



A Chapter of POCA

# news

[www.PanteraClubNorCal.com](http://www.PanteraClubNorCal.com)

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## *Monthly Meetings Return!*

Once again, because there was no formal meeting, there are no minutes to report. A handful of people have been taking part in online gatherings on Zoom, but thankfully this is not going to be necessary any longer.

As reported last month, Holder's Restaurant is once again open for business, and they are able to accommodate us in our usual meeting room. Even at best, we typically fail to come anywhere close to filling the room, so it should be no problem retaining social distancing guidelines. Hopefully many of you will come to the meeting this month!

The second and third Breakfast Club Rallies this year both saw notable PCNC participation, and while the April rally is fully subscribed, the May rally is available for signup now!

# Membership News

## New Members for April:

We have no new members this month.

## April Membership Anniversaries:

We congratulate the following people for the indicated years of continuous membership in the Pantera Club of Northern California:

**Mike and Lori Drew:** 32 years

**Tom Padula and Autumn Cardone:** 26 years

**Michael and Cindy Brunn:** 8 years

**Timmy and Tess Rodriguez:** 5 years

**Andrew and Michele Duafala:** 2 years

**Lee Scales:** 31 years

**Perry and Brigit Strongin:** 21 years

**Robert Bunfill:** 6 years

**Richard Bakman:** 4 years

**Hiroshi and Yoko Miyata:** 2 years

For various reasons, the following members did not renew their POCA/PCNC membership:

**Tony Guinasso, David Luckenbach, Paul Rimov, Steve Davis, Tom Leverone**



# Thermostatically Yours....

*Story and Photos by Mike Drew*

Recently I found myself helping a relatively new Pantera owner whose engine needed to be removed due to zero compression in one cylinder (it turns out he bent a valve somehow). After the motor was removed and partially dismantled, I asked about the car's overheating characteristics. He said that the car ran nice and cool on the highway, but had a tendency to get hot in traffic.

This is a commonly reported Pantera malady, often falsely attributed to some inherent design flaw in the car. "They all do that, sir" was the line used by Rolls Royce salesmen back in the day to brush away owner concerns about one thing or another.

But the fact is that no properly maintained Pantera should ever, ever overheat. If your Pantera is overheating, it's likely that something is wrong. And it's even more likely that the problem was caused by the owner (either you, if you were monkeying with it, or the previous owner).

One thing that has contributed to



*A cheap, conventional Murray 351C thermostat on the left (sold by the O'Reilly auto parts chain), and the high-zoot FlowKooler Robertshaw unit alongside*

more Pantera overheating problems than anything else is the fitment of an incorrect thermostat. How can something so simple have such a deleterious effect,

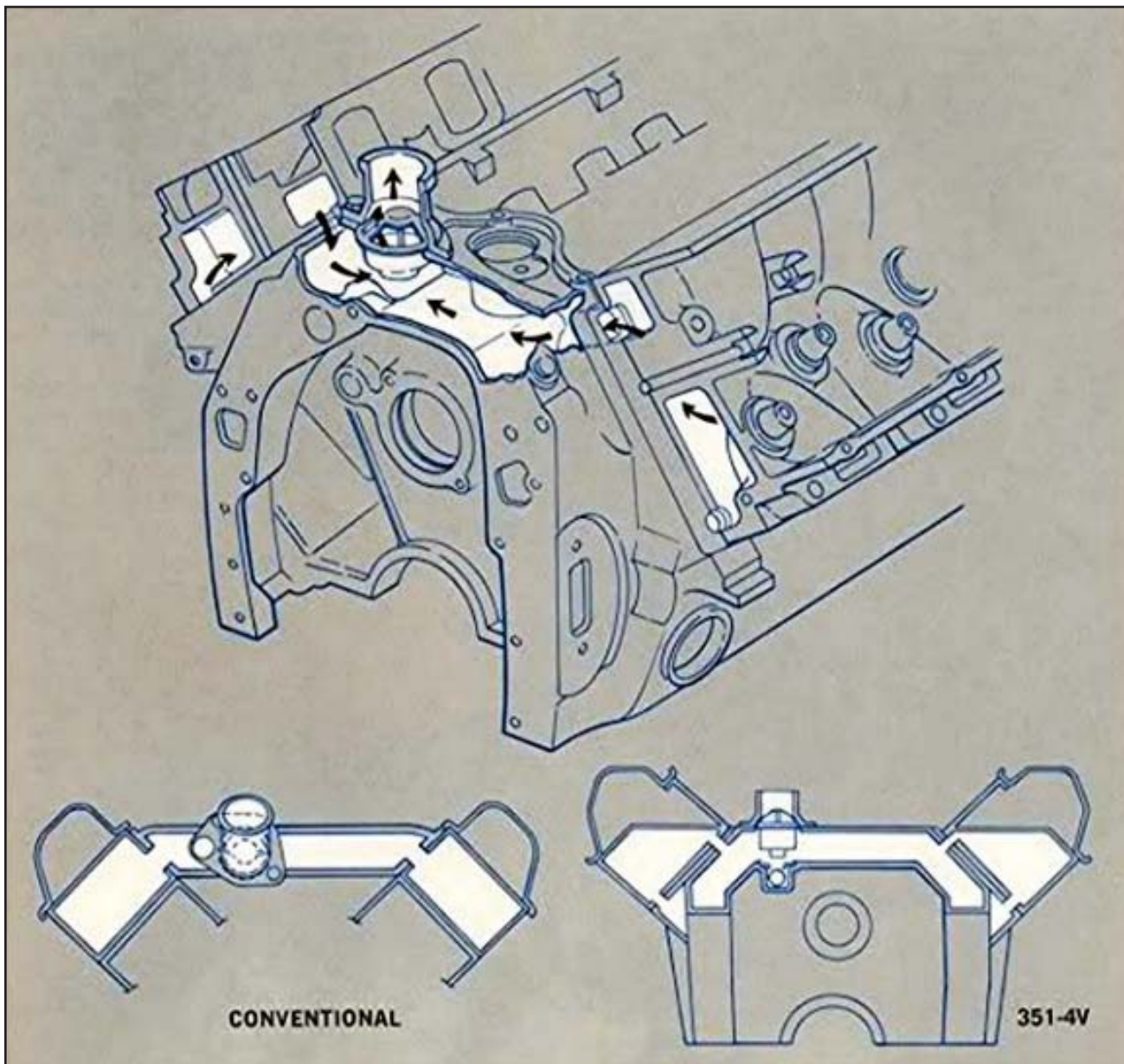
and how can so many people get this simple thing wrong? This requires a bit of in-depth discussion.

Standard Ford V-8 engine architecture sees water being inhaled by the water pump, pressurized, and then forced into the engine block. The water is forced upwards through passages cast in the block, then into the heads. In virtually all Ford V-8 engines, the water is then forced from the heads into the intake manifold, and from there, it arrives at the thermostat housing.

The thermostat faces towards the front of the car. When the thermostat is closed, water is prevented from passing forward to the radiator. To avoid cavitation of the water pump, which can lead to uneven heating and also damage the water pump impeller, all other Ford engines use a small 5/16" bypass hose next to the thermostat, leading to the suction side of the water pump. During engine warmup, some water is allowed to cycle past the thermostat and back into the water pump, thus promoting circulation. When the water heats up enough to open the thermostat, the majority of



*This radiused brass disc pressed into the top of the block is a critical component of the 351C cooling system. Eliminating it or using the wrong thermostat leads to chronic overheating, and blocking it is harmful too*



*This drawing from Ford Engineering clearly shows the architectural differences between all the other contemporary Ford V-8 engine families, and the 351C (and related 302C, 351M and 400M)*

the water flows forward to the radiator, but the bypass hose remains in effect, so a small portion continues to flow from the hot engine directly to the inlet side of the water pump, whereupon it is mated with incoming water from the radiator and reintroduced into the engine.

Ford engineers were feeling especially clever when they designed the 351 Cleveland. Apparently they felt that the bypass hose arrangement, which had been used successfully for decades, was old-fashioned. They wanted to preserve the same philosophy but move the process inside the engine, which would allow them to do away with the

pesky bypass hose. Too, they decided the intake manifold didn't need to be cooled, so the Cleveland uses a 'dry' intake. Water flows through the block and heads only. To this end, they devised a scheme they called the "Controlled By-Pass System".

The thermostat was rotated 90 degrees to face straight upwards, and positioned on the top of the engine block. Water flows from the bottom of the block into the cylinder heads, and then out the top of the heads into the top of the block, until it reaches the thermostat. When the thermostat is closed, instead of being routed through an external

hose, the water instead falls through a radiused hole (formed by a pressed-in brass disc with a hole in the center), into the inlet side of the water pump, where it is recirculated. When the water heats the thermostat up, it opens, and a 'hat', unique to the 351C thermostat, drops down and partially (but not completely) blocks off the orifice in the brass plate, which diverts the majority of water flow forward to the radiator.

The thermostat itself is basically identical to those used in all other period Fords, with the significant exception of the 'hat' which is pressed onto the bottom of the thermostat. Many people

believe the function of this device is to fully block the hole in the disc, but this is not true. Ford engineers did the Pi-R-Squared thing and deliberately calculated the area of the disc left uncovered by the hat. Not surprisingly, this area is absolutely identical to the area of the bypass hose used on other Ford engines!

So why make such a deviation from standard practice? Well, when the thermostat is closed, much more water is free to flow through the engine and back into the water pump, and this increased flow gives a faster, more even warm-up without hot spots, particularly in the

valve area. The new system improved the thermostat's ability to control water temperature with less cycling. Additional benefits included improved heater performance, and potentially increased flow to the radiator when required.

So, it was a brilliant innovation, which works exceptionally well. That is, until some well-intentioned person substitutes a standard Ford thermostat

for the 351C unit. At first glance, they appear identical so it's an easy mistake to make. What's worse, many thermostat manufacturers can't even keep the details straight between their own engineering and marketing departments, so the marketers will falsely label standard thermostats as being suitable for use in a 351C, which most emphatically they are *not*. Even when the Cleveland was

regularly encountered, most parts store counter people weren't knowledgeable enough to know the difference, and today almost any parts store will gleefully sell you the wrong part.

So it's no wonder there are so many Panteras improperly equipped. A few years ago, Garry Choate and I bought a Pantera from a person who had been driving it in southern California for



*A high-flow thermostat for a regular Ford engine appears on the left, and a specialized 351C thermostat on the right. The only difference between them is the brass 'hat' pressed onto the end of the thermostat, which serves to more completely block the orifice in the disc pictured earlier*



*Both of these thermostats are intended for the 351C. The one on the left is a standard unit, costing less than \$10, while the one on the right is the FlowKooler Robershaw High Flow unit, which is more like \$45*

20 years. The car was rock solid, but exhibited overheating in traffic. Sure enough, when we got it to Garry's house and checked, it had a standard, non-Cleveland thermostat. The seller had bought it that way and never touched it.

At a PCNC tech session held in conjunction with a Super Bowl party, I arrived just in time to see a hapless club member completing the installation of an oh-my-gawd radiator, and cooling fans strong enough to propel the car at 25 mph all by themselves! He had suffered the low-speed overheating situation for years and finally decided throwing several thousand dollars



*The business end of both thermostats, showing that the pressed-on 'hats' are identical in diameter*

at it was the only possible cure. I asked if anybody had ever bothered to look at the thermostat? Sure enough, it was the wrong one! I dashed to the parts store, spent \$7 on a proper one, they installed it, and the problem was solved. (Too late to return all the expensive parts and undo the extensive rewiring needed for the fans, but at least he knows he can make it safely home if both his drive-shafts fall off the car!).

Getting back to the story I started with, the new owner purchased his car from a fellow who had driven it for over 20 years while enduring low-speed overheating, despite the fitment of a quality Fluidyne radiator and Spal fans. With the short block sitting on a stand, I scraped away the paper gasket and plucked out the thermostat. Sure enough, it was a non-Cleveland unit!

This then leads to the obvious question: If there are so many wrong thermostats out there, which one is the right one?

Well, the basic answer is simple enough—any thermostat intended for use in a 351C engine must, *must* be equipped with the added-on hat to allow the cooling system to function properly. But beyond that, we enter into the realm

of superstition.

The standard 351C thermostat from Ford was rated at 192 degrees, because generally engines need to run somewhere between 190-200 degrees for maximum performance and efficiency. Because of the long distance between the engine and radiator (compared to, say, a Mustang), by the time the thermostat opens, it can take awhile for cold water to make the journey back to the engine, and perhaps the engine could get a little bit hotter before cooling starts taking place. For this reason, most Pantera owners chose to run 180-degree thermostats instead.

Some people make the mistake of running a 160-degree thermostat. This is a very bad idea. They falsely believe that it will somehow be better, but at least one of two bad things will happen. For starters, engine warmup will be delayed because the thermostat opens long before the engine is warmed up, and cold water is then introduced into the engine. If the rest of the cooling system is marginal, eventually it will heat up to 190-200 degrees (or more) anyway. But if the cooling system is up to snuff, the car will simply refuse to warm up at all, and motor down the

road at 160 degrees, which leads to premature engine wear.

Some people make a different mistake. Feeling smarter than the Ford engineers who created the Cleveland's unique cooling system, instead they block off the orifice in the top of the motor entirely, which they think then allows them to then use a conventional thermostat. This is a very bad idea. In this scenario, when the engine is first started and the thermostat is closed, there is ZERO water movement through the engine, as the water pump impeller churns and churns away. The engine heats up unevenly, allowing hot spots to develop. If there is any air at all in the system (which is almost an inevitability, no matter how much effort is expended to eliminate it), the superheated air can turn to steam, which is an extremely powerful force, expanding at something like a 20:1 ratio. The same force that propelled locomotives across the prairie in the 19th century can propel your head gaskets into orbit today!

Too, once the water near the thermostat heats up (by radiant heating, since the thermostat is in a relatively cold part of the engine), when the thermostat opens, super-heated water goes forward

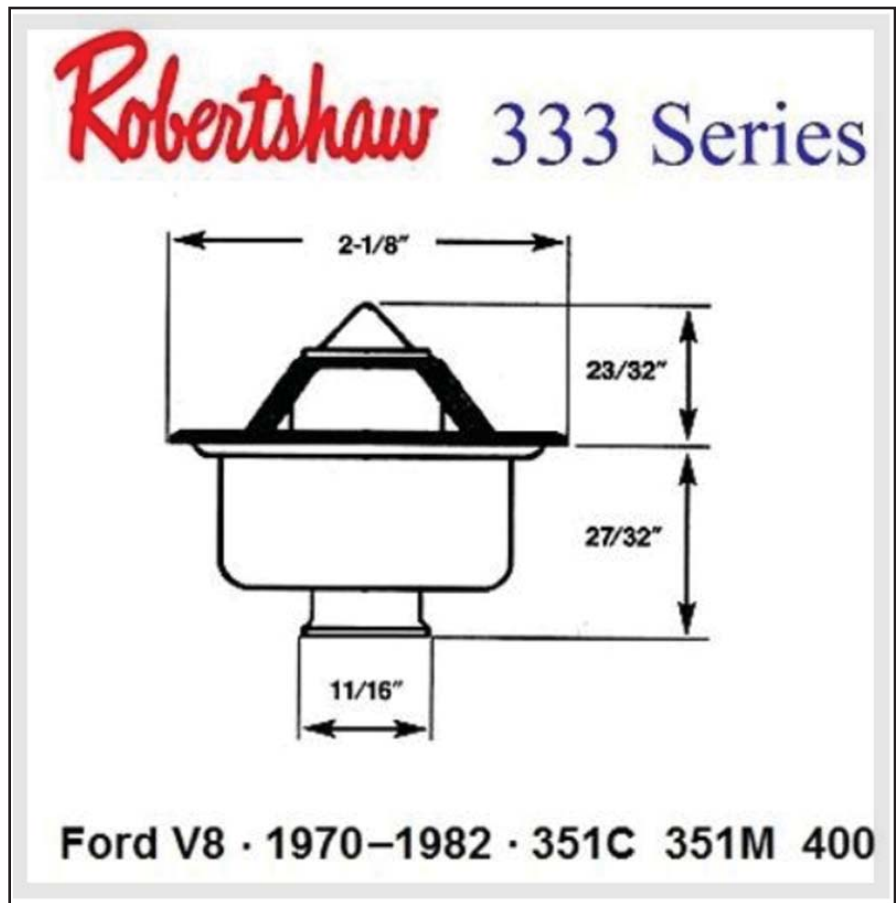
while ice cold water comes rearward. WHAM! With no controlled mixing of hot and cold water in the water pump, this super-cold water is introduced to the super-hot block, which can lead to thermal shock and premature wear, and even cracking of the water passages. Eventually this cool water reaches the thermostat, which then summarily closes, and the process repeats several times, with the engine subjected to alternating super-heat and super-cold until the system reaches stasis.

Hopefully by now you have come to agree that the Ford engineers were no dummies, and allowing the system to work as designed is the proper path to take. But even assuming one has agreed to this premise, there are other considerations to discuss.

The basic design of the automobile thermostat has remained virtually unchanged for more than a century. It's a very simple, straightforward arrangement, and literally billions have been made following the standard architecture, which was pioneered by Frederick W. Robertshaw in 1899. The company that bore his name still exists, and is a global leader in the appliance controls industry.

Some years ago, Robertshaw took a critical look at their 19th century invention and decided that improvements could be made. What resulted was something known as a 'high flow' thermostat. Although it generally functions in a similar fashion to the original design, the changes made allow it to flow a substantially higher volume of water over a given time period. Robertshaw started marketing their high-flow automotive thermostats several decades ago, and later they were sold under other brand names, such as Prestone. Most recently, the Robertshaw line of automotive thermostats was completely taken over by Flowkooler, a manufacturer of automotive water pumps.

There was a time when Flowkooler decided that sales volume didn't warrant keeping the 351C unit in production. I happened to find out about their impending discontinuation, and bought



*The critical dimensions shown on this Robertshaw engineering diagram are common to all Ford 351C thermostats*

up all their remaining stock, which only represented about 25 units. I slowly doled them out (at my cost) to needy Pantera owners until I was left with only one.

Some enterprising individuals realized that the only difference between the discontinued 351C unit and a regular one (which was still available) was the fitment of the hat. To that end, a Pantera owner and machinist named Marlin Jack tooled up to produce the necessary part to convert standard thermostats to 351C specification. This was necessarily a time- and labor-intensive operation, and the cost of his converted thermostats was upwards of \$75.

Recently, Flowkooler decided there was enough demand to reintroduce the 351C thermostat to the marketplace. They are offered in two different configurations. The first is a simple thermostat, while the second also includes a new disc (this is because when engines are rebuilt and the blocks are hot-tanked, often the disc is accidentally removed

and discarded, leading to catastrophic overheating). However, they failed to do their homework, and the orifice in their new disc is too small; it's the same size as the hat, meaning that water flow is completely blocked off when the thermostat opens. Too, because there is very little clearance, if the thermostat isn't perfectly centered over the opening, the hat could potentially become jammed against the side of the opening, jamming the thermostat open. The OEM Ford disc is a much better solution.

I recently purchased a couple of new Flowkooler Robertshaw thermostats, both to help the fellow whose plight inspired this (surprisingly long and getting longer) article, and also to compare with the one good one I had remaining on my shelf. Flowkooler is kind enough to include an engineering drawing of the unit on the box, which allows you to examine the product and ensure it meets their specifications.

Which, in this case, they did not.

First, they accidentally sent me one



*It's fascinating to witness the reaction when a thermostat is dunked in a pot of boiling water. The entire bottom half grows away from the top half, opening up the unit to allow water to pass through. At the same time, the hat at the bottom of the unit descends into the mouth of the disc in the block, mostly (but not completely) blocking water flow to the inlet side of the water pump, and diverting most of the rest of the water forward to the radiator via the pressure tank*

351C unit, and one standard unit by mistake. The 351C part number is 333-180 while the standard one is 330-180, and they had sent one of each. Fortunately I know the difference and was able to get them to swap out the wrong one. Then, when that one arrived, it proved to be slightly defective.

Sigh.

They made a valiant effort, but the hat they pressed onto the bottom of the thermostat wasn't pressed on far enough, with the result that when the thermostat opens, it will pass completely through the orifice in the disc, which possibly could result in a slight increase of water flow. So, I am about to return it in the hopes of getting one that meets the proper specifications.

The reality is that I have never, ever heard of anybody suffering any kinds of problems with a ordinary, \$9 351C thermostat available at any parts store (assuming that you know what to look for), so it's difficult to make a demonstrable argument that one needs a \$40 Flowkooler Robbershaw high-flow thermostat. However, when one considers the challenges the Pantera cooling system can face, it seems to me like false economy to forgo the unit that is purportedly 'better', even at 4x the cost, because the actual cost is still so relatively low.

One more point—most cars make do with a cheap paper gasket on the thermostat housing. When combined with dedicated water neck/water pump sealer,

it can effectively seal the system, but it's a bear to scrape the gasket off any time any maintenance is performed (which, let's be honest, should be almost never, if all is working as designed). Fel-Pro makes a super-duper water neck gasket, only for the 351C family of engines, made of compressed wonderfulness. Instead of using paper, these gaskets use steel impregnated silicone. They are extremely effective, and have the advantage of being easily removed, and as a bonus they are reusable. Costing about \$10-13 vice the \$3.99 of a standard paper gasket, this also represents a 4x price increase, which is nonetheless trivial in the grand scheme of things. Although purportedly they are good enough to seal properly all by themselves, I prefer the belt-and-suspenders approach and always give both sides a



*The Fel-Pro 35041T is arguably the best thermostat housing gasket available for the 351C, by a comfortable margin. Even at 4x the cost, it's a bargain*

light coating of Permatex water pump gasket maker before installing.

And with that, you are now qualified to speak with authority on this arcane, much-misunderstood topic, which is arguably the single most important technical aspect a Pantera owner needs to know!



# Breakfast Club Rally

*Story by Mike Drew*

*Photos by Mike Drew, Lori Drew, Ron Southern, and BCR Pics*

After the rousing success of the first two Breakfast Club Rallies that PCNC members participated in as a group, it was no surprise when a similar number of club members appeared in the parking lot of Peet's Coffee in Terra Linda for the March iteration.

Once again, there was a bit of variety among club members' cars, with some electing to forgo their Panteras in favor of mounts they deemed more suitable (or, just different). The most extraordinary of these was Tom Leonard's 2008 Alfa Romeo 8C Competizione.

The 8C was Alfa Romeo's premiere sports and racing car in the years leading up to WWII. Clothed in a variety of custom bodies, they were used for everything from Grand Prix racing, to endurance racing, to elegant boulevardiers. For the 2003 Frankfurt Motor Show, Alfa Romeo unveiled a 21st century interpretation, with body lines paying homage to the styling of the famous Alfa Romeo automobiles of the 1950s and 1960s. They subsequently chose to put the show car into production, but limited worldwide availability to only 500 coupes and 500 Spyders (convertibles).



*Despite having been badly ripped off by an unscrupulous seller of an east coast rustbucket Pantera, Martin Mitchell is still a great fan of the marque*



*Part of the PCNC contingent, headed by Tom Leonard's spectacular Alfa Romeo 8C Competizione*



*Check out this lineup—Ferrari F355, Porsche 911, Lotus Esprit S2, MGA, 289 Shelby Cobra, and hot-rod Alfa Romeo GTV6!*



*The most spectacular car present was this Ferrari 275 GTB/4. Alongside was a fantastic Jaguar XK-120, with a variety of classic cars all around*

The car uses a unique chassis and suspension, with several components shared with the contemporary Maserati GranTourismo. The powertrain is the Ferrari/Maserati-derived 4.7L flat-plane V-8. The engine was built by Ferrari, and the car was assembled by Maserati in Modena. Reportedly only 90 of them were ever sold in the USA. Quite a special car indeed!

Most of the other PCNC participants came in their Panteras, but Matt Kelleher decided to try something English instead, and came behind the wheel of his newly restored MGC GT, a

3-liter straight-six variant of the stalwart MGB. The MGC was considered a bit of a failure when new, and was only produced from 1967-69, but today they are considered quite rare and sought-after. Rather than being a concours car, Matt's ambition was to create a great, solid driver, and in that he has completely succeeded.

Garth and Leslie Rodericks once again made the trek from San Jose in their Pantera, but this time we were joined by a highly unexpected face, that of Dave Lindsay. He had to get up at the crack of dawn, and drive for hours from

his mountain home outside of Murphys, but he felt like exercising his beautiful silver Pantera GTS, and what better way to do it than in the company of friends? He grossly overestimated the amount of time it would take him (traffic flows smoothly before dawn on a Saturday!) and he was among the first to arrive.

I was pleased to see Martin Mitchell, a one-time club member who bought a Pantera sight-unseen from Massachusetts, while living in Japan, back in the mid-1990s. Predictably, the car was an absolute disaster and he was well and truly hosed by the unscrupulous seller.

When he moved back to the USA, he spent a few years hoping to sort it out but finally wisdom prevailed and he sold it off as a very needy project. Yet he has always maintained his enthusiasm for the marque, and the club, and it was nice to see him make the effort to come see us.

At the appointed hour, with no formal announcement, drivers and passengers all climbed into their respective cars and headed out. It's always a major gaggle trying to get 150+ classic cars out of



*Mike and Lori Drew leading Tom Southern out of the parking lot, with a Ferrari 308 behind*

a parking lot, through city streets and onto the freeway, and the group was quickly dispersed, although the PCNC contingent made a valiant effort to stay together. Mike and Lori Drew were in his yellow Pantera this time, with Ron Southern in his yellow and black car. Steve DeMaderios and his son Roman were in their monster-engined black Pantera, and Tom Galli was in his red Pantera as well.

We soon left the freeway and set out on small, scenic byways, heading to the west, through Marin cattle country. After about 45 minutes of twists and turns, we pulled into the hamlet of Point Reyes Station. There we were joined by Markus Diebel, driving his black Pantera (solo this time). We all got



*Once again, over a hundred classic cars could be found plying the scenic back roads of Marin and Sonoma counties*



*Dave Lindsay drove for hours just to get to the start of the rally, behind the wheel of his Pantera GTS*



*Tom Galli flashes past in his '71 Pantera*

out and stretched our legs, enjoyed coffee and pastries, and admired the other cars from the rally entering the town. Eventually, we noticed that most cars were leaving rather than entering, and so we clambered into our respective cars and set off once more.

After ten miles on Hwy 1, we turned inland at the town of Marshall on the aptly named Marshall-Petaluma Road. Before we got to Petaluma, we turned off onto a tiny road, which lead to another tiny road, and then another. It was a rather navigationally intensive

rally, as many of the turns came only a mile or two apart from one another. We crossed under Hwy 101 and continued east, climbing into the Sonoma mountains.

The rally was slated to end in the Sonoma square, but we had a special treat in store for us. Unbeknownst to us, Tom and Kathy Leonard had hatched a plan to host a luncheon at their expansive villa in the town of Glen Ellen, outside of Sonoma. The fact that the rally route passed within just a few hundred yards of their house made it a very simple task. In the parking lot, Tom marched around with a phone in his hand, taking sandwich orders, and Kathy very kindly drove into town and ordered custom sandwiches for each of us.

At the appropriate spot, we all turned off the rally route, then turned up the Leonard's driveway, and parked here and there about the place. The first order of business was the obligatory tour of their three (!) garages filled with cars, and a



*Ron Southern and Garth Rodericks admire Tom's grandson's 1971 Mustang*



*The garages were filled with fine cars, as we all enjoyed a terrific lunch together on the Leonard's back patio*



*Tom's 1923 T-bucket generated a lot of interest, as it is a car completely outside the experience of most of us. It's an all-steel, original 1923 Model T with a custom nose, powered by a pumped-up Ford 302. It has proven sufficiently powerful to rip the rear suspension right out from under itself!*

most impressive second-story man-cave above one of them. Ron's grandson has a 302-powered 1972 Mustang Sports-roof that has been a project for the two of them, and it is only days away from completion. Ron also has a 1923 T-bucket hot rod that he inherited from a good friend. It boasts a pretty spiffy Ford small-block V-8, which proved strong enough to rip the rear suspension clean out of the car on one of his first drives! Suitably repaired and strengthened, it is now (perhaps wisely) for sale!

Following the tour, we settled down on their lovely patio and enjoyed a splendid luncheon. Kathy outdid herself rustling up all the sandwiches, along with a variety of chips and drinks easily capable of satiating just about any desire.

Eventually the shadows started to grow longer, and it became apparent that it was time to make for home. After a bit of cleanup, we said our goodbyes and then headed out. Many of us passed through Sonoma on the way, and managed to catch glimpses of other rally-goers heading this way and that, before settling down for the long drive home.

Breakfast Club Rallies has hit upon a winning formula, and they continue to impress with their well-researched routes over roads that would otherwise remain completely undiscovered. The fact that as many as ten PCNC cars are now taking part just adds to the enjoyment they provide, and the gracious hospitality of the Leonards was just icing on the cake!



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## NEXT CLUB MEETING

**Thursday, April 29th, 2021  
7:30 P.M.**

**HOLDER'S COUNTRY INN  
998 S. De Anza Blvd, San Jose**

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## UPCOMING CLUB EVENTS

29 March ----- PCNC Monthly Meeting returns! (see E-blast for details)

8 May ----- Breakfast Club Rally

**REMINDER — NEWSLETTER ARTICLES DUE BY 15th OF EACH MONTH**