

Spring 2009

THE *Quiet Zone*

The World Is About To Get Quieter

The world is about to get quieter, and I wish I could say that it was because of the work of NPC. While we deserve some credit, most of it goes to the fact that the world is running out of fossil fuels and to attempts to limit climate change.

Aurally, the last century has been the fossil fuel era of noise pollution. The beginning of the 20th century coincided with the beginning of many of the century's worst noise problems—1903 heard the Kitty Hawk flight, the Harley Davidson Company, and the Ford Motor Company. To make a racket in the 20th Century, more often than not, one burned fossil fuels. In planes, trains, cars, trucks, buses, motorcycles, ATVs, snowmobiles, boats, lawn mowers, leaf blowers, weedwhackers, chainsaws, generators, and power plants, noise as well as carbon dioxide and other pollutants were waste products.

It is clear that the 21st Century will see the end of the fossil fuel era. Whether in response to limited natural resources, the rising costs of fossil fuels, or global agreements to limit greenhouse gases, it is only

a matter of time before we hear the end of the fossil fuel era of noise pollution. In twenty to forty years, the soundscape will be very different. Already, higher fuel and ticket prices caused the airlines to slash their flights by 10%, even before the economic meltdown last fall, which is causing further reductions. And we're driving less, approximately 100 billion fewer miles in the US last year. Vehicle speeds on highways are also dropping.

When planes aren't in the air, when cars aren't on the road, they aren't making noise. When vehicles drive slower, they aren't making as much noise. More importantly, however, there are even bigger changes coming.

The world is about to get quieter, but how we rebuild and fuel the economy will significantly determine just how quiet it gets. We have a tremendous opportunity to reshape the soundscape. The important question is if "quieter" will be part of the "cleaner" alternative fuels we select. There is still much work to do, but our challenges are easier than even a decade ago. Instead of trying to push

FROM THE DIRECTOR

The world is about to get quieter, and in this edition of the *Quiet Zone*, we tell you why. We also investigate what adding noise to hybrid and electric vehicles will do to our streets: make them noisier, but not safer. And we show what you can do to quiet your home.

Also in this edition of the *Quiet Zone*, we launch an effort to create the world's largest library of noise pollution. NPC's website is already the world's largest online library of noise, and we're asking acoustical professionals to make donations when they retire or clean out the bookshelves. Finally, following the library theme, the EPA Noise Library insert summarizes the most important EPA documents available on our website, and we review the recently republished book, Cedarhurst Alley, an anti-noise novel you should read.



Les Blomberg
Executive Director

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back against a V-8 muscle car, we'll need to steer the hybrid, electric, or fuel cell car in quieter directions. Here is a summary of what is changing and what is not, as the fossil fuel era of noise comes to a close, along with the major challenges we'll face in the effort to quiet the world.

NOISE FROM HIGH SPEED/LONG DISTANCE TRAVEL

The future of commercial aviation is bleak. Some airlines are in bankruptcy and more are headed that way. Planes are about the most energy inefficient way to travel, and since their emissions are injected directly into the upper atmosphere, their environmental impact is greater than other types of transportation. Future climate change agreements are likely to greatly impact air travel. Aviation noise will be decreasing in the future.

General aviation, and therefore general aviation noise, will decline for the same reasons as commercial aviation, but general aviation also has additional problems related to the significant national security risks general aviation aircraft pose. So far, the United States has not addressed the threat of loading a large general aviation aircraft with explosives and flying it into the spent fuel storage facility of a nuclear power

plant, or literally thousands of other susceptible targets. Unless the world becomes significantly more peaceful in the future, general aviation will tend toward that of Israel, where regulation is much stricter. The alternative is likely to be the very quick demise of general aviation after the first substantial attack and disaster.

In the last 40 years, in part because of increasingly cheaper air fares, people have tended to move farther from their families, so demand for long distance travel is unlikely to drop. The economy has become less locally oriented too, so demand for business travel, both of people and products, is also unlikely to drop. Therefore, a shift to more high speed rail is likely to occur. And rail noise will increase.

The greatest noise problem related to rail is the blowing of train horns at intersections. Train horn noise will likely increase due to increased rail freight. High speed rail, on the other hand, requires dedicated corridors, and so for high speed rail, train horns are not likely to be an issue. Increased train speeds, however, can increase noise levels of the train, and the rapid onset of the noise is particularly troublesome. It is unlikely, however, to ever reach the scale that aviation noise reached.

NOISE FROM HIGHWAYS AND ROADWAYS

Highway noise has been growing almost non-stop since 1903, except for during the World Wars. The energy crises of the 1970s also managed to slow the growth in highway noise. Higher gas prices slowed the growth in the miles vehicles travel, and the slower 55 mph speed limit had the acoustic impact of taking half the vehicles off major highways. Of course, that didn't last long.

It is much more likely that we are on the brink of much more significant and lasting changes in transportation. With any luck, the General Motor's Volt, the hybrid that will go 40 miles on battery power before the engine ever turns on, will be introduced in 2010 as planned. GM is hoping it will save the company, and NPC is hoping it will significantly quiet urban areas. The Volt, and the quickly increasing fleet of electric and hybrid vehicles (including trucks and buses—GM also makes a hybrid bus) are significantly quieter in urban areas, where speeds tend to be slower and the dominant sound of vehicles is the engine. (On highways, the dominant sound is the tires, so electric vehicles will have less impact on roadways over 25 mph.)

The marketplace seems to be on our side, poised to bring about a quieter future. Consumers just have to buy the more fuel efficient cars, trucks, and buses in the future. Those gains can also be wiped out, however. There is an effort by advocates for the blind to add noise to hybrid and electric vehicles. Their reasoning

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The Noise Pollution Clearinghouse
P.O. Box 1137, Montpelier, VT 05601
toll free (888) 200-8332
e-mail: npc@nonoise.org
website: <http://www.nonoise.org>

BOARD

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Henry Labalme, *Founder, TV-Free America*
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Red Wetherill, *Acoustical Consultant*

STAFF

Les Blomberg, *Executive Director*
Peter Buknatski, *Outreach Director*
Dennis Weidemann, *Special Projects Director*

The Quiet Zone is published by the Noise Pollution Clearinghouse, a non-profit organization dedicated to creating more livable cities and more natural rural and wilderness areas by reducing noise pollution at the source.

is that hybrid and electric cars, which are quieter, will be easier to detect by blind people if they are louder.

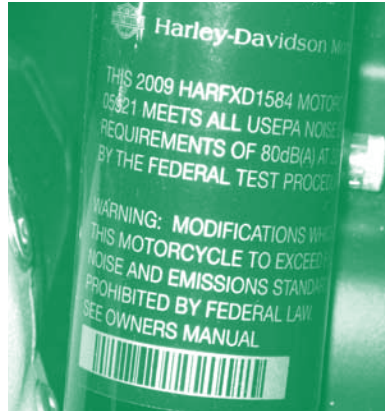
Amplifying engine sounds, as blind advocates recommend, at first thought might seem like a workable solution to the difficulty blind people have detecting vehicles. If you are at a big auditorium, and you can't hear the presenter, all you need is to give the presenter a microphone, amplifier, and speaker. But if you are in a busy restaurant with dozens of people speaking, and you can't hear someone at your table, giving everyone in the restaurant a microphone, amplifier, and speaker won't help. It will be louder, but people still won't be able to hear each other.

In fact, in a multi-dimensional situation where lots of people are trying to hear lots of other people, the best thing you can do is lower the background level. Our streets are much more like the crowded restaurant example than the auditorium example. Blind people are not trying to hear just one car, and it isn't just one car that is making noise. Blind people are unable to detect millions of conventionally powered vehicles every day because of the high background levels on our streets. Making hybrids as loud as the conventional cars they already can't hear is not a solution.

It turns out that hybrids, because they quiet the background levels, may actually enhance safety by allowing pedestrians to better hear faster moving, more dangerous vehicles that are currently masked by slow moving and idling vehicles. (See accompanying article describing NPC's research in this area.) Advocates for the blind should be allies in the effort to quiet road noise, and we need to find ways to convince them that what they seek, better detection of vehicles, can best be achieved by lowering the noise level, not increasing it.

Hybrids and electric vehicles are the good news. But for motorcycle noise, the end of the fossil fuel era by itself will bring little improvement in motorcycle noise. Higher fuel costs may actually result in more motorcycle usage in the near term. Moreover, there is no reason to think that declining fossil fuels will cause motorcycle use to drop anytime soon, or cause owners motorcycle owners to suddenly use mufflers.

There is a lot that can be done to quiet motorcycles, however—in some European and Asian nations, permitted motorcycle noise levels are half as loud as they are in the United States. National noise regulations have not changed since the 1980s, but a number of communities are looking to local laws to control motorcycle noise. New York City has introduced a “not plainly audible at 300 feet” standard for motorcycles, eliminating the need for a sound level meter. Other



The EPA requires this label on all motorcycles, and a similar stamp on the exhaust system. The absence of the exhaust system stamp indicates that the exhaust system has been modified, often being replaced with “strait pipes.” Communities can require that the mufflers of all motorcycles display the federally required stamp as an easy means to determine if a motorcycle exhaust system is legal.

cities have used the Federal regulations (from the EPA) that require original and after-market mufflers to have a stamp on them that states the muffler meets the 80 dBA at 50 feet standard. Communities that have a “do not tamper with or modify the exhaust system” clause in their noise regulations can use the absence of the EPA's required stamp on the muffler as prima facie evidence of modifications or tampering. Also, communities can adopt as a requirement that motorcycles on public roadways display the EPA required stamp. This can quickly eliminate the worst offenders from roadways.

NOISE FROM OFF-ROAD VEHICLES

Higher gas prices alone seem unlikely to significantly impact off-road vehicle use, with the probable exception of boats, which use much more fuel. Moreover, the control of noise from recreational vehicles such as boats, ATVs, dirt bikes, and snowmobiles is severely limited due to difficulty and expense of enforcing typical decibel based noise regulations. Off-road vehicle noise will not be decreasing without a significant amount of political activism, resulting in better laws and a stronger enforcement. Minimum distance requirements are currently the best protection from a neighbor on a dirtbike or ATV circling the perimeter of his small lot ad nauseum. A minimum setback of 200 feet from a residential property line for ATV use reduces the noise level by increasing the distance to the neighbor and effectively requires on average a 4 acre lot to maintain the setback. A 400 foot setback requires a nine or ten acre lot.

NOISE FROM LAWN EQUIPMENT

Electric lawn equipment, which tends to be more than ten decibels quieter than gas equipment, remains the best opportunity to improve the suburban soundscape in the next ten years, but it is unlikely

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that the cost of fuel will drive this change. Improving performance of electric equipment, as well as quieter, cleaner, and easier operation and maintenance, are more likely to be important factors. Electric models make much more sense for occasionally used devices such as hedge trimmers and chainsaws, as aging gas will not plug the carburetor, rendering the device unusable when you need it and resulting in expensive repair bills. Electric models are always ready to run. For other lawn equipment, electric devices avoid the need to store gas in your garage or shed, and the likelihood you will spill it in your car or on your clothes. Moreover, people operating electric lawn equipment are not walking (or riding) in the exhaust stream of an internal combustion engine, breathing in a host of nasty pollutants.

NOISE FROM ELECTRIC POWER GENERATION

Electric generation is one area where there will be a significant growth in noise due to the changing energy situation. As climate change regulations take shape, we'll see jet engines being grounded—literally. They won't be over your neighborhood as often, but they might be in your neighborhood. The turbine engine isn't just for flying. It is used on the ground to generate electricity from natural gas. Your neighborhood is vulnerable if a gas pipeline intersects utility transmission lines nearby. There will also be increased demand for cogeneration, where the waste heat from an oil or gas generator is used to heat buildings. Similarly, utilities are co-siting peak demand generators at businesses that require back-up generators, so instead of running just when the power is off, they will also run when the demand is high. This trend towards distributed (in neighborhoods) electrical generation means the power plant is smaller, but closer to neighbors.

Finally, wind power can create some potentially serious noise problems. Wind is clean energy to everyone but those living near wind turbines. The utilities should be taking steps to make sure that neighbors do not hear the

turbines within their own homes, but so far the wind industry, like the fossil fuel industry, is in denial about its impacts. And while wind energy's overall emissions are much less, they have chased people from their homes and turned neighbors against each other in otherwise tranquil communities. Wind power would have much better neighborhood acceptance if the industry could guarantee that neighbors will not hear the turbines in their homes, and compensate them if they did. Also, small residential scale wind turbines could become significant neighborhood noise problems if not adequately controlled and engineered.

The one truly quiet energy generation technology is solar power. While currently not as cost-effective as wind or other renewable alternatives, the sooner it becomes so the better for the environment and the soundscape.

THE WORLD THAT ISN'T GETTING QUIETER

Just because the world is about to get quieter doesn't mean that conventional anti-noise work is done: there are still barking dogs and plenty of other non-fossil fuel sources. The latter part of the 20th Century also heard a growth in electrically powered noise sources, air conditioners, refrigeration equipment, and electronic amplification (boom boxes, boom cars, stereos, etc.).

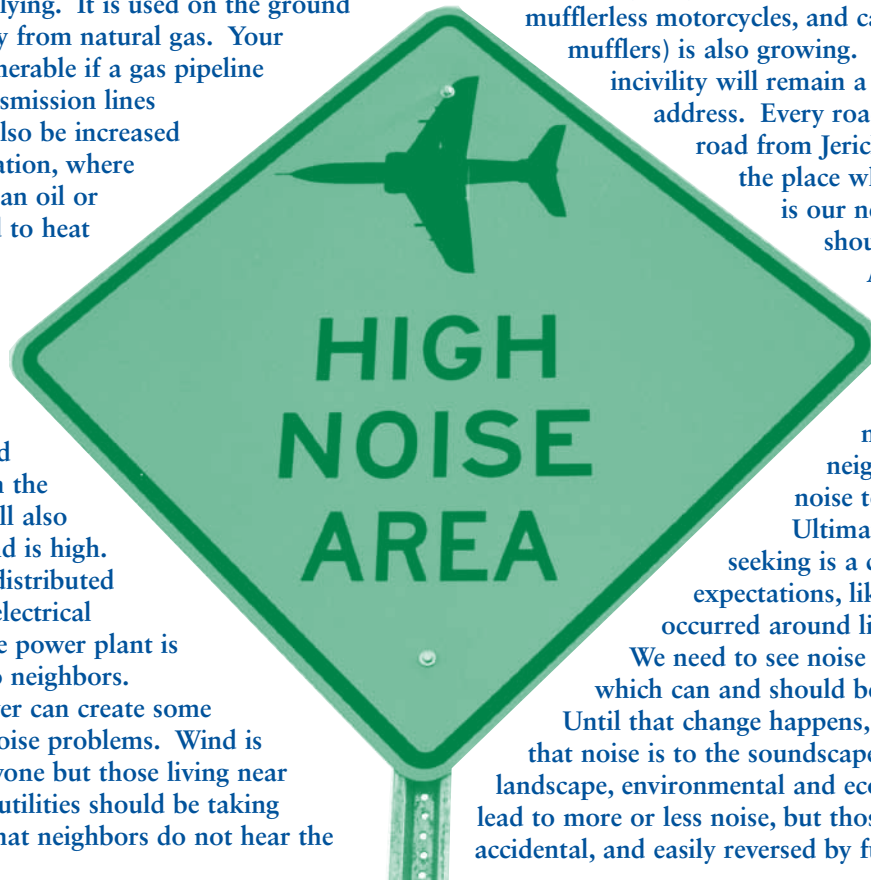
Unfortunately, in-your-face noise (such as boom cars, mufflerless motorcycles, and cars with modified mufflers) is also growing. Dealing with incivility will remain a major problem to address. Every road seems to be the road from Jericho to Jerusalem—the place where we ask, who is our neighbor and how should we treat them.

And just as in biblical times, it is a test that many people fail. We must keep up our message that good neighbors keep their noise to themselves.

Ultimately, what we are seeking is a change in national expectations, like the one that occurred around litter in the 1960s.

We need to see noise as aural litter, which can and should be cleaned up.

Until that change happens, until we realize that noise is to the soundscape as litter is to the landscape, environmental and economic factors may lead to more or less noise, but those changes will be accidental, and easily reversed by future changes.



A Noisy Hybrid?

Advocates for the blind have hit the streets, newspapers, and halls of Congress protesting quieter cars, and seeking laws to require a minimum noise level emitted by all cars.



No one wants pedestrians, blind or sighted, children or adults, endangered by hybrids. No one wants blind people, who face immense challenges in our society, to face additional losses of their independence and freedom. There is, however, absolutely no scientific evidence that hybrids pose a greater threat to blind pedestrians. This statement isn't like the cigarette companies saying that there is no evidence that cigarettes cause cancer. The issue isn't what constitutes scientific proof. It is that there is very little data. There have been no blind fatalities due to hybrids, even though nearly 5,000 pedestrians are killed each year due to conventional cars. There is no good data on accidents, blind fatalities, or the detectability of vehicles by pedestrians.

NPC has taken a leadership role in filling the information vacuum. We published the first

“Advocates For Blind Seek Street Safety, Want Louder Hybrids”
— *The Associated Press*

comprehensive study on the detection of vehicles by pedestrians. Our findings: that pedestrians are unable to detect millions of vehicles

each day, hybrid and conventional vehicles, because background noise levels are too high. Here is what we know about vehicle noise and detection problems.

According to the US Census American Housing Survey, noise consistently ranks above crime, litter, and other neighborhood problems as the greatest source of dissatisfaction with where people live. More than 1 in 4 US households deal with street noise. This noise negatively impacts public health and safety, retards learning of children who live in noisy neighborhoods or attend noisy schools, reduces quality of life, and lowers property values.

To abate noise from roads, and the associated costs and impacts, billions of dollars of public and private money have been spent seeking to quiet vehicle noise. Billions of dollars have been spent constructing sound

barriers along highways, and each year the public spends on the order of 10 billion dollars to purchase and maintain vehicle exhaust systems. These efforts have slowed the

growth of noise, but have not resulted in significant reductions. As the lead article “The World Is About To Get Quieter” explains, that is about to change. Hybrid and electric vehicle technology can significantly quiet the urban soundscape.

H. R. 5734

A bill in the US House to direct the Secretary of Transportation to study and establish a motor vehicle safety standard that provides for a means of alerting blind and other pedestrians of motor vehicle operation.

Hybrids and electric vehicles are not silent, except possibly when they are stopped and the air conditioning, fan, and radio is off. The primary noise sources on a vehicle include the engine, which is very quiet on hybrid and electric vehicles, and the sound of the tires continually slapping down on the pavement, which is the same for hybrid

and conventional vehicles. Engine sounds are more dominant at lower speeds, tire sounds at higher speeds. Generally, above 25 mph, hybrid and electric vehicles are quite similar in noise levels, and above 45 mph, they are the same.

“Blind Protest Noiseless Hybrid”
— WJZ

If a hybrid, electric, or conventional vehicle cannot be heard, its sound is being masked by other noise. Acoustical masking occurs when background noise levels do not permit a listener to hear a particular sound. In the case of automobiles, millions of vehicles are masked by loud trucks, motorcycles, buses, the general din of traffic, and other noises emanating from the community. Hybrids make up only a small portion of masked vehicles, and will do so for many years to come.

“The Quiet Car Emergency”
— *National Federation of the Blind*

Both hybrid and conventional cars have significant masking problems in noise levels that are common in urban areas or near roadways. Moreover, tens of millions of people live in these areas. In addition to the general din of traffic noise, individual vehicles often cause significant masking. Truck and motorcycle regulations are lax (80 decibels at 50 feet), causing automobiles to be inaudible over large areas. Loud car stereos can also mask vehicle noise.

Making hybrids as noisy as the millions of vehicles

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that are already acoustically masked will not decrease the number of masked vehicles, since conventional vehicles already are not detectable at those levels.

“NHTSA to Hear ‘Silent Killer’ Complaints”
— *Consumer Affairs*

Moreover, adding noise to all vehicles that are masked doesn’t reduce the masking, because it simultaneously adds to the background noise. It is important to remember that in urban areas, most of the background masking is caused by vehicles. Adding noise to vehicles increases the background levels, increasing the masking, and in some cases, makes a bad problem worse.

Amplifying a masked sound is an effective technique in one-dimensional situations. If people are having trouble detecting (in this case, hearing) a speaker in a room, then giving that person a microphone and amplifier will increase detectability (if the room acoustics and reverberation are not a problem). However, in a multi-dimensional situation, more analogous to a noisy crowded restaurant where many people are talking, giving each person a microphone and amplifier would only increase the background noise, and no increase in detectability would be gained.

Our streets and roadways are multi-dimensional situations. Pedestrian listeners hear the noise of many vehicles, vehicles that mask each other and the many other sounds a pedestrian wants to hear. In the long run, amplifying those vehicles that are quieter would increase noise and cause further masking.

“Silent Car Killers”
— *La Voz*

There is a physical limit to detectability in multi-dimensional situations. Improvements do not come from making each source louder. The preferred method to increase detectability in multi-dimensional situations is to decrease the noise of the loudest interfering sources. With respect to vehicles, that means reducing the general din of traffic, and most importantly, the noise from trucks, motorcycles, buses, and cars with loud amplification systems or modified exhausts.

Significant improvements could be achieved by ensuring that car and motorcycle mufflers are not modified to produce more noise. In most communities, laws are already in place to address these issues, but are rarely enforced. The same is true for vehicular amplification systems. Moreover, truck and bus noise levels can be made significantly quieter. Greater public awareness of the safety risks associated with masking from environmental noise, as well as increased enforcement of noise regulations, would provide very significant improvements in pedestrian safety.

Hybrid vehicles are an important part of the solution to increasing detection. When hybrids are stopped, their engines turn off (although this feature will likely

be part of conventional vehicles in the future too). At intersections, removing the masking noise of idling vehicles means that the detection distance for moving vehicles, which are a much greater risk to pedestrians, is increased.

NPC’s study, “Noise Masking of Vehicles, A Comparison of Gasoline/Electric Hybrids and Conventional Vehicles”, shows that under almost all vehicle speeds and background noise levels, if a conventional vehicle can be detected at a safe distance, so can a hybrid, and if the hybrid cannot be detected at a safe distance, neither can the conventional vehicle. The key to understanding this counter intuitive result is to recognize that hybrids are quietest when they are moving slowly, which is when they also have the shortest stopping distance and are the least risk to pedestrians. Even though they may be quieter, they can still be heard outside the stopping distance of the vehicle. The NPC study concludes:

Hybrid and Conventional Vehicle Study Conclusions

- *A major vehicle detection problem exists, but the problem is not unique to hybrids. Conventional vehicles are commonly masked by noise from other vehicles and environmental noise sources.*
- *Modifying hybrids to mimic a gas engine is not likely to produce significant safety benefits. Both car types exhibit very similar patterns of detection, receiving favorable ratings in the same settings. Likewise, both exhibit poor detection ratios in urban areas and near major highways. Any differences in detection occur at slow speeds, where there are fewer serious injuries, and fatalities are rare. Even then, hybrids still maintained good detection ratios, just not quite as good as the conventional auto. At speeds where serious injury rates climb, there is no difference in detection. Only in a narrow band of operating conditions (without fans, air conditioning, or engine running), and in a narrow band of background conditions (mid 50 dBA range) is it likely that conventional vehicles significantly outperform hybrids in detection.*
- *One interesting result does offer hope for increasing detection of all vehicles. Detection of both car types were poor in high noise settings, suggesting that reducing overall noise from vehicles, including motorcycles, trucks, and buses, may have broad benefits.*

Efforts to reduce noise, or to increase enforcement of noise pollution laws are effective ways to increase detection distance. Adding noise to hybrids is not.

BOOK REVIEW

Cedarhurst Alley: A Lighter-Than-Air, Anti-Noise Novel

Cedarhurst Alley is the acoustical *Catch 22*. The style, characters, and insanity are reminiscent of Joseph Heller's masterpiece. It is a well-written story of people trapped in a situation where common sense solutions are unthinkable and the unthinkable is the only practical solution. And noise is the problem—aviation noise.

Cedarhurst Alley is a good read, but it is a must read for anyone in the crusade for Peace and Quiet. Author Denny Hatch takes us on a wild romp through the politics of noise by following the life of Hendon Chait and his family as they try to escape from under a JFK flight path called Cedarhurst Alley. The book was written in 1970 (and recently republished), so the planes are 40 years old, the laws are out of date, and the proposed solution is



Cedarhurst Alley
iUniverse Books
\$15.95

unsatisfactory, but the problem of noise is just as real.

I could tell you about Chait's autistic child, anti-Semitic neighbor, and airline pilot father; or I could tell you about the Nazi arms dealer, the nutcase National Guard colonel, and the small time Greek tycoon—helium salesman/caterer/wine dealer. The characters are memorable. I could tell you that reading Denny Hatch is cathartic for all those desires to get even with noise makers. I could tell you that the book is reminiscent of the only real aviation noise victory in the last 50 years—the stifling of the Concorde SST program by threatening to shut down major airports by staging a drive-in. But instead I will tell you to buy a copy and read it yourself and enjoy.

World's Best Noise Library

Donate Dusty Acoustical Classics

Do you work in the field of noise? Are you retiring or just looking to empty a few book shelves? By donating those books to NPC you'll get a tax deduction and ensure that the books get a wider audience.

NPC is already the world's largest online library of noise. Now we're hoping to create the world's best library of noise. We'll create an online catalog and loan the books out to the public, schools, and acoustical professionals. If you are trying to figure out what to do

with your personal library of noise, consider donating it to NPC. We're looking for everything from important historical texts to textbooks, EPA pamphlets, Acoustical Society of America Journals and publications, Noise Control Engineering Journals, papers concerning noise control, important legal decisions, and research into the impacts of noise on people and animals.

Contact NPC at 888-200-8332 if you would like to help build the world's best library of noise.

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The Quiet Work of NPC

At NPC we've been working to create a cleaner, quieter future. Our work has included quieter cars and trucks, quieter roads, quieter lawn equipment, quieter appliances, quieter schools, better noise ordinances, and cleaner, quieter alternative energy.

This past year we've helped cities modify and pass noise ordinances, helped citizens quiet their neighborhood, wrote chapters in two books concerning noise pollution, and helped the U.S. Park Service create a tool kit for quieter parks.

We analyzed flight paths, roadways, and off-road vehicle use to pick the quietest place in America for *Backpacker Magazine*; we were featured in *Ode Magazine*, and dozens of newspapers around the country. We will soon be featured in *US News and World Report* and *Men's Health*.

With our website, www.nonoise.org, the world's largest library of noise, and with our press coverage, we are bringing the message that the world can be much quieter to the general public. We also bring that message to policy makers, as NPC has testified at public hearings in small communities, major cities, and in Washington DC.

We are also working on the cutting edge of noise control and hearing conservation. Our research into the noise levels of hybrid and electric cars resulted in the first comprehensive study of pedestrian safety and hybrid vehicles. Also, we are in the final stages of a

study of a potentially revolutionary new hearing test to assess the risk of hearing loss from consumer electronic equipment such as iPods, as well as noise around the home or workplace.

In 2009, we face many opportunities and challenges. The world is about to get quieter. Market forces are actually driving a reduction in noise. With the high fuel costs, limited fossil fuels, and pending climate change agreements, it looks like we'll be making less noise and switching to quieter electric technology in many areas. But NPC is needed to make sure those changes are as quiet as they can be. NPC hopes to steer the new technology in quieter directions.

But we need your help. Please use the enclosed envelope to support a quieter future.

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