

## Under the Hood, October 2020

Almost 100 years ago (1922), two engineers at the GM Research Center determined that the compound tetraethyl lead could reduce the tendency of pre-ignition (or knock) of a gasoline engine. At the time many engines were running compression ratios (CR) of less than 6.0:1. Compression ratio simply refers to the ratio of the volume of air in an engine cylinder at the bottom of the piston stroke compared to the volume at the top of the piston stroke. It is generally accepted that an increase of one point (example 7.0:1 vs. 6.0:1) in compression can increase engine power 3-4%. However, at the time, the quality of gasoline was so poor that as the engineers increased compression ratios, the result was engine knock which could destroy the engine. It took awhile for the use of tetraethyl lead (ethyl) to be widely used, but with time engine compression ratios started to rise. Chevy introduced the 235 ci six cylinder engine in 1950 with a CR of 7.5:1, rated at 115 hp. Three years later, Chevy introduced the Corvette with the same basic engine, with a compression bump to 8.0:1, a more aggressive camshaft, three carbs and a rating of 150 hp. By the late 1950s the engineers were rapidly increasing compression ratios as the gasoline suppliers added more tetraethyl lead to the gas. The zenith came in the late 1960s when we had the Chrysler street hemi and the Corvette L88 sporting compression ratios of 12.5:1. These engines and Ford's 427 (12.0:1) were not easy engines to keep running right and many owners spent their weekends on tune ups. If you were around that era, you might remember the Sunoco stations with their adjustable pumps. The fuel pump had a rotary dial where the purchaser could select the grade of fuel from Sunoco 190 to 260. I think the numbers were mostly marketing speak, but Sunoco 260 was claimed 102 octane (compared to the 91-92 octane that we buy today as premium). In high school I worked at a service station/car wash, and most buyers would ask for "ethyl" rather than "premium". Of course, we discovered that tetraethyl lead was a deadly compound and by the early 1970s was being phased out of gasoline. As a result, compression ratios for new cars were reduced to keep the engines from knocking and owners of those high compression engines often were at airports buying aviation gasoline or expensive racing fuels that still allowed lead. Fast forward a few decades and with the advent of computer controls, fuel injection, direct injection, overhead camshafts with adjustable valve timing etc, the engineers have been able to again increase compression ratios to increase horsepower and also efficiency. For street driven the automobiles, I believe the current highest CR is 14.0:1. Both the Ferrari 458 and Mazda's Skyactive engines run at 14:1. The 6.2 liter C6 LS3 engine had a compression ratio of 10.7:1 (the Z06 engine was 11.0:1). With the introduction of direct fuel injection into the cylinders, the engineers were able to increase the C7 6.2 liter LT1 engine CR to 11.5:1. I had thought that the C8 would have an even higher CR, but the C8 6.2 liter LT2 engine still features a CR of 11.5:1. Perhaps Chevy engineers have hit the ceiling on compression ratios achievable with a push rod engine design and today's fuels. Time will tell whether the engineers can find additional opportunities for CR increases with the push rod engine, or whether we will have to wait for overhead camshafts and 4 valve heads. Remember that compression ratio is directly related to horsepower and efficiency which provides incentives for the engineers to be creative.

Judy knows that when it comes to cars or motorcycles, I can find many ways to waste time. I find bringatrailer.com (BAT) a very enjoyable way to while away some time. This is especially effective in bad weather when I am stuck inside anyway. If you have never visited this site, give it a try. It is an auction site full of interesting autos and other powered mobility devices. You click on a thumbnail of a vehicle to get to that auction site. One of the fun parts is all the dialog between the various bidders, watchers and owners while the bidding increases until the auction finally closes. Recently I watched the auction for a

1972 Ford chassis motorhome. You might say “Who cares about an old motorhome?” However, this motorhome was originally built for McLaren race cars and served as their hospitality suite at the races. Powered by a Ford 390 with a C6 transmission, the interior was very period with brown upholstery and a patterned green carpet. It even had an incinerator electric toilet to reduce demand on the holding tanks for long races. As a side note, this type toilet was very common in railroad caboose applications in the 1950’s and 60s. The McLaren name was still visible on several panels of the motorhome. The bidding was spirited and from what I could determine the winning bidder was the current CEO of McLaren. I expect this motorhome is headed to England for display at McLaren’s headquarters. During the same time period I was also watching a 1961 Pontiac Bonneville convertible with a tri-power 389 and 4 speed. Maroon with a tri-color red interior. Tri-color interior might sound rather garish, but the color differences were subtle enough that it was actually attractive. Pontiac’s 8 lug wheels were a fitting addition, even though you are hard pressed to find any tire shop that will even tackle balancing these very special wheels. The car had just about every option made, including some that weren’t necessarily originally available with the engine/transmission package. During this period, Pontiac was the performance GM division. However, the cars were huge. The Bonneville was 219” long. You could almost sleep lengthwise in the trunk. As a result, these older big Pontiacs have not seen the prices of cars like the GTO, and similar mid-sized vehicles from the other divisions. Regardless, this particular Bonneville was an extremely well-done restoration and the bidding followed. With three days to go before the close of the auction the bid was at \$32,000, and I was predicting to Judy that it would get to \$50,000. During the last few minutes of the auction, I was amazed to see the final bid reach \$65,000. BAT has an interesting auction conclusion. For instance, assume the auction closes on a certain day at 2:00 PM Eastern time. To prevent someone from perching at their computer to input at the last possible second, the auction can continue past the normal closing. With every new bid, the auction is extended for 2 minutes. That gives every bidder another chance. The auction finally closes when there is no new bid within 2 minutes after the last bid. I had a personal interest in this auction. At my high school job, the older brother of a co-worker had a 61 Pontiac hardtop with a 389, 4 barrel carb & 4 speed. Neither the co-worker nor I could even dream of owning a car like this, so we were overjoyed when he would occasionally let his younger brother use the car on a Saturday night. The two of us would cruise the Ave for seemingly hours, or at least until we ran out of money trying to make sure we returned the Poncho with as much gas as we started. Yes, gas was cheap, but these big Pontiacs burned a lot of gas and minimum wage doesn’t go very far. Anyway, if you decide to check out Bring a Trailer, don’t blame me.

Now that I am on an auction report, I have to report on what I can only think is a bit of insanity at the latest Mecum auction. The very first Shelby GT350R (Mustang) to win a race was just sold for \$3.5 million. This GT350R was driven by Ken Miles and was in absolutely beautiful condition. Those that watched Ford v Ferrari would have seen a representation of this GT350R in some of the movie clips. Although this actual car wasn’t in the movie, I suspect that the movie tie-in with Ken Miles was at least partially responsible for this record setting auction bid. Remember that Mecum has a buyer premium of 10% added to the bid price, so the price out the door was \$3.85 million. I can only dream of what I could do with the buyer premium alone in filling my garage with the desirable vehicles.