

SOUNDS & SILENCE: RECLAIMING SILENT SPACE

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*Stillness is what creates love,
Movement is what creates life,
To be still, Yet still moving --
That is everything!*

Do Hyun Choe, Japanese sage

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INTRODUCTION A COMPLEX SUBJECT

This special issue is meant to prepare the way for a longer study of noise pollution. As will become evident, the subject is quite complex for a number of reasons: "noise" involves more than just a discordant sound that is subjectively determined; loud noises even tolerated by some as "music" can rupture eardrums or lead to deafness; other "noises" besides sound exist such as visible noise (clutter of commercial signs), vibrational noise (an earthquake), spam among electric messages, and light pollution (glare of urban lighting or blinking lights). Not all sound that is unwanted by some would be regarded as noise by others, but sometimes that which is first considered pleasant can over time become incessant and even mind numbing. Furthermore, some sounds that could be regarded as noise at the moment heard may be alarms or necessary for the safety of those who comprehend their significance.

To add to the complexity, Bart Kosko, in the book *Noise*ⁱ regards noise as inherent in certain circumstances and even beneficial at given times. He mentions that an infant just coming from the womb regards all sound as noise, and only with time discovers meaningful signals for carrying on life. The book is highly technical, and Kosko lays out a strong thesis that noise is under-appreciated and a quite complex subject. It might appear that little more needs to be said. But noise is only a portion of sound pollution -- and that subject needs further refinement.

The sleeping family does not understand someone making a "noise" outside, which is a signal to evacuate due to an approaching forest fire. Noise pollution differs here from other forms of pollution both because of the subjectivity of commonly heard sounds and because of the evolving annoyance from sounds over a longer duration. Noise as unwanted sounds in the world in which we live is a nuisance; it defies neat scientific categories, and thus to speak of noise pollution involves value, cultural, psychological, physical, ecological, and medical judgments -- and so the complexity of the subject grows.

But the complexity deepens when one considers the abatement of the unwanted and unnecessary sounds. Here are a variety of ways of dealing with noise and excessive sounds -- pick up stakes and run; block the hearing but leave the sound as is; attack the sound source and reduce or eliminate it; or redirect the sound to other places so that a relative quiet may prevail. The question soon arises as to what sector of the government or what agency handles any sound abatement procedures. Furthermore, within abatement one can still ask whether sounds are good. Is part of our unsettling modern culture's problems due to lack of harmony between sounds and silence and not just to a particular type of

sound that is disconcerting? Thus the solution is not just the tackling of "noise pollution," but a lack of a prevailing harmony when it comes to matters of sounds and silence.

Sound is a mixed good. Sound can be soothing music to our ears or a sleep disturbance. The ripples of vibrations in the air give us sound if and when we are proper receptors of these events. Some of us find these sounds pleasing and some less so -- and we may even term the latter as "pollution" or a negative environmental impact on our sensibilities. We seek to avoid or minimize these impacts through positive remedial action that will restore some silence to its rightful place as part of the harmony of the universe. Thus we seek to expose what we term, with some individual bias, "discordant" sound or noise along with the lack of needed periods or rests of silence as two -- not one single -- components of sounds and silence.

Distinctions are emerging. In describing sound pollution we consider those sounds that are unwanted and unnecessary for the life of individuals from those sounds that are not wanted but trigger an important alarm when needed. "Look out for that deer," "He's got a gun," "Fire!" Often the last spoken words before a catastrophe are unwanted but are meant to be life-saving. A siren is a necessary warning for traffic to stop or scatter so that the ambulance can move through more quickly. In congested areas such warnings are numerous and soon add up to a collection of increasing decibels that make life less bearable. Just designating some sound as noise is not sufficient; its necessity is important. In further distinction, a band may be playing and some are happy but a nearby inadvertent listener may want to get needed rest. The band players and party-goers would be the last to define their activities as noise but others only a little distance away would swear it is. Even on an individual level, some could play their radio or devices too loudly and harm their hearing and yet never call the sounds received as "noise." So it is not just like beauty in the eyes of the beholder but a little more complicated than that. Noise is a negative concept, and its negativity is partly quantitative (measured in decibels) and partly subjective as to whether it is desired by the hearer. A sound can be interpreted differently (the sound of rainfall to the fearful person versus the music of rain to the one desiring the patter on the metal roof that brings on sleep).

Remedial action comes in many ways and with attached strings. To reduce or halt unwanted sound may seem good to the maker, although neighbors regard it as a problem. Besides the challenge involving remedial actions by individuals of differing judgments, certain remedial actions require sophisticated and often expensive technologies and complex regulations that are equally difficult to enforce. Generational differences soon express themselves. One

solution is live and let live and use ear plugs, retreat to a sound proof section of the house, run away, or remove the hearing aid; another is to address the problem head on with club and loud voice -- but that is simply more of the same excessive sound and triggers even more noise; another method is to call the police and complain. What we are sure of is that the volume and duration of auditory stimulation increases everywhere, and so it needs to be addressed in an orderly fashion.

Dividing the Subject into manageable parts is crucial. Obviously, it takes a wide variety of experience and disciplines besides environmental science to acquire a final answer about excessive sound: public interest activism, mental health, spirituality of silence, acoustical engineering, motivational analysis, psychology, and music theory to name but a few. Perhaps enough has been said by others in some of these areas and only needs further integration and publication. Over the years I always wanted to leave much of this assembling work to a fellow environmentalist friend, Art Purcell. He has desired to write more extensively on this matter of noise pollution and still plans to do so.

Sound and silence is a different approach, for it goes beyond identification of excessive and unwanted sounds and shows the need for silence. A shift of attention extends beyond pollution whether regarded as "sound" or "noise" and emphasizes a balancing of remedies with ways to create silent space for more harmonious living. Here excessive sounds that do not necessarily harm acutely become a disharmony calling out (as it were) for periods of silence. This is an aspect of restorative or healing environmentalism.

Silence is the other side of the coin called sound of whatever form. A very nice musical sound could be pleasing but when repeated over and over could become annoying and then depressing, and may even lead one who must hear it constantly to mental instability. In our ideally harmonious lives, concordant sound is coupled with silence. This harmony is craved, prayed for, and strengthened by and through our efforts. It is one thing to create a sound; it is quite another to create space for silence. This is not the silence of the dead or forsaken, but the silence that punctuates sound and gives it better quality, that stands for the needed rest in a life of activity. Composers know about it; so do homemakers when the kids are in school; so do farmers who can turn off the tractor and just walk about the cultivated field; so do truck drivers at a rest stop (at least one away from congestion); so do research people in the nook of a library; and so do hikers in the early evening breeze at sunset after a strenuous day.

Value of silence. I treasure silence for it gives me time to reflect on where I am going and what I plan to prepare to do just up ahead in time. Even the constant ringing in my ears does not distract from this silence. What is evident is that the concordant sounds in life must have pauses of silence in order not to be defined as chatter and thus "noise in a more general sense."

Is not the difficulty in the modern world that we have neglected the value of silence because we have allowed continuous noise to destroy our appetite for it? All the latest electronic gadgets have helped perpetuate modern sound in a continuous fashion, non-stop, invasive, penetrating, overpowering, culturally "necessary," the answer to loneliness. Yet when we are silent and within a busy mental world we need not be lonely. Just being with a companion and not saying anything is of value. Just speaking in prayer is a time of awareness of the presence of a Holy Other. Silence has immense value, but it takes practice to discover it.

Distinctions are worth emphasis. Noise is discordant sound, but sound pollution embraces more, namely, the lack of silent space. I am becoming more convinced that we suffer from both noise and sound pollution, though the problem areas cannot be treated separately. That is why this is not a book about noise pollution but it is definitely one about sounds as properly and improperly conceived. The silence component is the corrective to the benefit but overuse of sounds. The rhythm of harmonious sound and silence is a nearly forgotten virtue in the hustle-bustle modern world. Just as the smoking factory chimney of a half century ago was regarded as a sign of healthy economic activity, so loud and often discordant music or continuous -- not just boisterous -- conversation is a contemporary sign of compulsive social over-activity, the lack of silence of the heart.

Should not the question be asked, "How could you do significant things with street noises and constant attention to the cell phone?" Total silence is for the deaf and that is not golden in itself, only a challenging opportunity to utilize communication through other means: sign language, gesture, and/or certain electronic media.

Sound is necessary. Sound is the most facile form of communication whether it be utilized by a whale, a bird or a human being. We communicate information, warnings, greetings, farewells, and many other bits of information via voice or over the electronic media. The train whistle or car horn is a warning; the bell is a call to prayerful service; the wind chime gives a pleasant atmosphere. To be speechless or to fail to hear are burdens on both the afflicted individuals and their loved ones and companions. Sound means so much that it is celebrated in many ways. The only problem arises when there is too much of a good thing -- then a pollution of the air waves occurs.

Silence is necessary. While most would affirm that unwanted sounds are good to suppress and escape, still it takes another level of awareness to admit that the quality of periods of silence is directly related to the sounds on either side of them. A valuable pause is one that separates good sound and becomes a component of harmony. Sound pollution is lower on the listing of environmental problems than air and water pollution and global warming effects. However, part of the lower rating is due to our modern culture that would not be willing to admit noise as a problem; that is because busyness that includes din as a necessary accompanying effect would be considered a part of welcome development and growth. For these moderns, noise is progress even when disturbing to some.

Silent periods do not need to be signs of lack of social awareness. Rather, in order to enhance social skills and communication, silent periods are absolutely necessary. The generous and kind Abraham Lincoln was so often bothered by job seekers and others that he had little time to himself during the work day of his presidency. Finally, in early 1865, at the end of his first term and in preparation for his Second Inaugural Address, he accepted the suggestion of his secretaries and sequestered himself for four-hour periods of complete silence so he could concentrate. He discovered that silence can be golden.

There is a time for everything, a time for every occupation under heaven:... a time for keeping silent, a time for speaking...
(Ecclesiastes 3:1,7)

While silence is golden under certain circumstances, there may be a time to break it and speak up. The hard-pressed victim would hope that someone would come to his defense by breaking his or her silence and speaking. When the performance is completed and the audience is dumbfounded, a silence instead of applause may be deafening. When a good soul has been attacked by another, those standing about are silent for a moment and some only wish another would say something to break the stillness. Silence may be the absence of sound, but it can speak in various auspicious ways. Too often silence is regarded as the lesser, as the sign of diffidence, ignorance, lack of attention, disinterest, fear, or quiet disapproval. Misplaced individuals tolerate incessant sound, not because they like it, but because they regard it as necessary for the success of the world in which they live; to stop is to become unfaithful to the modern demand for participating in sound-making. For them silence is intolerable. There's a time for everything.

The price of discordant sound is high. Growing numbers of hearing impairments, increased stress levels, and the inability of more people to concentrate all contribute to this emerging

problem. Scientific evidence now verifies that rising decibel levels especially in urban and congested areas are taking their toll on health and quality of life. Granted it is more difficult to show a causal health relationship than with other forms of air pollutants. But the problem exists, and with proper safeguards and regulations it can be handled. In recent years the public has become convinced that smoking is not the hip thing but a health hazard. Analogously, we need to curb noise for the good of a vast number of non-vocal citizens. They have suffered too long and their ranks are rapidly swelling.

Creative harmony is our calling. Neither massive bursts of sound nor total silence is perfect any more than is super activity or total sleep. From a cosmological standpoint, the universe began with a big bang, and that ringing out is the sign of activity as we know it. We are creators of sound and lovers of distant silent space, and balancing the two can be done artfully or not. And in order to return harmony to the world in which we live, we must furnish silent space not as an optional choice, but as a necessity for some who crave it, and for all who desperately need it. We must become champions of silence as much as of harmonizing sounds. That is a basic environmental message here.

Cultural problems deserve questioning. Modern culture whether American or worldwide finds that creating sound is such a blessing that no one should judge the sound emanating; rather it is expected that others remain non-judgmental about all sound. When we are traveling on an airplane and either in the waiting area or on the plane itself, the person next to us is likely to start a cell phone conversation in a louder than normal voice. This nearby phone speaker is totally oblivious and insensitive to our desire for silence or our space that is being infringed upon.

The erosion of civility only adds to the trouble in today's world. We are now faced with the limits of tolerance. Do we allow disturbances to go unchallenged? Are we afraid to challenge noisemakers, who regard silent space as non-existent or something worth exploiting? And does this come from the macho attitude that all forms of commons may be conquered by the loudest and the mightiest? Is our silent tolerance due to a guilt complex -- that we are willing under certain circumstances to do the same with others as is being done to us now? Or is there also a sense of compassion for the noise-maker? We tolerate the infant who shows discomfort with the wet diaper. Must we not tolerate the overly stressed office workers who speak a little too much or too loudly to friends on the cell phone?

Individual problems can become social ones as well. That sense of allowing the condition we do not totally approve of to coexist with our demand for silence is part of being together with others in a tolerant community. The problem is one of setting

limits on this infringement of the commons of silent space. At what point does the little venture into silent space become annoying and destructive? When should we resist in a confrontational manner? Does the aggressive noise-maker suggest to the seeker of silence that he or she move or put on ear plugs? The challenge is to see that this individual infringement actually transcends the individual and becomes a community problem and that wider ranging solutions may have to be proposed. And we say "solutions" because the answer lies in a variety rather than one method only.

Sounds and Silence? A book title is the first thing conceived and the last thing determined. Publishers remind us that the attention span of potential buyers and/or readers is incredibly short. The ability to catch someone's attention is only a matter of seconds. Thus the title needs to be succinct and the sub-title informative enough to draw attention and to be the target of search engines on the Internet so as to attract a more specific audience. Communication here involves a crucial economy of words. "Noise Pollution" is a negative concept and we are aware that few negative titles have drawn widespread attention, e.g., exceptions in the 1960s were Rachel Carson's *Silent Spring* and Ralph Nader's *Unsafe at any Speed*. What followed was that raft of books on consumer misdirection and environmental abuse which has attracted some concerned citizens but leaves behind the multitude who prefer to avoid reading about more problems. Here we are seeking to avoid the negative pollution aspects to consider a more positive approach.

Noise-making infringes on the right to silent space. Like all air pollutants (toxic fumes, dust, mold, etc.) excessive sound or noise is difficult enough to control especially in an age that values personal freedom that can be interpreted as the right to make noise -- a supposed component of free speech. Only some Americans are sensitive enough to realize that noise infringes on the commons of silence where necessary rest occurs. We hear the phrase "you have the right to remain silent." If we have that right to remain silent, we certainly have a right to be blessed with the gift of needed silence in our lives. We are not free to contaminate the air that is a basic commons -- and noise is a form of contamination. The defenders of serenity and tranquility are generally more hesitant than those fighting for toxic free air.

Through environmental resource assessments over a quarter of a century of work, we have come to the conclusion that noise pollution is a sleeper as far as environmental quality goes. The quality of life could be highly improved by controlling the noise whether internal or external to a given location. Is noise inevitable and are solutions authoritarian? Are we talking to the choir when noisemakers frolic all around? Reflecting on

difficulties and risks inherent in this problem, we decided to combine revealing the problem, the discordant din and chatter of imperfect communication, with a discussion of solutions. From a more spiritual standpoint we must demonstrate the value of formal silent times in personal reflection.

Most likely all of us are beset with noise problems and yet only a few will acknowledge the problem. Harried soccer moms and dads, overworked social service employees, half-deaf street vendors, smiling subway conductors, over-coffee'd rig drivers, tractor cab-riding farmers, perceptive psychologists and their patients, upwardly mobile yuppies gentrifying inner cities, hoarse umpires, and prisoners and prison guards will long for blessed peace. Extending the list will actually include all of us, even those who claim they need loud music while they study or pray. The vast audience is already stressed-out, becoming deaf, and growing more irritable and yet regards the acknowledgement as something traitorous to our culture. We all have a stake in redeeming America and in doing so with a smile, even with a noisy background.

Methodology. The first section surveys sound pollution problems starting with volume and duration of modern sound. Discordant indoor sounds are described, and then the immediate outdoors (the yard and immediate environs), and then on to the larger surrounding communities in which we live. The physical, mental and psychological conditions of both people and other living creatures are touched upon. In the second section the harmony of concordant sound and silence is treated, starting within ourselves and then moving outward to the wider community. Several remedies are considered to reduce excessive sounds indoors and outdoors on both the part of individual practices and that of the wider community (neighborhood, state and national policies and actions).

SECTION I SOUNDS AND FURY

A. Sounding Off: Increased Historic Discordance

The term "environmental noise" means the intensity, duration, and the character of sounds from all sources.

U.S. Code, Title 42, Section 4902

Excessive sound exists throughout our modern culture from traffic congestion with its sirens, horns, blaring radios, and tire squeals to the indoor din of tvs and appliances. Studies show a shocking increase in excessive sound in hospitals [a Johns Hopkins study]. People remark about the excessive hustle and bustle in school classrooms especially where performance is in need of improvement. We are aware that the sound can only become a disturbance, if there is someone there to be annoyed. Let us consider for a moment the rise of excessive and annoying sounds that become an increasing problem for many of us in recent times.

It can make an environmental impact on our lives and yet part of the difficulty in any discussion of sound is that the impact is subject to individual interpretations which all add to the complexity of the problem of modern noise.

1. History of Sound-Making

We often think back to those with weak or moderate voices trying to address crowds in times before the invention of microphones. How did they do it? Certainly the strong voice could reach to even thousands in certain circumstances, but that was rare. Amphitheaters were engineered with exceedingly good acoustics in the Greek and Roman world and thus theater and civic debate could occur with some regularity. But what did rural folks without recourse to such elaborate arenas do about sound in their open fields much less in meadows or wooded areas that could absorb some of the human voice? Sound-making before amplification and explosives was difficult and the din of battles rare.

Since recording is so recent with Edison and others, we do not have a hint of the sounds that coursed the air in the nineteenth century and earlier. What about the street noises of early New York City or the sounds of the rural countryside or even the sound of Mozart's concert in the eighteenth century? Church bells and cow bells? Shouts and curses? Prayers and songs? What did a typical homestead sound like? Cries of babies? Bang of pots and pans? Laughter and song in the evenings? Except for some rare narrative, the past is strangely silent to us who like records of just about everything.

Noise is an annoyance. In earlier times, carousing would keep people up at night, and so records exist of civic authorities seeking to address such sound abuses. The Romans had nighttime regulations to suppress the clatter of chariots on the stone streets. "Bellow" is a poem from the early fifteenth century that in its very text explains how a poor worker is annoyed by the constant noise that surrounds him. Even in American Colonial times there were regulations related to curbing noise. The notion of silence being a commons shared and expected by all was one of the earliest recognized human rights: the right to remain silent. Interestingly enough, one of the earliest forms of environmental pollution involved excessive sound or "noise" as defined by a portion of an annoyed population. In fact, this excess could be defined far more easily than excessive air or water pollution though these could be noticed in congested areas. Also of interest is that the populations truly believed that this form of environmental pollution could be controlled.

Degrees of noise exist. Certainly at times of major battles, one could hear the shouts and curses, the thundering cavalry and the clash of swords. Smashing steel had its sound but gunpowder added much, with the explosive blast giving off a sound that could be heard for miles. By the time of the cannonade at the Battle of Gettysburg, in 1863 perhaps the loudest human-made sound of the nineteenth century, one could hear the noise and see the flashes dozens of miles away. The sounds of natural explosions, such as erupting Krakatoa Volcano in 1883, were loud. But in the twentieth century the sounds of clashing armies accelerated, especially with the artillery duels on the Western Front from 1914 to 1918 and then the bombings in the Second World War, and with their crescendo at Hiroshima and Nagasaki in 1945.

Modern artificially-produced sounds were becoming more pronounced and memorable; but the din of modern warfare was not the entire story. A large number of the devices that can cause major noise from motorcycles and airplanes to jackhammers and leaf blowers were arriving on the consumer scene to replace clattering horse hoofs and the driving commands of loud-mouthed teamsters. There had always been occasional natural and many artificial

sounds but not with the volume and continuity of modern urban life.

2. Awareness of Today's Din

Certainly the sound of battles still persists in war-torn parts of the world, but we always hope and pray that these will soon cease. As for natural sounds such as thunder, then will always be present in stormy weather and must be expected, maybe with even greater frequency with the onslaught of global warming.

But there is another form of noise that was not here a mere century ago -- the sound of traffic congestion made by moving internal combustion vehicles. Honking, screeching brakes, and sirens only add to the massive noise in the streets, and these wear on the nerves of some even when they cease recognizing their immediate presence. The story of the effects of excessive sound is unfolding, and yet many are in a state of denial of its impact or importance, for how could modernity with all its busyness hurt us?

In this age, sound can be physically measured, and a given sound can be objectively compared with other sounds, not just compared in terms of a qualitative softness or coarseness or suddenness. Objective quantitative measurements of loudness can be made in decibels (dB). When an adjustment or weighing is made for high and low-pitched sounds according to ordinary hearing, the adjustments are called "A" weighted levels (dBA). This sound is measured in logarithmic units called "decibels," which go from zero where humans start to hear to over 140 where noise causes pain (certain rock and roll concerts). Permanent hearing loss can occur when continuous exposure occurs over a number of years at approximately 85 dBA.

Source	Sound level for operator in dBA
Chart 1	
Inside Noise	
Refrigerator	40
Floor Fan	38 - 70
Clothes Dryer	55
Washing Machine	47 - 78
Dishwasher	54 - 85
Hair Dryer	59 - 80
Vacuum Cleaner	62 - 85
Sewing Machine	64 - 74
Electric Shaver	75
Food Disposal	67 - 93
Electric Lawn Edger	81
Home Shop Tools	85
Local Outside Noise	
Gasoline Power Mower	87 - 92
Gasoline Riding Mower	90 - 95
Chain Saw	100
Stereo	up to 120

Transportation Noise

Inside airplanes	60 - 90
Motorcycles	100
New York Subway	up to 101

Acoustical experts recognize today that the major source of rather continuous noise affecting a greater portion of the population is that of traffic noise, whether overhead airplanes, the roar of trucks, or the rumble of the approaching subway train.

The continuous sound of heavy traffic on an Interstate or major artery to or from a major urban area is now taken for granted. These transportation means are new, and we need to move about. Thus we seek to contend with their side effects including noise no matter how annoying to traveler and nearby resident.

Additional modern problems exist. There are numerous sound-making sources and practices that were not known a few decades ago:

* **Boom boxes** are a travesty to the auditory senses and are even held close to the ear, another phenomenon not known in the 1800s. Music so loud that one cannot hear oneself talking is quite recent and is extremely damaging to hearing.

* **Recreational vehicles** such as water skis and off-road vehicles are loud and piercing sounds that compete with the quiet space of areas meant for relaxation.

* **Lawn devices** including snow and leaf blowers, chain saws and lawn mowers are common noisemakers in urban and rural areas alike.

* **Poor urban planning** results in locating housing developments immediately adjacent to highways, airport flyways and industrial developments, some of which appear after the homes have been built.

* **Television and radios**, which are operating when others prefer to rest or study or talk, seem to be always playing. Other appliances and heating cooling devices also disturb the indoor environment.

Silent space disappears. With the modern drive to acquire more and more gadgets, appliances and other devices, the need for placing a value on silence comes as heresy to a capitalistic competitive and profit-oriented society. Is not the gadget a profitable device to make, sell and convince the consumer to use?

How would our economic system find money in quieting down and resting? It just cannot be. It resembles the question posed to me in converting kitchen wastes to humus: What device must I

purchase in order to compost? To respond "none" seems mystifying to the consumer-oriented person. Today the gadgets of sound, from radio to television, from computers to, especially, cell phones all infringe on our needed individual or group silent space.

Some suffer in silence? Lack of silence can lead to an unhealthy silence where the oppressed person dares not face the issues of the day. A person who ought to speak out in an age of overwhelming sound, instead retreats into a silence that is not healthy from the standpoint of remedial action. Without realizing that silence is a common inheritance and worthy of all, the oppressed beats a strategic retreat into himself or herself. Thus a suffering in silence when one could and should speak is the utter misuse of silence and the loss of a precious opportunity to speak. This oppression is not recognized and thus there is a lack of social awareness which must be overcome.

Become socially aware. Silence brings on interior peace, a gaining of spiritual power to act, and a moment to speak with God in prayerful conversation; a willingness not to be interrupted by the busy outside world. To rob us of these moments is to attack the very essence of being human and aspiring to godliness. But our aspirations are cut short if we overly individualize our own problems with excessive sound. Others may have the same problem; others may suffer as well; others are worthy of our care and protection. I may allow the suffering to occur to me and suffer through it, but we must not tolerate the same sufferings for others. We need to become socially aware that we must at times speak up, for there is a time to speak as well as to remain silent.

3. Complexity of the Problem

Sound that is excessive whether in volume or duration is a major problem in our age. The problem of noise must be looked at from a number of viewpoints just as the solutions will be. For basics, noise is often **short-lived**, yet effects may be subtle and only begin to show themselves long after the initial impact.

*** Subjective differences** -- With amplified music what is enjoyable to one is a torment to another. We recall that the roar of waterfalls is frightening to one and an exhilarating thrill to another. Loud sounding machinery may be deafening to an operator and a happy sound to the distant captain of industry. A revving motor gives a sense of power to the driver but makes the annoyed resident feel powerless. Different people have different sensitivities. When people become more deaf, they raise the volume of amplifying systems to the annoyance of those of good hearing, and the hard of hearing individual hardly realizes it. Social protesters may know more about the effects of raising the volume but they assent to it as a way to attract notice. And some

demand tolerance from the silent neighbor, even when that person realizes that loud sounds will harm the perpetrator who is in a state of denial. What is a concordant sound can be a matter of taste. Someone may regard the intensity, beat, and rhythm of a certain type of music as definitely annoying and thus define it as "discordant;" another will violently disagree. The term "concordance" has the sense of being with or "con" and heart or "cord" and thus is an agreement or harmony of audience. When two groups fundamentally disagree, one can expect sound concordance.

*** Differences in cultures** -- Many modern urbanites appear to thrive on loud and prolonged sound. Some even say they cannot sleep without ongoing sound in the form of music. At least they are far more tolerant of infringing noises than their rural or suburban counterparts, who are more accustomed to silent landscape. Those living in more crowded conditions are better aculturated to domestic noise and gain a level of tolerance that others in quieter circumstances find disturbing. Some cultures seem to want continued social interchange and can even accept crying infants and toilet or bedroom noises more easily than others. On holidays the tolerance for fireworks is extended as part of the celebratory mood of the culture -- although some confess that these are annoying practices.

*** Differences in need for silence** -- A musical score that allows for no pause or intermission would be regarded as of poor taste and quality. Rests or silent places are part of the created sensation of good music -- though the definition is subject to interpretation as just noted. Even the hardest rock band must take breaks for the good of the performers -- and audience. The difference is not in the need for some silence, but rather in how much and when. Everyone must rest sometime for that is the nature of human beings and all animals for that matter. The degree of need will vary and some of us "need" far less rest than others. And even the definition of the rest period varies somewhat. The times for rest are perhaps more disputed than the absolute need or even the amount of time. We know of the person who has been disturbed all night by a party who goes to the party house at dawn. This person raps loudly and announces that he wants to let the group know that he has been disturbed during the night. So much for town/gown struggles.

4. Loss of and Lack of Silence

Today in our modern world two concurrent factors co-exist: the increase of discordant sound mainly through increased use of internal combustion engines and electronic amplification devices; and the hyperactivity of people who infringe on the commons of silent space. The first aspect is more easily recognized in our modern society because it can be quantitatively determined with

ease (loud and disruptive sounds). We can also determine quantitatively relative silent space for those who have no hearing deficiency. Silence can be the absence of sound or the absence of an auditory faculty to receive the sound. In this Special Issues we are speaking of a relative silence that reduces or ignores residual background noise and that permits a harmony of concordant sounds and periods of soundlessness.

Relative silence. This is the silence of the wilderness with occasional background sounds: wildlife and bird sounds; gently falling rain; a running brook; and breezes rustling tree leaves. This relative "silence" is highly valued by most people of any culture -- and is the time of rest. It is the silence that becomes the arena of the presence of one person to another with no words spoken; it is the silence of meditation as demonstrated so wonderfully in the 2007 film, *In Great Silence*. Here the monks of Saint Bruno enjoy a life of contentment in the mountains of France far removed from the hustle and bustle of the world; they still have time to chant and to make the ordinary sounds of work, walking about, and they hear the cow and chapel bells. In some way, the life of these monks is a harmony on a small scale that illustrates what the world itself should be on a grander scale.

Abrupt Sounds. In contrast to this silence is somewhat uncontrolled sound -- explosions, honking horns, shouts, and other random and discordant noises. But excessiveness may have a subjective cast and include those otherwise pleasant sounds that are excessive in volume or duration. For instance, a street musician stands in one place on a street and is heard in nearby stores and residences playing the very same music hour after hour. Some even have recourse to legal action to remove the person or curtail the length of stay at a given place; they say the repetition is driving them crazy.

Chatter. We all know someone who cannot stop talking and we excuse this person as suffering from a nervous condition. We may recall a plane or train ride when someone has a case of giggling or laughing at just about everything another says -- at first it is hardly noticed, and then one takes notice, and then it becomes irritating, and finally really annoying. It is a rather neutral sound at first, not something negative such as someone scratching on tin. However, the incessant sound becomes unwanted and thus evolves into "noise." What happens if an entire culture participates in this condition to some degree through cell phones and other sound receiving or producing devices? The condition and situation of the one annoyed adds to the degree of annoyance. Should someone be in a hospital and unable to stand the television programs selected by a roommate, the need for rest could make the situation unbearable -- especially because hospital fees are large. What starts as neutral emerges into something quite noisy.

A broader definition of excessive sound involves the use of amplifying electronic equipment that does not tire like a human voice or performance. The equipment continues and continues whether the listener tires or becomes inattentive through sheer exhaustion. Thus modern devices can continue the intensity and duration of a disturbance with no allowance for blessed silence.

Note: One type of sound pollution is "sonar" pollution or the use of sound waves in military defense and general communications. This can lead to confusion in wildlife such as among whales and other maritime mammals.

Vanishing silence. Destruction of silence includes the frenzy to produce, to move about, to socialize, and to strive to never be alone. This uncomfortable condition makes silent periods the abode of the inactive and worthless person, the one who does not have the gusto to live fully, to be interesting. All of us who grew up in the country and valued certain aspects of rural life saw this erosion of silence and the turbulence of super activity as not being good things, but still we were unable to articulate our uneasiness. Some of the symptoms of lack of silence include: attention deficit condition or syndrome and shortening of attention span; general uneasiness or expressions of annoyance and stress when waiting for an appointment; compulsive speaking and other forms of compulsive behavior; the lack of social graces and the ability to relax and chat in a neighborly fashion; use of nerve pills and prescription medicines to reduce blood pressure; an inability to pray and be alone with God; hyperactivity of business people, soccer moms and busy children; becoming uncomfortable with the pauses in a liturgy; lack of pause time in dialing a number that leads to an automatic cutoff as though a wrong number has been entered; road rage and instant start-up at a traffic light change; and on and on.

Cell phones and campfires. I observed two people seated across from each other in a restaurant. The husband with most likely his wife (no other kind soul could endure such discourtesy) simply talked through the entire meal on the cell phone to one party after another, re-dialing between courses. His attention and time were taken with conversation with distant people. Perhaps he was terrified that he would have to spend the next half hour with his wife in possible silent presence during the meal. People reflect how it is now necessary for modern urban -- and some other -- Americans to make conversation incessantly.

Campfire silence is a thing of the past because camp fires are not as ecologically acceptable as no fire at all. And Lord help the camper who has no cell phone connection to the vast outside world. We are a people who cannot relax in silence because that goes against who we are as talking people in constant

contact with others. We note the cell phone speakers who pause a second between two calls to think of whom to call next, but not of how much can wait until later. Calling shows importance, awareness of the situation, being with it, and of course, busyness, which is a compulsion during what must be regarded as work time.

Enter the subjectivity of silence. If one person's noise is another person's music, does this subjective criteria apply also to silence or the absence of sound? Our contention is that sound pollution is more than actual or perceived discordant noise; it involves the lack of silence, the conversational pause that has now turned into chatter, the Internet reflection that is now a personal blog. Certainly some might perceive enforced silence when they wish to communicate as oppressive. "You must be silent now." Furthermore, not all silence is good in itself, especially when something has to be said at a given time. Thus there are moments when silence is wrong and needs to be broken, and yet one person sees this plainly and another not at all. Silence is seldom neutral; it is golden or it needs to be broken. Sensitivity demands knowing the difference and being able to act accordingly.

Silence certainly can be viewed as good by all creatures. For human beings silence is the time to regain strength, reflect, plan, compose, speak with and listen to God. Those who live lives of meditative harmony teach the rest of us how we are to integrate our own lives. Instead of the pejorative meanings of silence for the lonely or isolated, silence for true environmentally conscious people enhances harmony. Noise now becomes unwanted sound of whatever sort that disturbs the domain of silence, the commons that we all seek in somewhat hidden ways.

B. The Increasing Din: Enter Modern Technology

Concerned and optimistic readers may hope that the public is becoming more aware of the need for silent space, and that sound levels are thus plateauing even declining. Sadly all indications are that this is not yet the case. It takes enormous awareness and elaborate remedial activities to bring down noise levels in most communities. For instance, damage due to excessive sound is not as proven or perhaps as serious as that due to tobacco smoking, a practice now frowned upon since it involves the air commons of all people, not only of the individual smoking. But smoking in public and making excessive sounds are akin. From all indications noise levels are rising at near record rates with millions of new land vehicles in places like China and India, with increased air travel, and with the ongoing sale and use of amplification equipment in virtually every part of the planet. No one has a complete handle on the global situation but the quoted

rise of one decibel per year on the average is hopefully far too high. We need not await the definitive quantitative recordings; we know things could get worse.

1. Amplification

The microphone seems so much a part of our culture that we repeat a question asked earlier: in pre-amplification times how were people heard by large audiences? Some talk about relayers who heard a portion of a message and then turned around and passed it back to the further reaches of the immense audience. In larger older churches one sees the half-shell pulpit cover over the place of sermon or homily. Bull horns were other such devices but certainly not used during long speeches or debates. And many people did not get the message but waited until someone told them what the commotion was all about up front. Such was life! We hear in great part because of this amplification in school and church and public gatherings, and just about everywhere. The good cannot be denied, but then the amplified sound can become unwanted -- and thus more and more din in our world.

Modern means speaking out. Houses seem to chirp like a nest of near fledglings: the drone of the air conditioner; the whirl of the fans; the blare of the radio; the incessant ring of cell and conventional phones, door bells, clock alarms; the confusing sounds on the ongoing tv program; the food grinder or juicer or mixer; the flush of the toilet; the peep of the microwave just finished. All are part of the language of domestic modernity. And against this background we know that in the last century came more effective, and often electronic, megaphones, microphones and music devices that reached out to more and more with ever greater volume and duration. We mention duration because in older times people wore down after a two-hour lecture or debate; today the radio and tv often continue throughout the day and night. What is modern is 24/7 in every way with its good and bad points.

Erratic behavior appears. But what is beneficial is never left alone when greed and avarice are nearby. The bad news is that these amplifying devices can become louder and more far-reaching, especially when used to entice consumers by profit-mongers. We come to a stop light and the next driver has the thumping sounds of "rock" or other music emanating from the radio; the auto is swaying; the driver is dazed; even the roadway and nearby vehicles are beginning to vibrate. No rest or silence at that stop light. The broadcasted "music" is the Mecca call for the gospel of that portion of our culture through efficient devices not yet sold a half century ago. The sacrifices called for are the promoter's hearing and well being along with those of everyone else within hearing range.

2. Home Electronic Devices and Appliances

Today the number of home appliances is multiplying, and gift-giving times (occasions that are multiplying as well) become the appropriate opportunity to add to someone's list of conveniences. Some of these devices such as the coffee percolator are quiet enough, but they add a little bit to the daily domestic chorus. And some such as the hair dryer, the clothes washer and dryer, and the second or third television set make themselves heard above the rest. Even the ever handy home computer is now in multiples in many homes, and has attached amplifiers for picking up the video clips on CNN. Soon the quiet home is a memory, especially when occupants have different sleeping periods.

Television has become a fixture in most American homes (I am part of the without cable tv minority). In the average house, the television is operating for about six plus hours per day, whether it is being watched or not. Television has its advantages and on certain channels the programs are educational but the common fare is bad, eating up precious reading time and social life with others present. It is both audibly and visually noisy, and a large proportion of its programming lacks socially redeeming value and becomes addictive to budding couch potatoes.

The computer game is a second home source of excessive sound that can be as distracting as television to those seeking quiet space. Unfortunately this more recent type of entertainment is not limited to the very young but extends into middle age groups and even to senior citizens, if people care to admit it. In fact, a major source of purchases are in the twenty- to thirty-year-old age range because they are the ones who can most likely afford the new expensive varieties. When operated, many of these games emit loud gun reports, animated voices and car crashes at various sequences along with intense and often loud background music. Likewise movies of only a few decades ago that were confined to indoor and even outdoor theaters are now in the home on a regular basis. Now one can buy or rent movies at amazingly low prices and these can become standard home entertainment fare for the avid moviegoer. Yes, the volume can be lowered for others, but the action may tempt the viewer to turn it up as the movie progresses.

Current equipment and practices are simply inviting more sound into the home. It is not surprising that when the public radio station features a large family, the deliberate effect of background noise nearly drowns out the interview. The same applies to offices of busy people and ongoing phone calls or with a report on domestic poverty whether taken indoors or out. Silence is not part of the modern domestic scene.

3. Outdoor Tools and Implements

Modernity involves many conveniences and some of these are to soften outdoor chores. I remind modern builders with their electronic hammers and power saws that we built houses in the 1940s and 50s with no electric hookup or power generator -- just hand saws, cross-cut saws, hammers and plenty of muscle power. Actually my dad could have been more electronically-equipped, but he regarded the tools as too dangerous for his young brood of aspiring home builders. The construction work proceeded at a rather fast clip but it was somewhat quieter than today's counterparts.

What applied to homebuilding also applies to lawn care. A hand mower or a shovel or rake will be generally quieter than a power mower, a *Rotatiller* or, heavens forbid, a leaf blower, one of the most inane of instruments that simply announces to neighbors that one is concerned about the fallen leaves. These powered instruments, to which one could add water dispensers, sidewalk edgers, weed eaters, hedge clippers and compost turners, are powerful counterparts to the indoor noisemakers. Delivery trucks and even distant jack hammers can also punctuate the tranquility of the pleasant neighborhood.

At times, modern rural life is not that quiet either. In the early morning hours I think back to youth and the drone of near or distant electric powered units running milking machines at the dairies. A host of other implements can be far more noisy: tractors in general, silage cutting equipment, grain dryers, harvesting and hay baling implements, and trucks. My brother remembers the noise of the corn crusher that was deafening and perhaps contributed to the permanent ringing in my ears, though we only did the operation a few times a year. Lacking all the work rules related to industrial instrumentation and ear protectors, the silent farm could become quite noisy on certain occasions -- and crushing corn as feed for cattle and hogs was certainly one of those.

4. Expanded Ground, Air and Sea Traffic

There is simply more traffic on the roads and airways today. Those who recall the quiet few days after the 9-11 event when all the planes were grounded will know the blessings of a pause that refreshes. The same applies to those near a highway when they awaken to the effects of a snow storm that closes down the traffic for a period -- though others are frustrated by being stalled.

Land. People like the convenience of being in proximity to major highways for fast getaways and returns but there is a price to pay, namely, ongoing congestion with its steady rumble. They soon notice that the noise depends on three factors: the traffic

volume (2000 vehicles per hour sound twice as loud as 200 vehicles per hour), the speed (traffic at 65 miles per hour sounds twice as loud as traffic at 30 miles per hour), and the number of trucks (one truck at 55 miles per hour sounds as loud as 10 cars at 55 miles per hour).ⁱⁱ Other sound-related factors include highway surface material (blacktop sounds different from concrete), the steepness of the road itself (on steep inclines heavier vehicles must labor to ascend or brake to descend), and frequency of motorcycles (virtually always loud). Truck noises are due to a number of factors (tires, engines, exhausts, squeaking brakes and backfiring). Though traffic noises are often regarded as continuous, the noise is never really constant due to number, speed and type of vehicles and then modulated by weather conditions as well. Accidents also change the noise profile on occasions.

Air. While large numbers of people live near major roadways, still more perhaps are bothered by being in air flight paths that used to affect only portions of major cities. With increased air travel, the dweller in medium-sized city are also being affected. Residents living directly underneath a runway to an international, national or regional airport know the noise situation, though some pretend to get used to it. A noise meter could determine something about the situation at a given time. A continuous graph could be taken from a constantly running noise volume recording device but representing the noise as a single number is regarded as more manageable. The two most common statistical descriptors used for traffic noise in decibels are the Leq (constant average sound level) and the L10 (sound level that is exceeded 10 percent of the time). The Leq is usually about three decibels less than the L10. Dwellers might be utterly surprised as to the volume of the noise and the duration throughout the day and sometimes night.

Sea. The vast oceans are not immune from human-generated noise though far fewer human inhabitants are affected. Deep sea oil and gas drilling disrupt communication systems of the bowhead whales. There is the confusion of sonar signals and blasting by survey vessels. About 127 supertankers ply the seaways (up to a reported 232 decibels),ⁱⁱⁱ along with 23,000+ freighters, tankers and other commercial bulk carriers. The statistics do not include all the smaller powered ships, yachts and boats, all with an effect on marine life.

5. Recreation Activities

After the insistent noises of everyday living, should not everyone regard recreation time as moments of rest and relaxation.

For many, recreation was a quiet sitting on the porch or walking in the woods with only the sound of birds and insects. Well that

is the case among relaxing folks, but the great majority like a little sound from the card game to a game of volleyball. In the past, cheering a sporting race and applauding at an amphitheater were recreation-related sounds from a crowd, some outbursts louder than others. Most of this is within reason and few regard such sounds as being excessive. However, I have found that intense college basketball games with the thunder of cheers and catcalls become so stressful that I cannot personally attend. Even some card games become loud and boisterous -- but are enjoyed by participants.

Some forms of modern recreation involve noise either from the participants as noted or more critically from the powered instrument used (see "Making Recreation Choices in Section II): motorcycles, snowmobiles, all-terrain vehicles (ATVs), motorboats with water skiing or jet-skiing, airplanes used for hang-gliding, and motorized scooters and other combustion engine devices. Are these powered vehicles naturally more entertaining or are there other reasons for their popularity? That may be hard to decide since many thoroughly enjoy less noisy forms of sports such as biking or hiking.

With powered vehicles comes increased sound but there is something more: powered vehicles generally cost far more than the non-powered forms of entertainment just mentioned, and this drives the recreation equipment industry to advertize and promote the use of powered planes, boats and land vehicles. The increased recreational activities are thus driven by capitalistic endeavors and the cost of higher priced consumer goods. A state of the art motorcycle or ATV is in the thousands of dollar range; a speedboat or small airplane is a tenfold or more increase. With increased power and comfort come other high ticket items such as motor homes now known as camping (to be distinguished from primitive camping with tents). Along with cost and noise go other negative factors such as water pollution from motorboats and wildlife disturbance by ATVs. Unfortunately, where two or more forms of recreation compete for the same space, injuries are most likely to be suffered by those who are not using motorized vehicles, e.g., hikers are endangered by ATVs and swimmers by speedboats. Add to this the operation of powered-vehicles by the underaged or unskilled and the use of alcohol or other substance abuse materials by operators and the rate of accidental injuries and deaths increases.

Even spectator sports reflect this trend but in a more uneven manner. Sport car races are quite noisy and involve expensive vehicles. Basketball, hockey and other indoor sporting events are in costly arenas and can become quite noisy as well; but so can outdoor football or soccer matches, though in the latter case European events are even noisier than American.

C. The Aftereffects on People and Others

Most people are aware that an explosive noise very close to a person's ears will cause the eardrums to burst and inflict irreversible harm on the victim. Quite a number of veterans in past wars have come away with this physical impairment. But the volume and duration of sound can also increase stress factors for people and animals alike as well as cause the quality of life to deteriorate. A total sound assessment must consider all of these factors.

1. Effects on People

Hearing impairment and loss occur with large numbers of people, generally over a long period of time. A person may be subjected to random loud noises of great intensity and/or long duration, and yet the aftereffects may be cumulative and may not crop up for a long time. People are reluctant to regard gradual auditory faculty deterioration (noise induced hearing loss) with alarm and even hold that normal hearing loss is part of the normal process of aging. However, physical harm does occur with loud modern music and so concern is a cultural casualty of amplified music. As youth, those with hearing disabilities have a harder time learning to speak; when older, people who are losing their hearing but denying that it is so, still only hear partial conversation and cannot engage in social interaction as readily as those with more perfect hearing. Others in the social circle lose patience with the hard of hearing because they do not easily follow the rapid flow of conversation.

Impairment of Physical Health. It is now common knowledge that irreversible hearing loss may occur through loud noises, certainly at 120 decibels. Damage is generally thought to begin about 85 decibels which occurs more often than we think (see Chart 1 in A-2 of this section). Virtually everyone experiences temporary deafness at some times due to loud noises. I mentioned that our corn crusher would make the ears ring for a long period after its operation on the farm in my youth. I could not hear another worker speaking even when he was next to me. What we experience in a temporary manner -- Temporary Threshold Shift (TTS)^{iv} -- some people who pursue such activities over a longer length of time have as a permanent condition. Most likely such a condition can not be remedied by a hearing aid, for exposure to such loud noises can be cumulative as each episode destroys some cells in the ear itself.

Noise Induced Hearing Loss (NIHL) is far more widespread than some might anticipate. The National Institute for Occupational Safety and Health estimate that some thirty million Americans are exposed to the hazards of noise; about one-third of the people

have some permanent hearing loss resulting from the noise exposure. Some 90% of miners expect NIHL hearing problems by age 52; more noise is occurring and thus the hearing problems increased 26% from 1971 to 1990 for those aged eighteen to forty-four.^v

Tinnitus is ringing in the ears (I discovered my mild case in working on this number of Special Issues). This condition refers generally to severe ringing in either or both ears or in the head. The disturbance may be quite serious and distracting or of a lower annoyance level and is rated as slight to severe depending on the level of disturbance to the victim. Objective tinnitus is an actual sound that can be detected.

Psychological Disturbances. The U.S. Office of Consumer Affairs and other governmental agencies find a causal link between noise pollution and sleeping disturbances, increased blood pressure, irritability, and fatigue. Rises in blood pressure and threats to the cardiovascular health of a person have been diagnosed to occur at higher noise volumes (above 70 dBA), which threats can prove to be a measurable degree of increased stress. Anecdotal evidence supports the theory that sleep deprivation is the major annoyance caused by noise. Virtually all highway travelers except the bone-tired complain about the highway noises near their over-night lodging -- especially at lower priced motels with rooms facing the highways. Vallet and associates studied the problem of people living near heavily traveled roads and airports under real-life conditions, and found increasing levels of stress.

On a broader front, noise pollution interferes with a wide range of human activities involving communication, eating, and recreation as well as rest periods. All know how hard it is to talk when the congestion is so great that one has to raise his or her voice; after awhile the added effort forces one to lapse into silence. A large number of people become irritable with those they cannot hear or understand when in noisy surroundings. As for eating habits, it is a perverse practice in places serving meals to crowds of people as at festivals or major events to raise the tempo of the background music, so that people will finish faster and depart, thus allowing more customers to take their places. Some who are sleep-deprived fall asleep at a moment's notice on airplanes and during talks, even though the average person who is subjected to 45 decibels of noise cannot sleep. Chemical stimulants only exacerbate the sleep deprivation problem.

One very special type of noisy situation that needs considering by most drivers is what to do when caught in stalled traffic and when the nearby booming radio gets on the nerves -- or at least it seems to be the cause of the surging rage. Determining contributory causes to mental stress in trying to

endure modern traffic congestion is somewhat difficult, but undoubtedly traffic noise along with other impatient drivers and the need for rapid reaction time, which requires concentration, are factors. As we know, having much on our mind makes background noise all the more annoying, especially if it cannot be immediately remedied.

Distractions in Learning. Noise related disturbances are present for youth in school and for all who are in the process of learning. Maser and co-workers found that school children attending a school beneath the Seattle-Tacoma airport in-flight paths showed a deficit on standardized tests when they were compared with a similar cohort of youths in a quieter school.^{vi} Cohen and associates found higher math and reading scores among children in noise abated schoolrooms than among those lacking such amenities.^{vii}

Distractions in Job Performance. We have all seen movies where the reporter or the cop lives on coffee, smokes and is surrounded by clanging typewriters. While typewriters are a thing of the past, still the excessive sound of hurried conversation continues in busy places. Tolerance levels for such sounds vary from person to person and so all ought to be sensitive to the hard-working non-complaining person. Even people who say they are immune to noises or are able to ignore work place noises probably are not aware of how noise affects their levels of stress. Today, noise levels are controlled in factories and most work places through limits set down by the Office of Safety and Health Administration (OSHA) standards. As factories are outsourced, one wonders about noise conditions in the workplaces in developing nations -- and whether worldwide working conditions are actually improving. However, in developed countries these American standards have helped put in dampening devices that have saved the hearing of countless workers. When people cannot hear well due to work conditions, safety warnings can go unheeded resulting in accidents.

Distractions for Convalescents. The quiet signs near hospitals have a purpose for many of the ill seriously need rest and lack of disturbing sounds. Such conditions may be present where walls are well insulated and areas are shaded with trees. But exterior noises are not the only disturbances. In fact, studies show interiors of hospitals are increasing in noise levels due to conversation, loudspeaker announcements, buzzers, television playing, the shuffle of feet and operation of medical equipment.

2. Effects on Wildlife/Pets/Livestock

So often when I travel our rural roads and see fresh road

kills I wonder whether the animals lack of speed or proper auditory perception, or the flare of vehicle lights cause the death of so many skunks (pole cats), opossums, rabbits, tarpons or other varmints. Do they know exactly the direction from which the vehicle is approaching and do they have time to get out of the way? Crows that are eating the road-kill seem to do quite well in scattering with oncoming traffic -- but not the victims they are feasting upon.

Stress on pets. Pets as much as human beings are forced to adjust to street noises. Like people, some dogs and cats are reported to find it hard to cope with noise just as they find it difficult to cross streets with heavy traffic. This is particularly true of pets that were born and raised when young in quieter rural or suburban areas. Some people select pets based upon the animals' ability to cope with noisy surroundings. A recent alarm about the contamination of imported pet food resulting in kidney failure reminds us that pet owners can become immensely disturbed for their pets' welfare and will take precautionary measures to ensure their well being. Dogs often hate thunder storms because the sounds hurt their sensitive ears. One owner tells about his otherwise lethargic dog going crazy during a storm and breaking through a screen door to get shelter in the house. Other pets are deeply sensitive to gun shots.

Farm animals. Our cows could easily be disturbed by strange and unusual noises and not "let the milk down," as we termed the condition. Chickens can be easily frightened and so can horses. In fact, all livestock are sensitive to sounds they cannot recognize. On the other hand, one finds that many farm animals respond to music. We knew dairymen who played classical music during milking time. The more excitable animals (and they differ in personalities) would calm down quickly to Felix Mendelssohn's *Scottish Symphony*. Maybe other types of music would suffice but Jersey and Guernsey cows have quite refined tastes.

Land-based wildlife. Just as affected as domesticated animals are the wildlife. The natural cycles of life from breeding to feeding and from nesting to migrating are part of wildlife itself -- and noises can have severe impacts in many of these activities. A noisy environment scares the wildlife away and thus limits its already reduced habitat, thus denying it feeding and nesting areas. This is especially worrisome with respect to threatened and endangered species. Studies show that birds will move away from trail areas, not just those frequented by off-road recreational vehicles but also those used by ordinary hikers. Bird calls have been found to become more shrill in areas of heavy sound impact. The noise of hovering helicopters can cause reindeer to panic or if properly directed can herd them in a certain direction. Snowmobiles are quite disturbing to wintering

wildlife as well.

Marine-based animals. Noise pollution of the oceans may be having severe effects on marine-based animals. Whales are acoustic animals whose lives are informed by what they hear -- not what they see. They sing love songs, change melody, sing in harmony, have voice ranges covering seven octaves, must travel over great distances and communicate with faint sounds. However, the various forms of sound pollution such as the Acoustic Thermography of Ocean Climate and Low Frequency Active Sonar could have severe effects on marine life communication patterns. Noise pollution of various types (up to 200 decibels) can cause whales confusion and beaching.

3. Social Irritation and Conflict

Annoyance is a major result of one person's music and another's noise. Thus the particular sound's definition as being concordant or discordant is somewhat questionable in a fractured society. A teacher or facilitator who desires intercommunication may be annoyed with the silence of a few or the over-talkativeness of others. But generally silence is not as annoying as excessive sounds. The goal of society is to maximize the well being of the whole. When many members of a group or community regard 3:00 a.m. morning music as disturbing, the will of the majority may have to prevail for normal rest periods. The ones who work at night and sleep in daytime will also regard operating a nearby bulldozer or backhoe in daytime as particularly annoying.

Irritation comes in many ways. To scatter one's garden tools and containers about the backyard may annoy a neighbor who likes tidiness, but it is not something that threatens him. Some communities would not allow for such disturbances even in the form of visible "noise," and so what is generally regarded as annoying may be regulated and controlled, even though no physical harm occurs. Even in water-short areas, some neighborhood organizations require lawns to be kept in certain ways. If the neighbor burns trash, a deeper irritation results; if he curses loudly, a further irritation brings the police. There result degrees of annoyance. Air-borne irritants that infringe on another's fresh air rights should be worthy of confrontation, policing and even legal action.

We learn to live with the minor difficulties in life: others' slowness in learning and speed in walking, lack of hearing when others do not speak loudly, another's eating habits or types of food, the desire to smoke in front of another, etc. Some irritants must be endured or else the annoyed can become an additional annoyance. Part of human life is to endure annoyances and regard them as challenges to be overcome. Such little bumps

in life teach us acceptance, patience and generosity. We all know that smoking practices known in the past as annoying are simply not tolerated today due to an infringement on the fresh air rights of others who had been expected to endure environmental tobacco smoke.

Through awareness of the ill health effects of tobacco what was annoying is now intolerable. The emerging awareness of health problems related to loud and enduring sound effects is on a similar level. Noise, often tolerated, is beginning to be regarded like environmental tobacco smoke. Reluctance to confront noisemakers is decreasing; calling on law enforcement services becomes more frequent; sounds that were ignored by some are now noticed. Excessive and unnecessary excessive sound is gradually leaving the level of disturbance and annoyance and entering that of assault and infringement on the right to silent space.

Public noise-making is more than frowned upon; it is becoming a nuisance that some insist must be stopped -- or legal action will be taken. Some would even sue to have church bells silenced on Sunday due to the infringement of the church on their right to sleep in at this time. Certainly Moslem calls to prayer have raised hackles in Hamtramck, Michigan. Granted minor degrees of annoyance are not legal matters, but more infringing ones are. Loudness of sound-related activity has become a matter of legal action in this litigious age; this applies to everything from fire crackers to loud music, from revving motorcycles to operating bars after certain hours. And this is certainly bringing on a new activism,

4. Depressed Real Estate Values

Nothing seems to some people as real as the price of property -- especially if confronting mortgage payments. With the possible exception of a hog farm, few conditions can so influence property values as traffic congestion. Recently a young family I know moved from the house they were rebuilding for themselves to a somewhat distant farm area because the congestion and noise were too great. Fortunately their house is near a college where students are seeking off-campus accommodations, and so the need for student housing makes this a place in demand. However, had the property been in a busy commercial area with little lodging demand, the property value would be deflated due to excessive sound and congestion. Real estate values are quite sensitive to location, and congestion is one factor that influences that sensitivity. People soon want to flee to quieter places, especially if they spend time outdoors.

Property descriptions may sounds so enticing: large lawn, grand vista, half a mile from others, fresh air, wonderful trees, clean interiors, and such a low price. Then the prospective buyer

comes on a winter day and hears the trucks distinctly shifting gears and backfiring. Oh, the agent assures the person that summer foliage muffles the noise for over half of the year -- and snow will do the same. In one of my assessments I was shocked at a cloistered convent that had just this problem, a mile from a major Mid-Atlantic Interstate with its a steep incline just below the building. And then there was the potential assessment in the Midwest that we refused to perform due to the location in the direct flight path of a major airport. Yes, excessive sound can affect property values and desirability of certain residential sites.

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