I've Never Seen a Sound

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(Schafer is a Canadian composer and author of The Tuning of the World, a seminal work on the history of the soundscape. The material in this essay was originally presented as a keynote address at the twelfth International Congress of Sound and Vibration, held in Lisbon, Portugal, in July, 2005. Schafer notes in his accompanying letter that he is "trying to get the acoustical architects and engineers to come back to sound as sound, rather than the graphic projections that dominate most of their thinking today.")

To begin, I must give a brief account of the word "soundscape," how it came into existence, and the many ways it has developed, since not everyone may be familiar with this term.

In 1967 I was teaching in a communication department at Simon Fraser University in Vancouver. Noise pollution was an issue, especially around airports, since the introduction of jet aircraft during the 1960s. I decided to give a course in noise pollution. It was not successful. The students considered the subject negative and felt that anything they might do to resist noise increases would be futile. Moreover, many students were enjoying rock music, which emerged in the same decade as jet aircraft and was performed at similarly high intensities.

How could I turn the course into a positive subject of research? It occurred to me that we should be studying the total acoustic environment, its evolution through history, and its variations around the world. We needed a word to describe this new research, and that's how the word "soundscape" ("paysage sonore") was introduced.

Of course, the word is derived from "landscape," a subject that has been intensively researched for centuries. Geologists study landscape formations. Geographers study landscape in its relationship to society. Architects and engineers restructure landscapes, and painters have painted them. And since photography, we have all been introduced to the appearance of divergent landscapes from around the world.

But who had systematically studied the evolving soundscape? The answer was no one. Yes, of course, work has been done in building acoustics. And we can deduce some patterns of the acoustic environment from the history of music, since musicians have often imitated environmental sounds in their compositions and improvisations. But that is about all. So I decided to try to develop projects that would analyze the evolution of the soundscape from past to present.

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The first thing to realize is that the soundscape is dynamic. It is constantly changing both in time and place. And every sound commits suicide—it will never be heard again.

I asked "Where are the museums for disappearing sounds?" At that time, there were almost none. So I sent my students out to record the sounds of Vancouver, the city in which we lived. Every sound recorded was to be accompanied by a card indicating the time and place recorded, the history of the sound object, and any social observations that might be significant. From this research we produced our first document, The Vancouver Soundscape, comprised of two LP records and a book analyzing the recordings and providing historical context.

Recordings, however, tell us nothing about soundscapes before recording was possible. To know past soundscapes, we would have to study documents by a variety of observers: historians, writer, inventors, painters, photographers, commentators—ear-witness accounts by people who listened carefully.

This became the subject of my Tuning of the World (Knopf, 1977), which attempted to show, in general terms, the evolution of the soundscape from ancient to modern times. As the book is available in several languages, I don't need to describe it here, but I will mention how researching it affected my attitude to the acoustic environment and that of an increasing number of other interested individuals.

I imagined the soundscape as a huge musical concert that is running continuously. The tickets for this concert are free, and we are all listeners. But we are also performers because we make sounds. To a certain extent, we could also aspire to be composers and conductors, shaping and designing its events.

Since we are condemned to listen to it, why not try to improve it? It seemed inevitable to think this way because we are always at the center of the soundscape, listening out. That is exactly contrary to the visual environment of which we are always outside, looking in.

In short, visual awareness is not aural awareness. Visual awareness faces forward, while aural awareness is centered.

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This inclusiveness of the soundscape reminds us of the medieval theologians' definition of God as a "presence whose center is everywhere and whose circumference is nowhere." When we go back in history or mythology, we discover the voice of God or the gods in the sounds of nature everywhere: in thunder, in wind, in waterfalls—even in the quiet trembling of leaves. To the prophet Elijah, God's voice was heard as a gentle breeze

(Kings I:19). In those days, the natural soundscape was just as full of miracles as the electronic soundscape is today.

The amazing thing about this natural soundscape is that none of these sounds or divine voices will harm your hearing. God was a first-rate acoustical engineer. Listen to the sounds of your own body—how quietly you can move your arms and legs. Then imagine how you might sound if you were designed by General Motors.

I have been accused of being a dreamer in attempting to restore some of the features of the natural soundscape to modern life. But the word "ecology," new at the time we began our research, inspired us to believe that one day we might think in terms of acoustic ecology, restoring the balance between living creatures and the natural environment. The establishment of the World Forum for Acoustic Ecology is the beginning of a movement that in 1970 was only a dream.

Of course, there were loud sounds in the past and the loudest were the sounds of warfare and religion: the beating of drums and shields in warfare and the rattling of sacred bones and the ringing of bells in religion. Reflecting on this acoustic pattern, I formulated a theorem: Wherever you find the loudest noise or noises in a society, you have a center of power, which I called the "Sacred Noise" because these sounds were immune to proscription.

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Every society has its Sacred Noises. In the Middle Ages it was church bells that rang constantly, to which was later added the organ, the loudest machine on earth prior to the Industrial Revolution. During the early part of the 19th century, however, the Industrial revolution replaced the churches, and railroads carried industrial noise throughout the countryside. Sensitive people disliked railroads: Flaubert hated their noises as did Dickens, Zola, and Wagner.

Although it was known that industrial noise was ruining the health and hearing of workers, nothing was done about it. You cannot prosecute or curb a Sacred Noise; you can only wait for its power to pass. And that is, of course, what happened. By the middle of the 20th century, Societies for workmen's compensation were set up in most civilized countries, and programs of aural hygiene were established in factories.

At the same time the factory ceased to be the dominant community noise as the aviation industry took over and the entertainment industries erupted. Today, with each generation of jet aircraft showing a reduction of a few more decibels, enthusiasm for flying is diminishing; but the boom-boxes of films and popular music remain un-assailed.

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Over the last few centuries, increasing numbers of people have left the countryside and moved to the cities. Aside from losing the sounds of nature, in what other ways have their

listening habits been affected? One of the most conspicuous differences between urban and rural listening is that in cities there is no distant listening—all sounds are close. There is also little distant viewing because buildings block views.

In the rural environment, important information comes from the distance and may come from any direction. Where I live, on a farm in Ontario, a hunter can tell whether his dog is in pursuit of a deer or a rabbit by the sound of his barking. The deer runs in a straight line; the rabbit in circles. Generally, an intruder in the rural environment will be heard long before he is seen, his presence announced by barking dogs passing the news from one farm to the next.

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This leads me to suggest that the rural inhabitant listens in a more unfocused manner than the urban dweller. We speak of peripheral vision when we view a Chinese landscape painting, with a cloud in one corner, a mountain in another and a waterfall somewhere else. Perhaps there is something like peripheral hearing in an open environment where one overhears rather than focuses consciously. Urban life requires much more focused listening where one is surrounded by sounds requiring quick response: voices, telephones, bells, buzzers, horns, and the like.

The density and demands of the urban soundscape make for a lo-fi environment in contrast to the hi-fi soundscape of the countryside, where there is less noise and clearer signals. Each season brings a different soundscape, and the changes are often signals for changes in agrarian work. The Greek poet Hesiod, in his long poem Work and Days, tells us that the time for planting was when the cry of the crane was heard overhead (line 451). And where I live, the time to stop tapping maple trees for their syrup is when the frogs begin to be heard in the ponds. Then the ice has melted; the sap darkens and is of inferior quality.

Urban sounds are distinguished in another way: many of them are owned by someone, and copyrighting of sounds appears to be definitely on the increase. Disputes are reaching the courts as they did when the motorcycle manufacturer Harley Davidson sued Honda for attempting to duplicate the sound of its motor.

A few years ago, I recall an invitation from the engineers at BMW in Munich to suggest ideas for a distinctive sound for their new automobile. “What we would like, Mr. Schafer, is to produce a vehicle that, when heard coming down the street, would cause listeners to say, ‘Ah, I hear a BMW’.”

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The only crime in visual art is the straight line,” claimed the Austrian painter Hundertwasser, because it is not found in nature. Sounds prior to the Industrial Revolution were discrete and interrupted, and rarely are droning sounds found.

In great contrast, the internal combustion engine brought into the soundscape the "flat line," which was followed by many other generators of low-information, high-redundancy sound: ventilation, heating, electrical systems and, of course, aircraft. With the increase of these heavy, droning noises, the soundscape thickens into an infrasonic drone.

Sometimes, with a class of music students, I have done a relaxation exercise that culminates in asking the class to sing the tone of "prime unity"–the tone that seems to arise naturally from the center of their being. In North America this usually turns out to be B natural. In Europe it is often G sharp. What is the significance? B natural is 60 cycles and G sharp is about 50 cycles. They are memory traces of the electrical frequencies of two continents.

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We listen to the environment and echo it back in language and music. In ancient times, people did not visualize the auditory experience. There were no texts or notations. Every sound was a new creation. It was magical.

The creation story in the Bible, is typical of that era when sound generated everything. God spoke and the world appeared. Notice the order: sound precedes sight. This is also the pattern in countless other creation stories where sound is the first force.

To make sound is to participate in the original urge to shape the world. God created the universe with his mouth, and the fastest way to get action today is still verbal. As civilization developed, however, vocalizing gradually gave way to visualizing as the primary means for storing and transmitting information.

Sound cannot be known the way sight can be known. No sound can be repeated the same way twice, not even your own name. And a sound heard once is not the same as a sound heard again. Interesting fictions have been invented for weighing and measuring sounds: alphabets, music scripts, sonograms. But everybody knows that one can't weigh a whisper or count the voices in a choir.

In contrast, seeing is analytical and reflective. It places things side by side and compares them. Thus Heraclitus said that "the eyes are more exact witnesses than the ears," and Aristotle preferred sight as "the principal source of knowledge."

Sights are knowable. Sights are nouns.

Sounds are actions; they move and change. Sounds are verbs.

Sight separates and isolates. Sound fuses.

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The graphing of sound goes back a long way—to the ancient Greeks, even to Mesopotamia, both in the form of musical notation. Musical notation is a mix of graphic and symbolic elements, but the graphic matrix adopted by the ancient Greeks, with time flowing from left to right and frequency indicated vertically, has remained both in musical notation and in the graphic analysis of sound.

I am merely drawing your attention to the fact that this approach to notation is a habit and has nothing to do with the nature of sound itself. Elaborate sound scripts have made many things possible.

For instance, the architectonic structure of a Beethoven symphony could not have been conceived without notation, nor would advanced work in acoustics or psychoacoustics be possible (though I seem to recall that Wallace Clement Sabine set the sound decay curve of Boston's Symphony Hall, still probably the best hall for orchestral music in America, using only a shotgun and some pillows).

We don't know how the magic behind the acoustics of the Asclepius theatre at Epidaurus was created, nor do we know whether the seven echoes directly under the main cupola of the Shah Abbas Mosque in Isfahan were intended or were, instead, a surprise accident. In the Ali Qapu palace, also in Isfahan, there was a room (now destroyed) in which sounds were reputed to live forever.

Forever? Obviously, the boundless, directionless, horizonless, and terrifying world of sound in which people once lived, and millions around the world still live, was remarkably exploited in the ancient world without much in the way of instrumentation to assist their creators.

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What would be the benefits of a more phenomenological approach to acoustics—that is, an approach that uses the naked ear as a guide rather than instruments and visual projections? In his Philosophical Dictionary, Voltarie writes: "God has put truth into your ears and error into your eyes… When your attentive ear hears: 'You are beautiful; I love you,' it is very certain that the words are not 'I hate you; you are ugly.' But when you see the sun … appearing about two feet in diameter, it is not demonstrated that it is a million times larger than the earth."

It would be interesting to make a list of researchers whose work combined both sound and visual studies. One figure would be Thomas Young, who argued convincingly that the wave theory applied to both sound and light (1802). Young's previous work had been in visual studies (he was the first person to measure astigmatism) and in the decipherment of Egyptian hieroglyphs. Another such researcher was Christian Johann Doppler, who formulated the explanation of the effect that bears his name in a work (Concerning the

Colored Light of Double Stars) that demonstrated the bending of both sound and light waves.

Evidently, the Doppler Effect had not been noticed consciously by previous listeners. What then was the sound that moved with sufficient velocity to attract Doppler's attention? Intriguingly, it was the locomotive. In fact, Doppler verified his theory by placing trumpet players in a speeding train and measuring the pitch change as it passed.

The Doppler Effect applies to both light and sound waves, but it would be wrong to presume that all discoveries are transposable. Rather, I am arguing that the visual nomenclature of many researches in sound may be moving us further away rather than closer to the essence of the aural experience, which is always phenomenological and unique.

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It is probably going too far to say that in any aural culture, science, especially physics and mathematics and their dependents—statistics, physiology, empirical psychology, drafting, demography, banking, and so forth—would disappear. Rather, it is probably enough to say that in purely aural cultures these modes of being don't appear in the first place.

Have I got off track? I was saying that everything in the world was created by sound and analyzed by vision. God spoke, first, and then saw that it was good, second.

But what happens if the thing created is not good? Then God destroys with sound. Noise kills. War. The Apocalypse. The Flood. In the Epic of Gilgamesh, we read: "The world teemed with people and bellowed like a wild bull. The uproar of mankind was intolerable; so the gods let loose the deluge."

John of Patmos in Revelation (the Bible's last book) and Mohammed in the Qur'an also say that the Apocalypse is ear-splitting. All traumatic events maintain sound as their expressive medium: war, violence, love, madness. Disease alone is silent and leads to analysis.

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Come with me now and sit in the grandstand of life. The seats are free and entertainment is continuous. The world orchestra is always playing: we hear it inside and outside, from near and far. There is no silence for the living. We have no ear lids. We are condemned to listen.

Most of the sounds I hear are attached to things. I use sounds as clues to identify these things. When they are hidden, sounds will reveal them. I hear through the forest, around the corner, over the hill. Sound gets to places where sight cannot. It plunges below the surface. It penetrates to the heart of things. Everything in this world has its sound—even

silent objects. We get to know silent objects by striking them. The box is empty, the glass is thin, the wall is hollow.

Here is a paradox: two things touch but only one sound is produced. A ball hits a wall, a drumstick strikes a drum, a bow scrapes a string. Two objects: one sound. Another case of one plus one equals one. Nor is it possible to join sounds without them changing character. Zeno's paradox: "If a bushel of corn turned out upon the floor makes a noise, each grain and each part of a grain must make a noise likewise: but, in fact, it is not so." In acoustics, sums are differences.

Sounds tell me about spaces, whether small or large, narrow or broad, indoor or outdoor. Echoes and reverberation inform me about surfaces and obstructions. With practice, I can begin to hear "acoustic shadows," just like the blind.

In Emile, his book on education, Jean-Jacques Rousseau wrote: "I would have plenty of games in the dark…. If you are shut up in a building at night, clap your hands. You will know from the sound whether the space is large or small, if you are in the middle or in one corner."

You cannot control or shape the acoustic universe. Rather the reverse. This is why aural societies are considered unprogressive, they don't see straight ahead. If I wish to order the world, I must become "visionary." Then I close my ears and create fences, property lines, straight roads, walls, maps and diagrams.

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As developed in the Western world, all major themes of science and mathematics are silent (the space-time continuum of relativity, the atomic structure of matter, the wave-corpuscular theory of light). Instruments developed for their study—the telescope, the microscope, the equation, the graph, and, above all, numbers—are likewise silent.

Statistics deals with a world of quantities presumed to be silent. Philosophy deals with a phenomenal world presumed to be silent. Economics deals with a world of commodities assumed to be silent. Even religion deals with a God who has become silent.

Western music is also conceived out of silence. For two thousand years it has been maturing behind closed doors. Walls drove a wedge between music and soundscape. The two fell apart and became independent. Music within; pandemonium without.

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But everything ignored returns. The vehement obscurity of the soundscape pushes back to confront us as noise pollution. As an articulated problem, noise belongs exclusively to Western societies. It is the discord between visual and acoustic space. Acoustic space remains askew because it can't be owned. It becomes disenfranchised—a sonic sewer.

Today we view the world without listening to it, from high-rise apartments and glassed-in towers.

In an aural society, all sounds matter, even when they are casually overheard. Some sounds are so unique that once heard they will never be forgotten: a wolf's howl, a loon's call, a steam locomotive, a machine gun. In an aural society, such sounds can be brought forward and mimicked in song and speech as easily as visual society can draw a picture or take a photograph.

The musicologist Marius Schneider, writing of primitive music in the Oxford History of Music, says: "One must have heard them to realize how extremely realistically aboriginals are able to imitate animal noises and the sounds of nature. They even hold 'nature concerts' in which each singer imitates a particular sound (waves, wind, groaning trees, cries of frightened animals), 'concerts' of surprising magnificence and beauty."

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What is the secret of this "art form"? Repetition. Repetition is the memory medium for sound. Repetition is the means by which sounds are retained and explained. Repetition is the medium by which the events of the world are remembered and affirmed. Repetition is what produced the Iliad and Kalevala—either by one author or more likely by many authors.

Repetition never analyzes but merely insists. Repetition makes the listener participate not by comprehending it but by knowing it. "It is written but I say unto you….." And I will say it again and again, because Hearing is Believing.

As the grip of the visual-analytical world weakens and is replaced by intuition and sensation, we will begin to discover again the true tuning of the world and the exquisite counterpoint of its voices.

We will find the center. Then the whole body will become an ear, and all sounds will come to you, the known and unknown, the sweet, the sad, and the urgent. And in the obscurity of the night, all sounds enter my consciousness of their own accord, unhurried, strangely blended, the light-toned and dark. Before I sleep, I say to myself, "I will never see a sound."