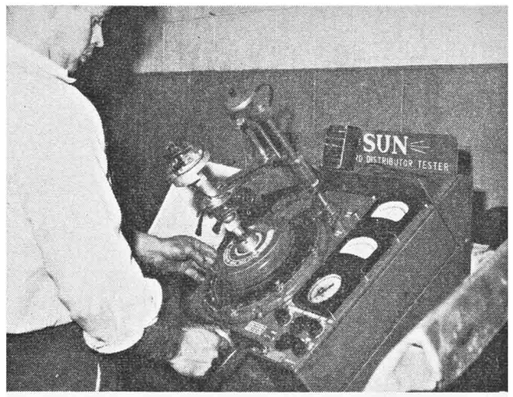

Above, Dave Warren makes final adjustments on stock Quadrajet carb. Right, Dave reworks the distributor for full centrifugal advance with 20 degrees coming in at 2400 rpm. Total advance is 32 degrees.

100% PURE FIREBIRD

Royal Pontiac builds a better 'Bird that's going to be the wheels to beat in the growing Pure/Stock battle

BY ROGER HUNTINGTON

DRAG RACING in the new Pure Stock classes is mushrooming in popularity all over the country. Here's a place to race your everyday street machine just the way you drive it on the street—without spending a couple-thousand dollars for special equipment and an engine blueprint job, like you have to these days in the "Stock" classes. This is hot drag racing on a shoestring, and the guys love it.

The editors of CARS Magazine thought it would be interesting to take a popular high-performance showroom stock model, set it up with all the legal "tuning" allowed under Pure Stock rules, and take it out to the drag strip and see what it would do. It was hoped that the story might give you fellows some ideas about your own cars, and maybe get you started in this new fun drag class.

It wasn't hard to find the test car. The guys at Royal Pontiac in Royal Oak, Mich. are always raring to do this sort of thing, and manager Leo Martin out at Motor City Dragway has been wonderful about letting us use the strip facilities in the off season. We called Milt Schornack, Royal's performance chief, and he was glad to set up a '68 Firebird 400 Ram Air automatic for the test. This could certainly be considered a "popular" high-performance model with the young buyers. These smaller specialty cars (Mustang, Camaro, Firebird, etc.) with big engines are fast gaining the status of true "supercars" with the youth market. The lighter weight, small size and long-hood sporty lines are catching on big.

A year ago we would have had to think twice about the Ram Air package. Many stripes were banning them in the Pure Stock classes because production wasn't sufficient to consider it "showroom stock" equipment. But this year you can order a Ram Air GTO or Firebird out of any Pontiac dealer—and many carry them in stock. Factory installations may exceed 5000. This is a true stock car.

The Firebird made a good test car for other reasons. Pure Stock rules limit you to a maximum axle gear ratio of 4.11. All '68 Firebird Ram Airs come from the factory with 3.90 gears as standard equipment—so there was no need to switch gears to set up the car. (Late Ram Air GTO's come through with 4.33 gears.) And of course, you get dual exhaust with the 400 engine, so no big exhaust changes were necessary. Pure Stock rules require a conventional street exhaust system, running through legal mufflers, with no Lakes cutouts to dump the exhaust ahead of the muffler. About all you can do is install straight-through glasspack "Hollywood" mufflers in place of the baffled factory mufflers. The fellows made this change on the test

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This baby has 3.90 gears, Wide Ovals, and hood-mounted tach. More goodies help cut et's by 3/10ths and increase top end by 2 mph.

100% PURE FIREBIRD

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car, which helped a little bit—(but having to retain the factory resonator cans behind the mufflers killed some of the potential benefit of the glasspacks).

Regular street tires are required in the P.S. classes. This didn't hurt the standard Firebird too much because the 400's carry Firestone Wide Oval F70-14 tires on 6-inch rims as standard equipment. As you know, these have up to two inches wider treads than conventional tires of equivalent size, and the extra rubber on the track does wonders for traction. There is one caution with Wide Ovals, though: don't reduce the pressure too much, as you do with conventional tires. With the very broad, low section a low inflation pressure causes the tread to buckle upward in the center, so you actually have less rubber on the track even though the "footprint" is longer. The Royal boys ran 24 psi pressure on the Wide Ovals for the test. We tried a few blasts down the strip with 20 and 22 psi, but the e.t. fell off. There was a lot more smoke coming out of the hole.

Setting up the engine was not much of a job because Pure Stock rules don't allow you to do very much. No head milling or blueprinting or cutting piston deck clearance. No special exhaust headers. No special forged replacement pistons and exotic ring sets. No expensive over-the-counter "service" parts in the lower end. You run your engine just the way it comes off the assembly line, with only a few minor external tune-up tricks allowed.

You *can* re-jet the carburetor. Royal performance mechanic Dave Warren went to work on the big Rochester Quadrajet that comes standard on all large Pontiac engines. Main jet size was increased from .072 to .074 inch, and tension was increased on the spring that controls the opening of the secondary air valve. (This is a simple adjustment on the little torsion-type spring on the end of the air valve shaft.) The pressure of air flowing into the air horn causes the butterfly-type valve to tilt open gradually as the engine speed increases. It's not connected in any way with the accelerator pedal. This prevents over-carburetion and stumbling when the throttle is punched suddenly at low speed. Normally the air valve starts to open at around 2000 rpm (with wide-open throttle), and is not fully open until 4000 or so. When you increase the valve spring tension it opens at a *slower* rate—like maybe between 2500 and 4500 rpm. The Royal guys have found that this improves drag strip e.t.'s by *reducing* the effective venturi area in the mid range, which apparently improves mid-range torque and pickup. Sounds funny, but there it is. Do some experimenting yourself.

Another Quadrajet modification that Royal generally makes is to increase the stroke of the accelerator pump from 1/8 to 3/16, to get quicker throttle response out of the hole. But the boys decided not to make this change, as they were not sure it would be considered legal in the P.S. classes. (Also it's not as beneficial with an automatic transmission as with a 4-speed.)

The ignition system came in for some special attention. P.S. rules allow modifying the spark advance curve, and the boys took full advantage of this. As usual they aimed for faster advance at the low end, as this helps initial acceleration off the line. (Though it would show no benefit if the engine were tested at constant speed on a dyno.) The standard centrifugal advance curve gave 20 degr. crankshaft advance at 4600 rpm engine speed, with an initial setting of 9 degr. BTC. (For a total advance at high speed of 29 degr.) Milt Schornack keeps the same centrifugal advance of 20 degr.; but he uses softer advance weight springs so the 20 degr. comes in at around 2400 rpm engine speed. Then the initial setting is moved up to 10 to 12 degr. for a total of 30-32. This may not seem like much total advance for an unblown machine; but the new '68 Pontiac combustion chamber, with its broad dish shape, apparently gives much faster combustion—so less advance is required.

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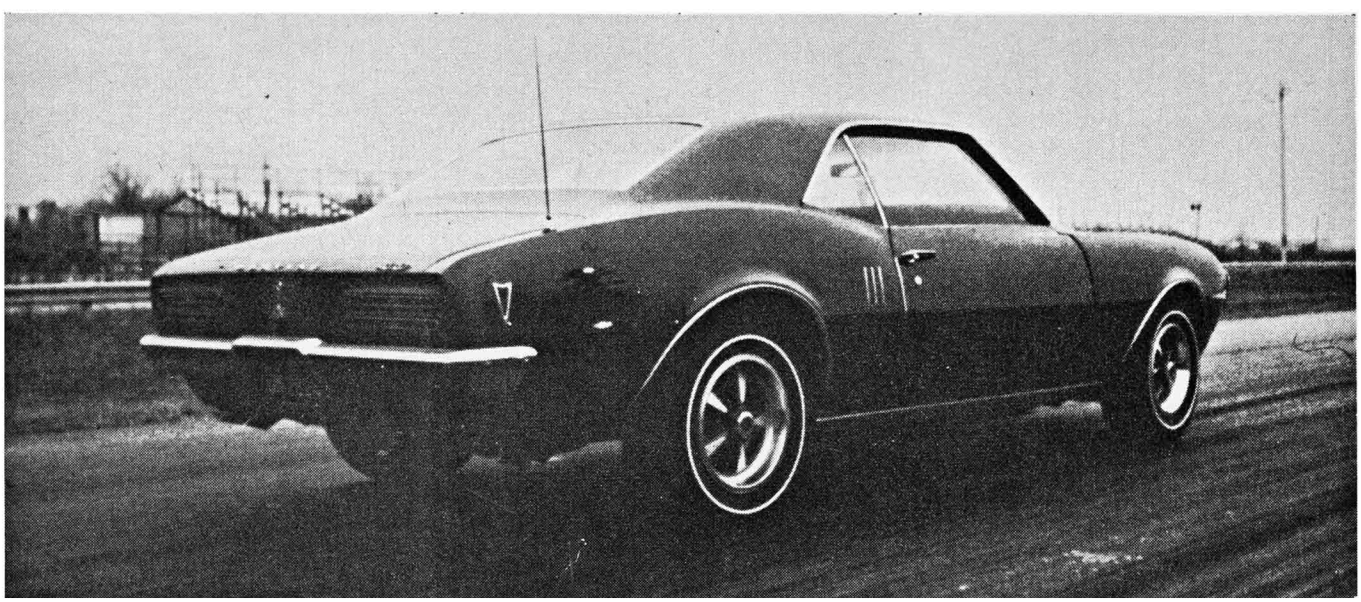

Ram Air Firebird at Motor City Dragway in a test set-up for P/S competition. It turned times in the high 13's at 103 mph.

The connecting rods on the 302 are .060 inches shorter than the ones of the 289 to accommodate for the extra crank stroke and the wrist pin's in the same location in the piston as the 289. To gain some extra strength, bigger 3/8th rod bolts replace the 5/16 ones and therefore had to be spaced out a little further away from the journal. Instead of a notch broached straight across the rod to retain the rod bolts and keep them from turning, this rod has a spot faced relief which leaves two strengthening rail sections extending around each bolt. The rods, we might add, are only 25 grams heavier than those of a 289, remarkably little considering the gain in strength.

A street type tunnel port has a fairly low 10.0:1 compression ratio, designed to help with emission control and durability, while the race machine has 11.5:1 and a piston with a slight pop-up. Pop-up pistons have never been very much in favor with the all out racers because they resulted in a loss of power due to the spark plug and valves getting shrouded. These, however, together with the broadened combustion chamber, have proven excellent.

The extruded pistons were designed with racing in mind. For instance, the sides of the towers extend beyond the skirt, leaving room for full floating pins and their retainers. The pins on the race engines, incidentally, have tapered bores which reduce weight and increase strength. Also, the race pistons will have special oil feed holes leading from just under the oil control ring directly to the wrist pin. Thus, every time the piston comes down, the oil ring helps scrape oil toward the pin.

The extruded pop-up piston will have the narrow 1/16-inch moly compression rings as well as a moly oil ring to put the finishing touches on this remarkable power plant. One incidental bit of intelligence which we picked up is that the production version of the tunnel ports were deliberately designed to keep the sale price within the reach of a normal wallet, so the 302 promises to be a volume item rather than a limited release pipe dream. It may well change things on the racing map.

PURE FIREBIRD continued

The '67 engines ran best with 40 to 42 degr. total advance.

Incidentally, all vacuum systems to the distributor are disconnected

CARS GOES AND *CARS* SHOWS!

(The Cobra-powered Cars Roadster is shown here at the N.Y. Hot Rod Show adorned by 5' 10" belly-dancing Josel Andrews and her 6-foot boa constrictor. Josel measures out at 37-24-38 and the snake hits the tape at 10-10-10.)

SO SNAKE DOWN TO YOUR LOCAL MAG-STAND EACH MONTH AND PICK UP ON THE UP-TO-THE-MINUTE HI-PERFORMANCE SCENE!

and plugged. The '68 exhaust systems, as you know, have a separate vacuum diaphragm which retards the spark to near top center at idle speed —in addition to the usual vacuum diaphragm to advance the spark at cruising speed. Both these deals only serve to hurt the sensitivity of the centrifugal advance system. And since they don't contribute anything to performance, the Royal guys generally disconnect them for any drag strip work.

The Firebird turned out to be pretty impressive on the strip, considering what little had been done to it. In fact the Royal team had taken the same car out to Motor City Dragway a couple of weeks earlier, in strict showroom trim, and got times in the low 14's at over 100 mph trap speed. Best time was 14.19 e.t. at 101.12 mph. Nothing had been done to it then, other than setting the initial spark timing.

With the above changes for Pure Stock we pulled a best of 13.83 at 103.58 mph. Ten consecutive runs were better than 13.92 at 102. And this with closed street exhaust and street tires. Strictly legal for Pure Stock in the new NHRA C/Stock class. (This would have been A/S last year.) That won't beat the stockers in this class, with all their expensive modifications; but it would be right in there against the P.S. jobs. Low 14's at under 100 mph was good in A/PS last fall, everybody was very pleased. We picked up about 3/10ths second on e.t. and 2 mph trap speed with the simple P.S. changes.

Incidentally various driving techniques were tried to get the best possible times. The special high-performance Turbo-Hydramatic transmission that comes with the Ram Air 400 engine (360hp) normally up-shifts at somewhere between 5000 and 5400 rpm with full throttle. Driver Schornack found he could get a bit better times by shifting manually with the console lever at 5600. (Remember that the Ram Air engine is supposed to peak its horsepower at 5400 rpm—so you would want to run at least 200 to 400 rpm above this to shift. And even this speed requires adjusting the rocker arm stud nuts to bring the hydraulic lifter plungers out to the ends of their travel, to give the effect of solid lifters. Otherwise the lifters will pump up as low as 5200 rpm, especially when the valve springs get a little

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tired. This mod is perfectly legal in the P.S. classes.)

Starting-line technique was ticklish with the automatic and 3.90 axle gears. The Wide Oval tires didn't have enough initial bite to wind up very much thrust in the torque converter with the brakes on. If you wound up as much 1600 rpm —(which is still well below the full-throttle static revs) the tires would just sit there and burn when you popped the brakes. Milt found that about 1200 rpm static, with brakes on, just a little above idle speed—gave the quickest getaway with the automatic. He could have run up much higher, and gotten away much quicker, with cheater slicks of course.

So that's the story, guys. Lots of meat in the new Pure Stock classes. The racing is just as hot, if not quite as fast, and the cost is nothing compared to what it costs to build up a competitive stock class car these days. Better look into it.

BEFORE STINGRAY continued

setup. In a lot of these oddball swaps, you can use commerical motor mounts made to put these engines into a '54 Chevy—simplifies things a little. You still see some of these crazy swaps around. We know one guy who's putting a 421 Pontiac into his '61 Corvette right now.

With enough chopping, fitting and welding, you can probably get any engine into the early Corvette. To prove this statement, Bill "The Paperboy" Lerner's Corvette is running a SOHC 427 Ford engine. Needless to say, the car is fast. It's a neat installation, too. With injection, the car is a bear.

Lately, the most popular engine swap into an early Vette is the 396-427 Chevy. Helping matters out a whole lot is a kit that Bill Thomas sells to simplify the whole thing. His installation kit contains everything from motor mounts to clutch linkage to fit the engine into the Corvette's cavity. In addition, he makes a set of special headers specifically engineered for this swap. It's a great way to go if you want to drop a late big block Chevy into an early Corvette. His kit plus headers makes the whole thing into a glorified bolt-in. Another beauty of this one is that the bellhousing and everything back stays where it is. Everything bolts up. This is about the easiest way to go if you're looking for ultimate power.

Suspension for drag Vettes is pretty straight forward. No trick stuff here. For the stock classes, heavy duty coils up front with spacers so that the car sits level with slicks, heavy duty leafs at the rear

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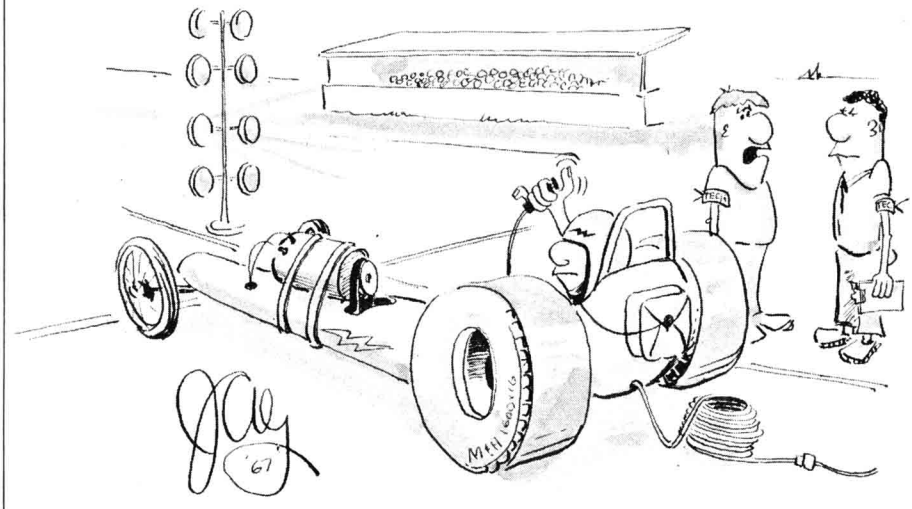

Says he's sponsored by some electric company.