



the fifth wheel

FEBRUARY 2011

[HTTP://WWW.CORVAIR.ORG/CHAPTERS/LVCC](http://www.corvair.org/chapters/lvcc)

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SNOWSTORM SLAMS LEHIGH VALLEY!

Such a familiar headline! And yes, we had to cancel our January meeting due to snow. What a winter! But hopefully, the roads will be clear for our next meeting, on February 23.

When was the last time you drove your Corvair in the snow? It's been nearly 40 years for me. My trusty Corvair, LeHeap, stays in the garage when it's snowing...

But that wasn't always so. I used to drive my Corvair in the snow all the time. My old '65 Corvair was my daily driver. It was a necessity to drive my Corvair in the snow.

We lived on a steep hill in North Arlington, New Jersey, and it was back in the days before the road departments layered the streets with salt. I'm talking 40 years ago.

The roads would be hard-packed with icy slippery snow, and conventional front-engine cars would burn up their tires, trying to get up that hill.

But my trusty Corvair would climb right up with no problem whatsoever, and it was easy to pass the other cars as they struggled to gain traction. It was just one of the some-times-forgotten advantages of owning a Corvair!

Do you remember those days? Allan Lacki



The Fifth Wheel is published monthly by the Lehigh Valley Corvair Club (LVCC), Inc. We accept articles of interest to Corvair owners for publication. Classified-style advertising of interest to Corvair owners is available free of charge to all persons. Commercial advertising is also available on a fee basis. Please contact our newsletter editor for details.

LVCC is one of the many regional chapters of the Corvair Society of America (CORSA), a non-profit organization that was incorporated to satisfy the common needs of individuals interested in the preservation, restoration, and operation of the Chevrolet Corvair. LVCC caters to Corvair people who live in and around the Lehigh Valley Region of eastern Pennsylvania. This is a very special car club! LVCC dues are \$10 a year for CORSA members or \$15 a year for non-CORSA members.

HEADER DESIGN: ARE YOU GIVING AWAY HORSE POWER?

by Ken Danielson k-danielson@sbcglobal.net

Abridged for publication in the Fifth Wheel newsletter

When most of us modify an engine for racing or performance street use we put a great amount of thought and effort into selecting a camshaft, determining what compression to run, and what head, valve train and intake modifications we will make. We double check the machine work and trial fit everything several times to ensure clearances are correct, all in an effort to ensure our engines will make the maximum horsepower possible and stay together. After installing our engine we bolt on an exhaust header(s) and fire it up for break-in without much thought about how the header(s) will complement the rest of our engine combination.

To many of us, exhaust header design is a science that we do not understand so we just buy a commercially manufactured header we think will work and don't put much more thought into it. We may check out our competition or engines similar to ours, and maybe ask around the pits to see what others are running on their cars, but that is usually the extent of our research into the subject. We may be leaving significant horsepower on the table without realizing it. Off-the-shelf production headers are not optimal for any engine unless it is configured exactly like the engine the header design was developed on.

Headers can increase power two ways. First by reducing the restriction to exhaust gas flow caused by a production cast iron exhaust manifold. A header allows the exhaust gases to exit the combustion chamber more easily allowing more air/fuel mixture to enter. The second is by taking advantage of a pressure wave phenomenon that occurs inside the header tube and utilizing it to create a low pressure area in the exhaust port during the overlap period of the valve timing events.

Pressure wave tuning is discussed at great length in the book "Scientific Design Of Exhaust & Intake Systems" by

Phillip H. Smith and John C. Morrison. When an exhaust valve opens and the exhaust gases begin to exit the combustion chamber under high pressure, a pressure wave is formed that travels at about 1400 feet per second; this is much faster than the exhaust gases, which move at about 300 feet per second. How that pressure wave is managed can greatly affect the performance of a header design.

By designing the header with the appropriate length primary tubes to match the pressure waves at a desired RPM, a negative pressure can be formed at the exhaust port at the optimal time to help pull more of the exhaust gases from the combustion chamber and fresh air/fuel mixture in.

Many people think that the exhaust gases from one cylinder help pull the exhaust gases from other cylinders as the gases pass the junction in the tubing. Pressure tests have proven that this is not true. The best headers rely on multiple pressure wave reflections combining together to lengthen the duration of the

low pressure during cylinder scavenging and attenuate the pressure peaks. By having tubes from multiple cylinders join together well before the collector, multiple pressure wave reflections can be created. When the original pressure wave reaches the point where the tubes join, the wave will travel up the non-exhausting tube and reflect back, joining the normal pressure wave reflection returning from the end of the header. Correctly designed, these headers can produce gains in the midrange of the power band. The primary and secondary tube diameters and lengths are very critical for optimum horsepower and torque on performance engines.

There are several different collector designs that have been developed over the years, some more effective than others. Most headers have a basic collector utilizing a large tube formed to fit over the primary tubes, with the center of the primary tubes having a gap that is plugged by a small flat piece of sheet metal. Most commercial headers are still made this way. Ed Henneman



Air-cooled horizontally-opposed 4-cylinder Volkswagen 412 engine with mandrel-bent pipes and 4-into-1 merge collector.

is the owner of Headers By Ed. Early in his career, Ed developed a "pinched primary" collector where the center of the primary tubes is heated red hot and pinched together to eliminate the gap before welding, resulting in less exhaust gas turbulence as the gases enter the collector, increasing performance.

Merged collectors were first used in about 1964 but did not become popular until the '90s. Merged collectors are formed by carefully cutting mandrel bends on a band saw to form a smooth primary tube transition into the collector resulting in a pyramid shape in the center of the collector to smooth the gas flow. The pyramid also takes up volume in the collector, ensuring a more gradual change in volume as the exhaust gases transition from the primary tubes into the collector. This more gradual transition gives smaller pressure wave reflections.

Venturi collectors are similar to the merged collector but have a smaller outlet that transitions to a megaphone shape, creating a venturi to speed up the exhaust gases and increase combustion chamber scavenging. The outlet diameter of the merged collector into the venturi transition is critical for maximum performance and is different for each engine combination.

Although there are many formulas and software packages for computing key dimensions, dyno and track testing is the only way to validate your choice in primary tube diameter and collector size. Ed's testing has shown that if you use a primary tube 2 sizes larger than necessary you will lose significant power. Smaller ID primary tubes increase power at lower RPM and larger ID primary tubes in-

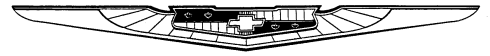
crease power at higher RPM, as long as you don't go larger than necessary. Header designers/manufacturers that truly know what works through testing will tell you to use the smallest diameter primary tubes necessary to support the horsepower level of their engine. Mark Lelchook feels that "80% of the guys out there are running the wrong size header". Other builders made similar comments.

Some of us must run mufflers at the track; sometimes the header to muffler length is not changeable. Straight-through glass pack type mufflers are seen by the exhaust gasses as pipe when it comes to exhaust tuning and may be used to decrease noise without altering your collector/extension tuning. Be sure the glass pack core is at least the same diameter as the inlet and outlet and the core is smooth and does not use jagged louvers. There are 2.5" inlet/outlet glass pack mufflers on the market with a 1 7/8" core tube! The modern "race" glass pack mufflers from vendors like Summit Racing or DynoMax have large, smooth core tubes. Burns Stainless offers their Ultra-Light race mufflers in a multitude of sizes to suit almost any race engine and can custom make mufflers to suit your needs if necessary.

A box at the end of the collector/extension with a volume of at least 8 times the volume of one cylinder (12 to 15 times that volume is better) has been proven to simulate the exhaust gasses reaching

the atmosphere. This causes anything after the chamber to have no effect on exhaust tuning as long as the pipes/mufflers can handle the volume of gasses the engine generates. These chambers can be hard to package in some cars but will allow a quiet exhaust system that has little or no effect on hp.

Very few racers experiment with header dimensions to optimize their engine's performance, it takes time and can be expensive but the improvements can be much larger than most of us realize.



NEWSLETTER NEWS

by Allan Lacki.

By now, you are likely aware that our very-talented newsletter editor, Professor Wesley Heiss, is spending nine months in Roswell, New Mexico developing projects at an artist residency program.

We're going to miss Wes while he's gone. His issues of the Fifth Wheel are always a pleasure not only because they include the latest information about our club, but also because of their professional layout and great graphics.

Until he returns, I'll be filling in as LVCC's temporary newsletter editor. I can't promise that the next several issues of the Fifth Wheel will compare to the ones created by Wes, but I hope you like them.

I'll do my best to bring you some unique articles on a range of topics. Some will be technical, like the exhaust header article featured in this issue of the Fifth Wheel. Others will not be so technical, and will be more specific to Corvairs. For example, the March issue of the Fifth Wheel will feature an article on the Corvair-powered AMT Piranha.

Of course, suggestions are always welcome. And if you would like to submit your own articles for publication, that's even better! Articles, notices, classified ads -- We'll publish anything that's fit to print!

'See you at our next meeting!



Cutaway view of an exhaust merge . Note the "pyramid" where the pipes join.

ALLENTOWN MUSEUM WANTS A CORVAIR!

The America on Wheels automobile museum in Allentown, PA plans to have a special exhibit to commemorate the 100th Anniversary of Chevrolet. The exhibit will be put on display in June 2011 and last for six months. It will consist of a lineup of Chevrolet's most important models, each from the model's first year of production.

One of the museum's members, George J. Bloeser Jr., reached out to LVCC member Randy Kohler to determine if any of us would like to offer a 1960 Corvair for display. Here are some of the details:

1. The car does not necessarily have to be concours quality, but it should be nice enough for public exhibition.
2. Any model Corvair is acceptable, (500, 700 or Monza), providing it is a 1960 Corvair. And if no 1960 Corvairs are offered for exhibition, the museum will consider any early model Corvair.
3. The car should be offered for the full six months of the exhibit. If this is

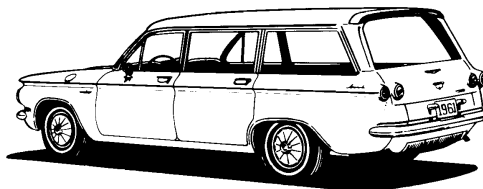
not possible, then the museum would entertain the possibility of having two 1960 Corvairs on exhibit, one for the first three months and the other for the remaining three months. This will enable the museum to arrange all the Chevys without having to move them around.

4. Naturally, the owner of the car will not be able to use it while it is on display at the museum!

George also mentioned that the museum is looking for a first-year (1962) Chevy II for display at the museum.

Are you interested in offering your 1960 Corvair or 1962 Chevy II for display? If so, call George Bloeser. His phone number is (610) 965-0585.

You can visit the America on Wheels museum website at:
<http://www.americaonwheels.org/>



NECC UPDATE

The Northeast Corvair Council (NECC) held a business meeting on January 26 to plan the 2011 Corvair Olympics. The Olympics will consist of three days of time trials, auto crossing, and drag racing in Indianapolis in July.

Rental contracts have been signed with the Putnam Park sports car track and Muncie Dragway. As soon as the auto-cross site has been chosen, NECC will announce the host hotel and open up registration for this three-day Corvair performance driving extravaganza.

NECC also continues to make progress with plans for the 2012 CORSA Convention, which will be held in Sturbridge, Massachusetts.

The hotel contract has been signed, volunteers have been recruited for specific tasks, and a milestone dates have been set to make sure everything is ready on-time.

The next NECC meeting will be held on February 26th in Southington, Connecticut.

LVCC Calendar of Events

- **Friday through Sunday, February 18-20, 2011 :::: Atlantic City Classic Car Show & Auction.**
Held at the Atlantic City Convention Center, the Atlantic City Classic Car Show and Auction is the East Coast's largest classic car show & auction! Over 60,000 enthusiasts and collectors are expected to attend. <http://www.acclassiccars.com>
- **Saturday, February 19, 2011 :::: New Jersey Assoc. of Corvair Enthusiasts Parts Auction.**
Doors open at 9:30 AM. Bidding begins at 11 AM, take a pizza break at 12:30, resume the bidding at 1 PM, and finish up typically around 2:30 PM. Location: Ashley's Auto Body, 274 Hillside Avenue, Flanders, NJ. Email Bob Marlow for information at vairtec@comcast.net.
- **Wednesday, February 23, 2011 at 7:30 PM :::: LVCC Monthly Club Meeting.**
Regular LVCC Club Meeting. 7:30 PM at the Lehigh and Northampton Transportation Authority (LANTA) office building in Allentown Pennsylvania. The LANTA building is located at: 1060 Lehigh Street Allentown, Pa 18103.
- **Saturday, February 26, 2011, 7 AM to 2 PM :::: Auto Literature & Gas Station Memorabilia Show.**
- **Saturday, February 27, 2011, 7 AM to 2 PM :::: Automotive Swap Meet.**
Both events located at the Leesport Flea Market, Route 61, Leesport, PA. Website: http://www.leesportmarket.com/Coming_Events.htm
- **Sunday, March 6, 2011, 7 AM to 2 PM :::: Hamburg Swap Meet & Car Corral.**
Sponsored by the Ontelaunee Region AACA. Hamburg Fire Co. Field House. 127 South 4th Street, Hamburg, PA 19526. Call Shirley Schaffner at (610) 944-8619 or email Lhedgehog1@aol.com for details.

Lehigh Valley Corvair Club Membership List

NAME STREET TOWN STATE ZIP PHONE EMAIL

Sorry internet readers! We redact our members' personal information from newsletters published on the web.

Legend:

- (1) President
- (2) Vice President
- (3) Secretary / Treasurer
- (4) Newsletter Editor
- (5) Interim Editor and NECC Club Rep
- (6) NECC Club Rep

Our Postal Address:

Lehigh Valley Corvair Club
2304 Main Street
Northampton, PA 18067

Club Officers:

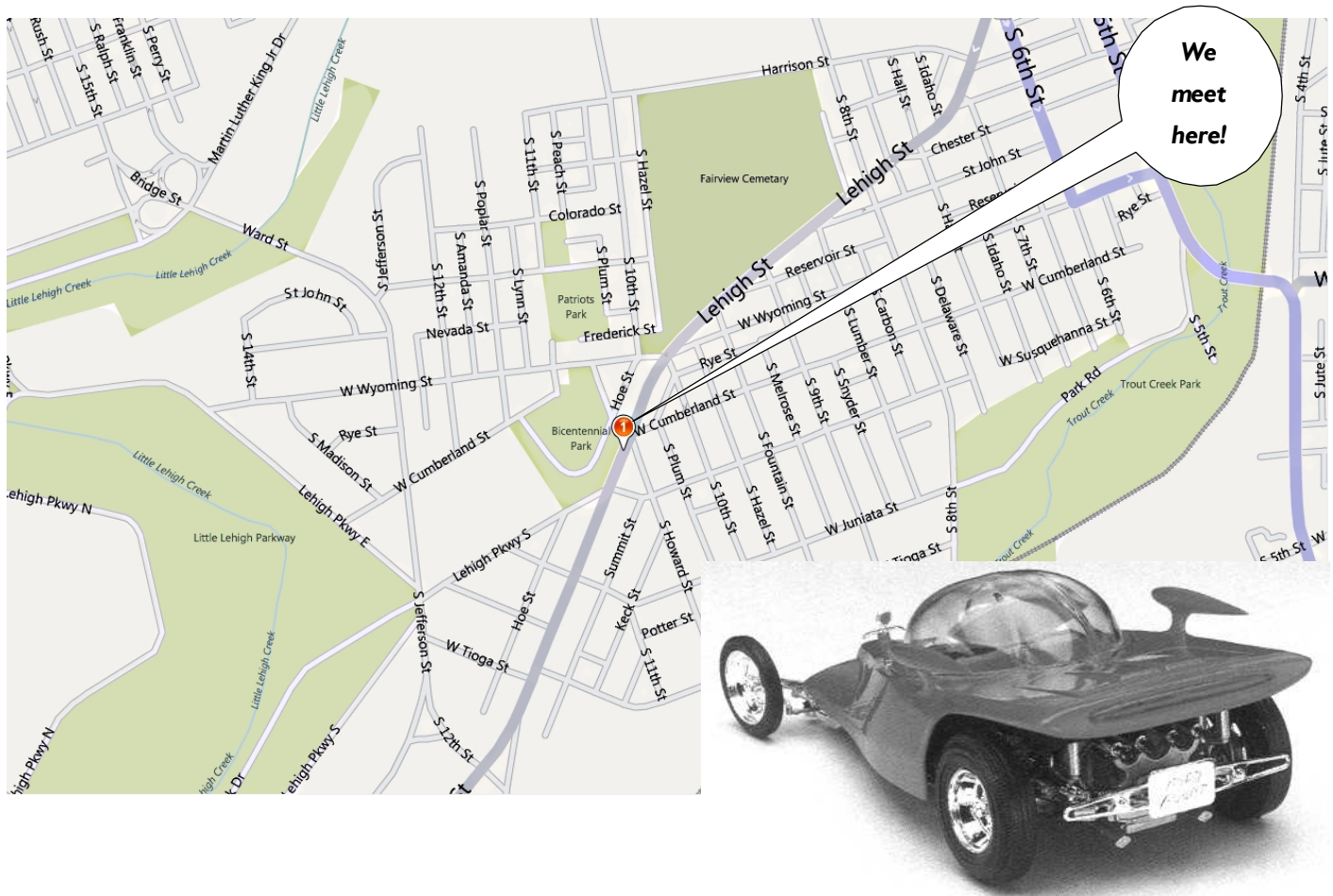
President: William Remaly
Vice President: Dennis Stamm
Secr-Treasurer: Richard Weidner



Next LVCC Meeting

Date: Wednesday, February 23, 2011 at 7:30 PM.

Place: Lehigh and Northampton Transportation Authority Community Center
2nd Floor Meeting Room
1060 Lehigh Street, Allentown , PA 18103



Big Daddy Ed Roth's Corvair-Powered "Road Agent"

CLASSIFIED ADS

1964 Corvair Spyder Convertible 164 cu. in, 150 h.p. 4 Speed, Maroon with Black Manual Top, Restored in 1992 Trophy Winner, comes with extra block, crank, cam, and many Spyder-related parts. Has Electronic Ignition, one year old Battery. White Wall tires, Wire Wheel covers. Aftermarket AM-FM-Cassette Radio. \$14,500.00 Call Fred at 215.234.4458

Corvair Rampside \$7,000 Condition is number 3 minus. This is the former Larry Schroy truck from the Lehigh Valley Club. Call Robin at 267.261.4643

Corvair Model Kits I have 3- 69 Monzas, 140 cubic inch engine with different options for the engine all in the plastic, one was opened and the inside of the roof was painted blue other that they are complete I would like \$8.00 each (firm). I no longer work because of a spinal cord disease so I can meet at any time. Thanks, Jim sportsmans58@hotmail.com