

The Bi-Monthly Newsletter of Corvanatics
The Forward Control Corvair People



Sportwagon
Greenbrier



Pickups
Rampside - Loadside

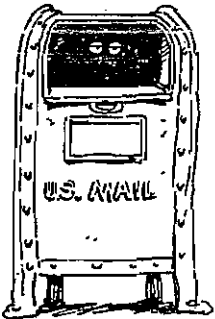


Van
Corvan



Vol. 26, No. 2 March-April, 1998

A Chartered Chapter of CORSA - Corvair Society of America



Letter
From
The
President!

Well, another year has passed as we move closer to the 21st century. Of course, Corvanatics will be there with it's outstanding members and their beloved FCs.

Thanks to member Mike Kellstrand for assuring Corvanatics a web page on the Internet. Members are encouraged to view our web page and provide their own input for consideration to Mike. I'm sure he would be glad to hear from members.

It's great having members such as Jean Allan working hard to put FCs in the forefront of the car-collecting public. I truly appreciate her efforts to have Old Cars Weekly publish her photo of her beloved '65 Greenbrier in their yearly calendar. I'm also looking forward to the March/April copy of "This Old Truck" magazine where Jean's efforts pay off with photos of her Rampside camper being published. On behalf of Corvanatics members, "Thank You" Jean for all you're efforts.

Of course, I don't want to take Ben Stiles for granted. He continues to keep us informed and amused with his ongoing contributions to our newsletter. Keep up the great articles Ben and "Thanks" for all you do.

Members should be firming up plans to attend our Annual Meeting during the CORSA International Convention. This year's convention will be held at the Convention Center in Collinsville, IL (St. Louis area) from July 28 - August 1st.

Presently I'm wanting a member to volunteer for a Tech Session to be given during our Annual Meeting. Contact me if you're interested.

I'm inviting members to join me on March 14th in Richmond, Virginia. The Corvair Museum will be having a spring clean-up in preparation for the up-coming open houses. Your time and help will be greatly appreciated by the Museum staff. If you're unable to attend, a donation to help defray spring cleaning costs would be appreciated.

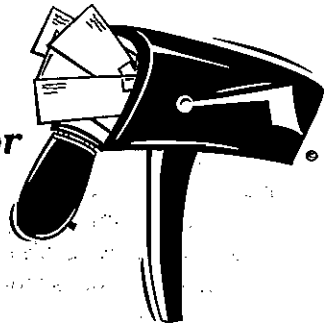
Once again, I ask members to donate FC-related items to the Museum. It would be great to have our own area of the Museum dedicated to the FC. Feel free to contact me

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Letters to the Editor



Dear David,

Very good newsletter, thanks to most everything coming from Ben--I don't know what we would do without him. Please relay my compliments to him. It seems that we just drive our Greenbrier. We took it to the Ultra 101 rally at Jim Craig's and then to "The Toss" (see Jan. Communique).

Membership is up by a few. We have gotten a few new ones by way of the internet. Mike Kellstrand has set up a CORVANATICS web page, and just recently added an on-line registration application. Also, since you added the application to the newsletter we have gotten some new members from that too. We lost a few members last year. We are sorry to lose any members, for whatever reason.

I would like to add our web page to the newsletter; if you could add it every month it would be great. Mike Kellstrand did this for us at no cost to Corvanatics. This is the address: <http://www.ziplink.net/users/mak/corvanatics/>.

You are doing a terrific job as newsletter editor. Keep up the good work. It is a thankless job. Our daughter did our club newsletter for years, and finally had to resign, too much. And now I have given you more to do, sending you the labels and stamps.

Boy, are you sticking your neck out on this Jean Allan thing. I wouldn't touch that with a "barge pole".

Two CorvanAntics got returned for no address; so if you will put the following in the newsletter:

IF YOU DID NOT RECEIVE YOUR NEWSLETTER, LET DIANE (GALLI) KNOW AS SHE HAS 2 THAT WERE RETURNED.

Bob and Diane Galli

Dear David,

I like the layout of your newsletter, very professional. I noted that you wanted some articles. Enclosed are some that have been written about the SafeGuard Ignition. The last part of the last article is my test drive of the unit in my Greenbrier. You might be able to use some of this in an article if you wish. I have it in my computer and can e-mail it to you for easy computer entry, or send you a Mac floppy. I use Pagemaker and Microsoft Word which is easily converted to PC format.

Christy Barden (I'm a male)
Boulder, CO 80301

Note the reference to my comments to Jean Allan from the Words from the Editor column in the last issue. I knew Christy was male. I am happy to report that my comments were accepted in the way they were intended--not sexist or malicious--a
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curiosity and interest in knowing more about people. See her interesting and amusing letter elsewhere this issue. As to my usage of floppy discs from anyone; I use a Mac LCII and Quark Express for CorvanAntics. Since I also edit most of the articles that come in it just is not practical for you to send me your discs.

Editor

Dear Editor,

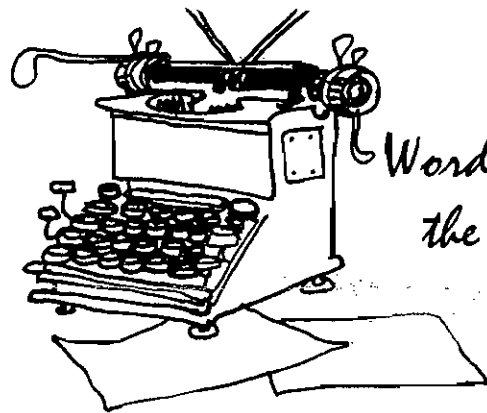
Reference CorvanAntics January-February 1998 side cargo door "striker plates":

I'm sure this is the plate(s) into which the door top and bottom pawls engaged to keep the door closed (latched).

There were indeed two designs. The 1961 models started with a striker plate having one "notch". A door was either latched closed, or not latched (or latched top and not bottom, etc.). This was subsequently considered unusual as doors, hoods, etc. normally have a "safety" position, giving a two-stage latch. Therefore the striker plate was redesigned to have two notches. I believe that these double notch plates went into production before the end of the 1961 model run.

(I was there at the time.)

Bob Kirkman



Words from the Editor

Wow! What a lot of articles and things came in this month. I guess that tells me that people are tired of my long-winded articles.

I was really pleased to hear from Jean Allan . . . and happy that she wasn't offended at my questioning musings. She took it all in the manner it was intended. Now, don't you all feel better . . . especially Bob Galli?

We have in this issue a really long dissertation on the evils of the engine knock (ping) that we have all heard now that we can no longer use the high octane and the leaded gas of old. And at the end there is even a solution to the problem. I suppose some could consider this to be an unpaid ad, but since the attending article was so informative we could afford to give the short plug.

There was another Tech Topic included with the detonation (ping) story. This was the actual test of the SafeGuard Ignition unit in the Greenbrier of Christy Barden. It will appear in the next issue as there is just not room this time.

There is also the beginning of a tale of restoration that we can all identify with . . . and smile. I say beginning, for the writer, Garry Parsley intended it to be in several installments. I will have to use my judgement as to just how long to let it drag out. It may get tiring to wait for the
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President's Letter Continued from page 1
or Museum Curator Wade Lanning (listed in Communique) with your donation.

In closing, I hope to see you at the Museum in March. And keep those articles coming in to the newsletter. "Thanks" to all of you for your efforts.

Ray Mitchell

Words from the Editor Continued from page 2

end to unfold over many months. We'll see. It may not take as long as Garry intended. I beg your and Garry's indulgence.

This wealth of Tech Topic articles should surpass even the wildest dreams of Bob Kirkman . . . and mine. Good reading to all. Comments would be welcome.

Just one more comment. Secretary Diane Galli has asked that we publish the address for our web page. So, it is now permanently to be found on the last page in the column to the right of the officers. Use it freely.

David Hartmann, Editor

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FOR SALE- FC Axle Bearings Used, 100% inspected. No defects. \$70 each. FC oil filter/alternator adapters, \$10 each. FC oil filler tubes and dip sticks, \$10 per set. Add shipping. FC clear glass: front doors, side doors, rear doors, body side, rear quarters. Detroit area. You pick it up, it's yours. Bob Kirkman, 1820 Moffat Rd, Leonard MI 48367. 248-628-2431.

FOR SALE- 1962 Greenbrier (8-door) solid body in excellent condition. GMC red, automatic transmission, no engine. \$1500. (616) 459-8037 Grand Rapids, MI. Call after 5:00 pm or leave a message anytime and I will return your call. JP Nicklas.

WANTED- Pictures of seats when up and when down to make a bed from Cree Coach Traville Campside of Marcellus, MI. I have an Owner's Manual for the Campside, but there are no pictures of the seating. I need to see how they were installed so I can restore coach serial number 202 that was made for the Rampside truck. Bob Ehrenreich, 1728 Manor Pkwy, Sheboygan, WI 53083. (920) 458-1170 evenings.

FOR SALE: Two 1963 Greenbriers. \$300, not running, but complete. Call: Bill Tuttle (314) 456-3738.

The Mysterious Jean Allan Responds

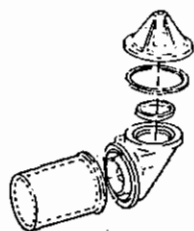
Well, David, your amusing discourse on my possible identity has elicited a response (I assume that was your intention). I must admit to being a female person (although it may not be wise to wait to see me in a dress to confirm that, unless you have a lot of time). Being female does not render one genetically incapable of recognizing a great vehicle and a good hobby. There is some indication, however, that something on the "Y" chromosome does contribute to the ability to back up a trailer.

I have two 8- or 9-car garages, 12 Corvairs (10 in good shape; 5 are FCs) and a new 26-foot enclosed trailer. The trailer is longer than you would think necessary to accommodate two Crosley cars (one of mine and one for my Dad, who just started messing with cars about 7 years ago when he saw how how much fun I was having with my Corvairs).

Of course, no one gets in such a fix with so many vehicles overnight. My first Corvaired was a '64 Monza sedan, silver, purchased from a used car dealer in 1981. For entertainment I had been looking for an old car that was

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Tech Topics



Causes and Cures for Engine Knock

Engine knock - that annoying rattling sound that sometimes comes from under the deck lid of your pride and joy, is a real killer. We have all heard the stories of blown head gaskets, broken pistons and damaged rings. Maybe it has already happened to you, too. But just what is knock, sometimes referred to as detonation or ping?

The knocking sounds you hear are the cylinder walls set into oscillation by intense pressure waves, caused by abnormal combustion. This is definitely not a good thing.

Normal combustion is a controlled burn that starts from the spark plug and spreads outward, causing a pressure rise in the combustion chamber. This pressure is then converted into torque on the crankshaft and this, in turn, turns your wheels. Ideally, the peak cylinder pressures will occur about ten to fifteen degrees after top dead center (TDC), as the piston is on its way down.

Detonation or Ping is a form of abnormal combustion that starts off right, but at the last millisecond, or so, something goes wrong. The remaining air-fuel mixture, called the "end gas", explodes all at once, in one violent burst, instead of burning in a smooth, controlled way.

Resultant engine damage is caused by an instantaneous pressure rise that can exceed 1500 psi. This is more than double the normal peak combustion pressure, and will blow head gaskets, pull case studs, break piston ring lands, and hammer the connecting rod bearings. Another form of damage seen is that the tops of the pistons will melt. High pressure waves produce localized hot spots, which then soften and erode the piston material. This is especially acute on factory engines with cast pistons or rebuilt engines using cast pistons. We have all known people running cast pistons that separated into two halves at the second ring land or at the oil land. Replacement forged pistons are more resistant to damage from detonation, but not at all immune.

High octane fuels are more resistant to detonation because they contain compounds that slow down the chemical chain reaction that we call combustion. If left unchecked, these chain reactions would quickly multiply, in the same way that a nuclear explosion occurs.

All fuels, regardless of octane, have a knock limit. This is reached when the temperature of the end gas mixture reaches the "auto-ignition point". Modern combustion chamber designers can use high swirl inlets and large "quench areas" to cool the end gas. Centrally located spark plugs and compact chambers can reduce the combustion time, inhibiting heat transfer to the end gas.

Our Corvair heads have a fairly good "quench area" (except '64-'66 Tubos and '67-'69 "smog" heads which have none), but the spark plug is located on a remote side

of the chamber, thus requiring a longer flame travel and poorer flame propagation. We can do things to minimize this, but we can not "redesign" our chambers without much expense. We will list below some of the other factors that affect end gas temperatures and resulting knock:

1. Intake charge temperature; 2. Engine temperature; head temperature; 3. Static compression ratio; 4. Camshaft profile; 5. Manifold pressure; 6. Spark timing; 7. Air-fuel ratio; 8. Humidity; 9. Air density (altitude).

An increase in compression ratio, manifold pressure, or spark timing will increase peak cylinder pressure, which in turn raise the end gas temperature and promote knock. Higher inlet temperatures also increase the end gas temperature. Make sure all your shrouding is in place and the air recirculation plate(s) are installed during the warmer months. Richer mixtures (larger main jets) can be used to cool the charge, but there is a limit. Richer than about 9.2 to 1, however, will again increase the tendency to detonate. We want to strive for around 14.6 to 1 for "cruise" and around 12.5 to 1 for wide open throttle (WOT). A decrease in humidity will also tend to increase detonation. Solutions: Some things we can change, and some we are stuck with. Obvious things to do are to get cold, fresh air to your air cleaner and, if you have a turbocharger, get the best intercooler you can afford. Work on your cooling system to bring the temperature down. It goes without saying, you also need to deflash your heads, keep the engine clean, free of oil, grease, etc., install a 12-plate oil cooler and install end covers on it, get a good aluminum pan and valve covers. In extreme cases, remove the lower shrouds and install a '60-'61 fan and a remote oil cooler.

A very helpful device, if you desire, is an O₂ meter. Get one that can be installed easily and viewed while you drive/road test your carburetor jetting. This will allow you to see what your air-fuel ratio is during actual operating conditions and make the necessary changes in carburetor jetting to set the mixture "right on".

Water-alcohol injection is very effective, but it can require thirty to fifty percent additional fluid, in relation to the fuel, so it is generally useful only for short bursts such as hill climbing or passing (pretty funny in an UV, huh?). It is my understanding, as of January 1997, that there is no current manufacturer of water injection systems, so you will have to build one yourself or find a used one. You may be able to locate one at an automobile swap meet. Once installed they do require some "adjusting" so they operate properly; this can be very time consuming. They are an "open loop" system (no feedback) and can be difficult to tune for maximum performance. As the variables which relate to detonation (humidity, fuel octane rating, etc.) change the "adjustments" to the water injection system may have to be revised. This can be a source of inconvenience during a trip.

For example, your system is adjusted perfectly for your UV given your favorite fuel and your geographic location. You load your coach, fill the tank with fuel and proceed to have that nice relaxing trip you have been planning. You venture into another area, the fuel quality is not what you expect, the temperature gets warmer, you climb some

Continued on page 6

6 DOOR 6

Finally! After three years of non-Corvair ownership, and almost fifteen years of non-FC ownership, I finally solved both of these problems in early June of 1997. Louis Guion IV was selling his yellow Greenbrier. The particulars of this Greenbrier are as follows: it is a 1965, built during the next to last month of production, 6-door, deluxe interior, powerglide, with a 140 hp engine stuffed into a truck block. The engine features .060-over forged pistons, modified two-carb heads, and many of Louis III's famous modifications. The van also sports a Spyder dash, power mirrors, clock, and many, many more features. This Greenbrier is pictured in the "Corvair Decade", although it is no longer in that kind of shape. Long time NTCA members will remember this as the Guion's "6 DOOR 6" van - the "best-handling FC ever built" - everyone else's words, not mine. The van was purchased with the following "known" problems: a broken crankshaft, cracked windshield, body damage on the right side, and a dead battery. I was also told that the van had sat for three and a half years with a broken "e" clip in the powerglide. When the Guions repaired the transmission, the broken crank was discovered, hence the sale of the van. In the near future I would discover a few more problems.

Let me digress for a moment to tell you that everything that is about to occur, did so for two reasons. Number one, I have no garage, so all repairs were done outside. This necessitated speed. Number two, we hoped to spend very little at first, just to get the van running, and then repair at our leisure. The process is not how I usually work. This being understood, read on.

Okay, first off we had to get the van home and replace the crank. Unfortunately, on the way home we did not heed Louis III's advice to stop often and refill the transmission fluid (nor did we always stay under 50 mph). That advice should have been a clue. We burned up the bushing and seal in the NEW convertor that they had installed. Of course we didn't realize this until after the crank had been replaced and the drivetrain re-installed. But I'm getting ahead of the story. Since the crank was indeed broken, I sent a spare crank off to be reground. Thinking that the Corvair vendor's price for bearings was too high at around \$130, I started calling around to see if they could be obtained locally. The first price I got was \$225, and that was wholesale!! The second place I called said, "sure they were readily available for \$220", or he had a complete reground crank and bearing kit on the shelf! in CLEBURNE, TEXAS!! Didn't take me long to get over there. A quick order to Clark's for the necessary gaskets and we were ready. I then split the crankcase using the article in the Tech Guide (something I had done before). While in there, everything I could reach was cleaned, checked, repainted, whatever. The rear housing was replaced due to a crushed boss. No other repairs were done at this time, again, hoping to get the 'Brier running and then complete repairs that we either did or did not know about yet.

So, now the engine is back together and in the van. It's running, rough, but running. It was while trying to reset everything that I noticed the large red pool under the rear

wheel. Remember the unheeded advice in the above paragraph? Why hadn't I looked at the convertor when it was apart? It was new, that's why. I've almost convinced myself. Time for another order to Clark's. After replacing the torque convertor, we're off to the races again. Now everything is set fairly close. It runs, but rough, but I decided to take a chance and drive it to work. The old gal didn't do too bad. It was quite obvious that it still needed fine tuning, valve adjustments, etc.; but she kept up with traffic. Good thing since the speedometer didn't work. So every night for the next couple of weeks, I would adjust a little more, replace another part or two, and go to work the next day. Day by day it ran a little better, but I never could get it to run and idle really smooth. The last day I drove it, the engine started to backfire through the carb when taking off from a light.

And now a few words from our sponsor. During this two to three week period, I read and reread the CORSA Tech Guide and Supplement at least a hundred times. If you don't already have these, BUY THEM NOW! I learned so much about these engines that I already knew wrong. These books are incredible! Be the first on your block--yadda, yadda, yadda.

Now back to our story. I really pored over the distributor articles in the Tech Guide, because I highly suspected that the problem lay there. With some of the usual engine modifications that Louis had used, I figured this had to be the place to start. Sure enough, the wrong vacuum advance was installed, giving too much advance, too soon. I replaced the advance, and while resetting the specs again, at idle -WHACK - WHACK - WHACK--you've all heard it, that sickening sound of a valve seat dropping. Here we go again! Hello, Clark's!! ...to be continued.

Garry Parsley
Cleburne, TX 76031



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Jean Allan Continued from page 3

unique, made in the US, and new enough to drive. This was just at the end of my time of fascination with foreign cars, and it was appalling to realize that not much was very unusual in this country unless you went 'way back to the classics.

My search in 1981 was for a project car to replace the motorcycle which replaced a husband some years prior to that. Little did I realize I had just serendipitously found the niftiest little car ever mass produced in the USA! I also didn't realize that you should look **under** a car before you buy it (if you're in Indianapolis), and that rust holes in the fenders probably mean there is even more serious rust underneath. It is likewise good to drive a car before you buy it to be sure it won't head erratically for the ditch after every bump in the road. All of that notwithstanding, the car finally did get restored, even though it took two new front fenders to do it. Every Corvair since the first one has had a more thorough going over--experience is a great teacher.

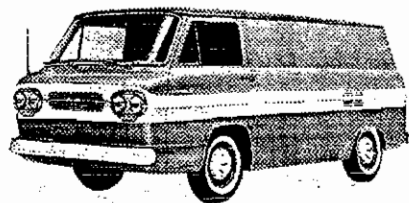
The Corvair's first repair bill (new steering components) sent me looking for the local Corvair club to find help, advice, parts, etc. It also led me to attend an auto mechanics night school course at the nearby vocational school; for several years I attended that same class since students could bring in their own cars to work on them.

A '64 Spyder coupe was advertised for sale on the bulletin board at work about that time, and by then I had learned enough to be excited to find it. So the illness grew. By the time my 2-car garage addition was built, there were three Corvairs to shelter, the third one a Corsa. It's been that way ever since. There's no such thing as a big-enough garage.

With a little encouragement from Pete Koehler, I started showing the Spyder at CORSA events. That led to a closed trailer to make life easier at the Conventions (less time spent cleaning; more time enjoying). My picture is on the cover of the November '84 Communique with that Spyder. A newer photo would only show more mileage, age, and weight, none of them on the car. Ultimately, the Spyder received first place senior trophies at three CORSA National Conventions and is pretty much retired now.

As you already know, photography is something else I like to fiddle with. Communique covers for May '88, May '90, and April '96 are my photographs. The '84 cover mentioned above is also my own photograph, taken with a timer and tripod.

The FCs in my "family" now are a '63 Rampside with a camper (Campside), a second '63 Rampside, a '64 Greenbrier with prototype folding rear seat, and two '65 Greenbriers. They have all generally "found" me by accident over the years. One of the '65s is the last one to leave the factory, but the other has a higher VIN: 1315. Number 1315 has a front license plate which reads: "Papier Maché Machine. You get the picture. The July '96 Communique has the story of the two other Greenbriers.



The "Last One" is the Greenbrier in the Old Cars Weekly 1998 calendar.

Why so many Corvairs? To paraphrase a thought in one of my previous Communique articles long-since forgotten: Corvairs are like men--every one has its own special endearing qualities. The good news is, you can collect Corvairs.

Well, David, you started this sexist thing . . .

Jean Allan

I was elated to receive the above letter from Jean and to see that she accepted my comments in the vein in which they were written--in jest and kind of tongue-in-cheek. Thank you Jean for all your welcome comments. We have all been enriched by your good-natured frankness and now we are just a bit better acquainted. Ed.

Causes and Cures for Engine Knock Continued from page 4

good elevation . . . you get the picture. Your water injection system is now not properly calibrated. You are either using too much water or not enough and you start to hear ping.

Not very much fun, but what more can we do. We can re-curve the distributor; that is a good move, but this is full of compromises when we are dealing with a mechanical device with springs, weights, distributor cam profiles, vacuum advance units and such. The only purpose for all the different "curves" in factory distributors is to keep the engine in "close" to its ideal timing at a specific RPM and TRY not to allow it to detonate (ping, knock).

This knocking is based on the cylinder that is most prone to knock during factory dynamometer testing and is based on testing and variables over 35 years old. Add a good dose of today's fuels, worn distributor parts, your ideal engine in your Whale-on-wheels, etc. and you can see that getting the correct curve from a distributor is going to take more than an educated shot in the dark and lots of testing. Each UV is going to need a different distributor curve, because each UV is different, much more so than a typical Corvair car is. The size, weight and other demands that the Ultra Van places on the engine requires the engine to operate at peak efficiency, much more so than any demands that a car can place on the same engine.

Continued on page 7.

Causes of Engine Knock

Continued from page 6.

We are dealing with old technology with our carburetors, distributors, mechanical advance curves, vacuum advance curves and initial timing settings. The rules of the game have changed vastly over the last 35-some-odd years when our cars/engines were designed and they just cannot deal effectively with some of the variables that are being thrown at us now.

Spark retard, within limits, is a powerful means of controlling detonation. Traditionally, this has been accomplished by retarding the spark in proportion to manifold pressure. The '62-'64 Spyderys and '65-'66 Turbocharged Corsas had this built in. It was a simple, but effective system. These engines ran a low compression ratio (advertised at 8.0 to 1, but measured at 7.5 to 1) a small carburetor, and a built-in exhaust system restriction to limit boosts. These clever "limiting factors" were tied together with a distributor which was set at 24 degrees BTDC, no vacuum advance, no centrifugal (mechanical) advance until 4,500 RPM. The pressure retard was in proportion to boost. This varied by year. Typical was 2 degrees for every 1 PSI, with a limit of 12 degrees for the '65-'66 Corsas.

Now how would this retard system work with your UV? It would not work at all unless you had a turbocharger, since it is based on boost pressure, not vacuum. Ideally, we need something for non-turbocharged engines that will sense the onset of detonation and take action before the ping destroys our engines.

Modern factory turbo, and some exotic non-turbo, engines have gone beyond simple boost retard, and are sensing the onset of detonation with a knock sensor, and then electronically retarding the spark. This is called closed loop spark control. Technology has advanced to the point that microprocessors can now even figure out which cylinder is pinging, and then retard only that cylinder. This would allow each cylinder of the engine to be running at this principle.

There are many aftermarket timing computers and ignition systems that are now available, but most do not use a knock sensor. They few that do use a knock sensor are not able to control individual cylinder spark. This is very important. If the knock sensor used knock (ping, detonation) as its only input, regardless of which cylinder is causing the knock, then we can lose up to 12% of the engine's potential torque output. It is important that the knock retard system does not retard the baseline ignition setting on all cylinders. Only the ones that require it. This can add significant torque to an otherwise retarded engine. With this, you will decrease your fuel consumption, lower engine temperature and promote engine longevity. Just what we are looking for.

With our UVs we want all the torque we can get. This loss of torque output is caused by the knock retard system retarding ALL the cylinders to eliminate the knock, not just the offending cylinder that is causing the knock, Remember the old adage to set your timing: "2 percent power loss below border line knock setting". What this

effectively is doing is setting your timing to the cylinder that has the greatest tendency to knock. Not all cylinders are created equally, even in the same engine with matched chamber volumes and matched piston deck heights.

After much research I have located a knock system that does everything we want, and more. This system is from J&S Electronics. It is a beautiful, self-contained unit. All the J&S systems I have installed have performed flawlessly, beyond my greatest expectations. These units are specifically programmed for Corvair engines using the Motorola 68HC11 microprocessor. The unit is programmed to know that the cylinder that is pinging is the one that just made the spark. The computer knows that this cylinder won't fire for two more revolutions, so it counts off the remaining cylinders, retarding each one in turn, only if necessary.

"The main problem with sensing knock", as J&S states, "is you're trying to hear inaudible pings, and at the same time you're trying to ignore audible valve clatter and piston slap." The knock sensing program that J&S has developed is proprietary, but the program has the characteristics of detonation stored in computer memory. The signal from the knock sensor is amplified and compared to a threshold from the Digital Signal Processor (DSP). If a detection is made, the program can retard that cylinder in proportion to how loud the detected ping was. This unit can retard up to six degrees before the knocking cylinder can fire again, and if necessary, keep retarding up to a total of twenty degrees. The unit incorporated a high output ignition module with active dwell control, works with or without a ballast resistor. The unit adjusts dwell for a full seven amps. Compare this to GM's HEI system which is limited to 5 1/2 amps.

Also built into the system is a digital rev control. This fully adjustable rev control requires no plug-in modules or "pills". Easily change the setting anywhere from 4,200 to 9,000 RPM. It is a "soft-touch" rev control. When that set point RPM is reached, the computer cuts every third spark. This results in a very smooth one-third drop in power. For our six cylinder engines, this could result in two fouled plugs, so the program fires three cylinders, then skips two, resulting in a forty percent drop in power.

The J&S unit does what we want, effectively, in one integrated, self-contained, compact box. Measuring only 6 x 5.5 x 1.5 inches and weighing a mere one pound. This unit will convert an antiquated mechanical advance/curve system to a stepless, electronic system with individual cylinder knock retard. Your engine will always run at peak advance without destructive detonation (ping, knock).

More research has been, and is being, devoted to a study of the knock phenomenon than to any other aspect of the internal combustion engine. We hope that we have provided some answers to the causes of detonation, and what can be done to help you get the most out of your Corvair engine. To learn more about this subject, pick up a copy of the *Internal Combustion Engine in Theory and Practice* by Charles Taylor, Professor of Automotive Engineering, Massachusetts Institute of Technology.

John Pizzuto and Ray Sedman

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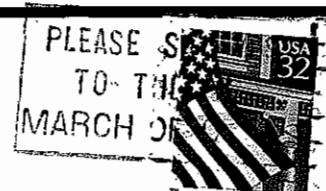
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