

task of the acoustic designer is to find reinforcements of natural sounds in the same way as the trellis reinforces the presence of the rose. One of his special problems will be to return an area of the park to the state of a quiet grove in the midst of active city life. This will not be easy. For frontage on busy streets giant mounds of earth may be the only answer, and these should not only be of sufficient height to hide the traffic from sight, but of such construction as to refract the sound away from the park and of such thickness as to deaden ground vibrations. Sunken gardens, grottoes and other types of acoustic baffles will also be of value here.

The suggestions made in these paragraphs will not be suitable for every park. Above all the acoustic park should be kept simple, and it is for this reason that its chief adornment may be nothing more than the Temple of Silence, a building with no purpose other than meditation. There is nothing special about the Temple of Silence except that in it all visitors will be expected to observe silence. It is to this place that the weary may come seeking nothing but the simplicity of the ultimate music on the other side of this world, the silence at the center of which may be heard the ringing of the great orbs of the Music of the Spheres.

Silence

A sound of silence on the startled ear . . .
Edgar Allan Poe, "Al Aaraaf"

Quiet Groves and Times In the past there were muted sanctuaries where anyone suffering from sound fatigue could go into retirement for recomposure of the psyche. It might be in the woods, or out at sea, or on a snowy mountainside in winter. One would look up at the stars or the soundless soaring of the birds and be at peace.

Leaning on our stout oaken walking sticks, our sacks on our backs, we climbed the cobbled road that led to Karyés, passing through a dense forest of half-defoliated chestnut-trees, pistachios, and broad-leafed laurels. The air smelled of incense, or so it seemed to us. We felt that we had entered a colossal church composed of sea, mountains and chestnut forests, and roofed at the top by the open sky instead of a dome. I turned to my friend; I wanted to break the silence which had begun to weigh upon me. "Why don't we talk a little?" I suggested. "We are," answered my friend, touching my shoulder lightly. "We are, but with silence, the tongue of angels." Then he suddenly appeared to grow angry. "What do you expect us to say? That it's beautiful, that our hearts have sprouted wings and want to fly away, that we've started along a road leading to Paradise? Words, words, words. Keep quiet!"

Just as man requires time for sleep to refresh and renew his life energies, so too he requires quiet periods to regain mental and spiritual

composure. At one time stillness was a precious article in an unwritten code of human rights. Man held reservoirs of stillness in his life to restore the spiritual metabolism. Even in the hearts of cities there were the dark, still vaults of churches and libraries, or the privacy of drawing room and bedroom. Outside the throb of cities, the countryside was accessible with its lulling whirr of natural sounds. There were still times too. The holy days were quieter before they became holidays. In North America, Sunday was the quietest day before it became Fun-day. The importance of these quiet groves and times far transcended the particular purposes to which they were put. We can comprehend this clearly only now that we have lost them.

Ceremonies of Silence In the park near the Botanic Gardens in Melbourne there is a sign:

IN MEMORY OF
EDWARD GEORGE HONEY
1855-1922

A Melbourne journalist, who,
while
living in London, first suggested
the solemn ceremony of

SILENCE

now observed in all British countries
in remembrance of those who died
in the War.

The fact is that as the memory of the world wars has receded, the observance of silence at 11 a.m. on November 11 has each year become more straggled. It will be the responsibility of the acoustic designers to work not only for the repatriation of quiet groves, but also to lobby for the reintroduction of quiet times. As a matter of fact, Yehudi Menuhin, President of the International Music Council of UNESCO, proposed at the 1975 congress that World Music Day should in the future be celebrated by a minute of silence. We are discussing here something much more important than setting time limits on noisy sounds; we are discussing the deliberate celebration of stillness, which, when observed by an entire society together, is breathtakingly magnificent. Here is an example: the program of the War Remembrance as commemorated each May 4 in Utrecht, Netherlands.

6:00 p.m. Lowering of flags to half mast in the entire city, until darkness falls. Closing of public amusements. No advertising or store-window lighting.

7:15 p.m. Participants in the *Silent Procession* will form in threes in St. Peter's churchyard. The places for relatives of the deceased, and other participants will be indicated on signs. People are asked not to carry ensigns, flags or wreaths with them.

7:30-8:00 p.m. The procession will slowly make its way beneath the sound of all church bells. During the procession, people are requested *to be still* (literally, to pay attention to being silent). The route: St. Peter's churchyard to the Cathedral Square via Voetius Street, Cathedral Street, the Old Church Square, Choir Street, Servet Street and under the Cathedral Tower.

8:00 p.m. *The bells end and two minutes of total silence begin.* This is indicated by the first of eight chimes of the Cathedral Clock and the lighting of the Cathedral Square.

8:02 p.m. End of two minutes' silence. The Royal Utrecht PTT Brass Band will play two couplets from the Wilhelmus, sung by those present. During this a wreath will be placed at the foot of the Memorial to the Fallen on behalf of the entire citizenry of Utrecht. All participants in the procession will file past the Memorial and will have the opportunity of laying the flowers brought with them. Everyone is urged to co-operate so that this may be carried out with as much stillness as possible.

8:15-8:45 p.m. An organ recital in the church by Stoffel van Viegen, closed by the singing of two couplets from the Wilhelmus.
Participation is open to everyone.

Attending this ceremony Barry Truax recalled:

It is a unique acoustic ritual in the community. Nothing in the experience of a North American can match it for depth of emotion. As you approach the square, the thundering mass of the largest Cathedral bells rolls over you, enforcing a hypnotic and fearful silence on everyone gathering. The entire weight of the tragedy of the War seems expressed in the heavy low-pitched mass of sound emanating from the high tower.

Slowly, one by one, the bells end and the texture thins as the procession emerges from the passageway under the Tower and slowly divides into rows in front of the Memorial.

The noisy city has become deathly quiet. Now the silence seems as oppressive as the bells did a few moments before. That heavy bombardment seems to have cleansed the air of the city's usual profanity, leaving a strange and nervous calm.

Very quietly a handful of musicians sound the opening chords of the National Anthem in muted low registers. There is an electric moment as a slow unison vibration is born in the throats of all present. The ground itself seems to rise to emit a resonating cry, slowly rising and turning around you in every direction. For a moment the unity these gentle and defiant people felt in the face of the Occupation seems rekindled.

Yet the military is absent. Slowly the individual mourners file past the Memorial to lay their own flowers after the young lad and girl have lifted the city's wreath into place. The number of mourners has fallen off in recent years, but for these few, the experience is relived in a profound and beautiful ceremony, which ends as we enter the Cathedral to the reverberant tones of the organ.

Western Man and Negative Silence Man likes to make sounds to remind himself that he is not alone. From this point of view total silence is the rejection of the human personality. Man fears the absence of sound as he fears the absence of life. As the ultimate silence is death, it achieves its highest dignity in the memorial service.

Since modern man fears death as none before him, he avoids silence to nourish his fantasy of perpetual life. In Western society, silence is a negative, a vacuum. Silence for Western Man equals communication hang-up. If one has nothing to say, the other will speak; hence the garrulity of modern life which is extended by all kinds of sonic jabberware.

The contemplation of absolute silence has become negative and terrifying for Western Man. Thus when the infinity of space was first suggested by Galileo's telescope, the philosopher Pascal was deeply afraid of the prospect of eternal silence. "Le silence éternel de ces espaces infinis m'effraie."

When one stays for a while in an anechoic chamber—that is, a completely soundproof room—one feels a little of the same terror. One speaks and the sound seems to drop from one's lips to the floor. The ears strain to pick up evidence that there is still life in the world. When John Cage went into such a room, however, he heard two sounds, one high and one low. "When I described them to the engineer in charge, he informed me that the high one was my nervous system in operation, the low one my blood in circulation." Cage's conclusion: "There is no such thing as silence. Something is always happening that makes a sound."

When man regards himself as central in the universe, silence can only be considered as approximate, never absolute. Cage detected this relativity and in choosing *Silence* as the title for his book, he emphasized that for modern man any use of this term must be qualified or assumed to be ironical. Edgar Allan Poe touched on the same thing when in "Al Aaraaf" he wrote: "Quiet we call 'Silence'—which is the merest word of all."

The negative character of silence has made it the most potentialized feature of Western art, where nothingness constitutes the eternal threat to being. Because music represents the ultimate intoxication of life, it is carefully placed in a container of silence. When silence precedes sound, nervous anticipation makes it more vibrant. When it interrupts or follows sound, it reverberates with the tissue of that which sounded, and this state continues as long as the memory holds it. Ergo, however dimly, silence sounds.

Because it is being lost, the composer today is more concerned with silence; he composes with it. Anton Webern moved composition to the brink of silence. The ecstasy of his music is enhanced by his sublime and stunning use of rests, for Webern's is music composed with an eraser. What irony, that the last sound of his life was the explosion of the soldier's gun that shot him.

In *Dummiyah* the Canadian composer John Weinzwieg has the conductor conduct long passages of silence in memory of Hitler's victims. "Silence," he says, "is the final sound of the Nazi holocaust."

In dumb silence I held my peace,
So my agony was quickened,
and my heart burned within me.

[Psalms 39:2-3]

Simultaneously with Webern's discovery of the value of silence in music, his compatriot Freud discovered its value for psychoanalysis. "The analyst is not afraid of silence. As Saussure remarked, the unconnected monologue of the patient on the one side and the almost absolute silence of the psychiatrist on the other was never made a methodological principle before Freud."

The relationship between music and psychoanalysis is by no means fortuitous. Like the music teacher, Freud made regular appointments to see his patients and listened to them at length. In psychoanalysis, as in much modern poetry, that which is not said is pregnant with potential meaning. Philosophy too terminates in silence. Wittgenstein wrote: "Whereof one cannot speak, thereof one must remain silent."

But these things do not reduce my contention that for Western Man silence somehow represents an unutterable impasse, a negative state beyond the realm of the possible, of the attainable. The same semantic complexion is borne out in Western lexicography. The following is the complete entry under "Silence" in *Roget's New Pocket Thesaurus* (New York, 1969). Read it and you will understand that what is described is not a felicitous or positive state but rather merely the muzzling of sound.

SILENCE—N. silence, quiet, quietude, hush, still; sullenness, sulk, saturninity, taciturnity, laconism, reticence, reserve.
muteness, mutism, deaf-mutism, laloplegia, anarthria, aphasia, aphonia, dysphasia.

speech impediment, stammering, stuttering, baryphonia, dysphonia, par-alalia.

dummy, sphinx, sulk, sulker, calm; mute, deaf-mute, laloplegic, aphasiac, aphonic, dysphasiac.

v. *silence*, quiet, quieten, still, hush; gag, muzzle, squelch, tongue-tie; muffle, stifle, strike dumb.

be silent, quiet down, quiet, hush, dummy up, hold one's tongue, sulk, say nothing, keep silent, shut up (slang).

ADJ. *silent*, noiseless, soundless, quiet, hushed, still.

speechless, wordless, voiceless, mute, dumb, inarticulate, tongue-tied, mousy, mum, sphinxian.

sullen, sulky, glum, saturnine.

taciturn, uncommunicative, close-mouthed, tight-lipped, unvocal, nonvocal, laconic; reticent, reserved, shy, bashful.

unspoken, tacit, wordless, implied, implicit, understood, unsaid, unuttered, unexpressed, unvoiced, unbreathed, unmentioned, untold.

unpronounced, mute, silent, unsounded, surd, voiceless.

inaudible, indistinct, unclear, faint, unheard.

inexpressible, unutterable, indescribable, ineffable, unspeakable, nameless, unnamable; fabulous.

See also MODESTY, PEACE. Antonyms—see LOUDNESS, SHOUT.

The Recovery of Positive Silence In the West we may assume that silence as a condition of life and a workable concept disappeared sometime toward the end of the thirteenth century, with the death of Meister Eckhart, Ruysbroeck, Angela de Foligno and the anonymous English author of *The Cloud of Unknowing*. This is the era of the last great Christian mystics and contemplation as a habit and skill began to disappear about that time.

Today, as a result of increasing sonic incursions, we are even beginning to lose an understanding of the word concentration. The words survive all right, that is to say, their skeletons lie in dictionaries; but there are few who know how to breathe life into them. A recovery of contemplation would teach us how to regard silence as a positive and felicitous state in itself, as the great and beautiful backdrop over which our actions are sketched and without which they would be incomprehensible, indeed could not even exist. There have been numerous philosophies expressing this idea and we know that great periods of human history have been conditioned by them. Such was the message of Lao-tzu: "Give up haste and activity. Close your mouth. Only then will you comprehend the spirit of Tào."

No philosophy or religion catches the positive felicity of stillness better than Taoism. It is a philosophy that would make all noise abatement legislation unnecessary. This is also the message of Jalal-ud-din Rumi, who

advised his disciples to "Keep silence like the points of the compass, for the king has erased thy name from the book of speech." Rumi sought to discover that world where "speaking is without letters or sounds." Even today one may observe Bedouins sitting quietly in a circle saying nothing, caught perhaps somewhere between the past and the future—for silence and eternity are bound in mystic union. I recall also the slow stillness of certain Persian villages, where there is still time to sit or squat and think, or merely to sit or squat; time to walk very slowly alongside a child on crutches or a blind grandfather; time to await food or the passage of the sun.

We need to regain quietude in order that fewer sounds can intrude on it with pristine brilliance. The Indian mystic Kirpal Singh expresses this eloquently:

The essence of sound is felt in both motion and silence, it passes from *existent to nonexistent*. When there is no sound, it is said that there is no hearing, but that does not mean that hearing has lost its preparedness. Indeed, when there is no sound, hearing is most alert, and when there is sound the hearing nature is least developed.

When there is no sound, hearing is most alert. It is the same idea that Rilke expresses in his *Duino Elegies* when he speaks of "die ununterbrochene Nachricht, die aus Stille sich bildet." Silence is indeed news for those possessing clairaudience.

If we have a hope of improving the acoustic design of the world, it will be realizable only after the recovery of silence as a positive state in our lives. Still the noise in the mind: that is the first task—then everything else will follow in time.

The Music Beyond

Before man, before the invention of the ear, only the gods heard sounds. Music was then perfect. In both East and West arcane accounts hint at these times. In the *Sangīta-makaranda* (I, 4-6) we learn that there are two forms of sound, the *anāhata*, "unstruck," and the *āhata*, "struck," the first being a vibration of ether, which cannot be perceived by men but is the basis of all manifestation. "It forms permanent numerical patterns which are the basis of the world's existence."

This is identical with the Western concept of the Music of the Spheres, that is, music as rational order, which goes back to the Greeks, particularly to the school of Pythagoras. Having discovered the mathematical correspondence between the ratios of the harmonics in a sounding string, and noting that the planets and stars also appeared to move with perfect regularity, Pythagoras united discovery with intuition and conjectured that the two types of motion were both expressions of a perfect universal law, binding music and mathematics. Pythagoras is reported to have been able to hear the celestial music, though none of his disciples was able to do so. But the intuition persisted. Boethius (A.D. 480-524) also believed in the Music of the Spheres.

How indeed could the swift mechanism of the sky move silently in its course? And although this sound does not reach our ears (as must for many reasons be the case), the extremely rapid motion of such great bodies could not be altogether without sound, especially since the courses of the stars are joined together by such mutual adaptation that nothing more equally compacted or united could be imagined. For some are borne higher and others lower, and all are revolved with a just impulse, and from their different inequalities an established order

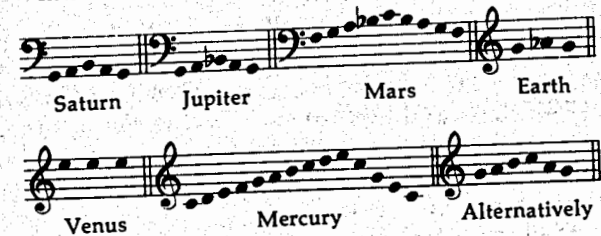
of their courses may be deduced. For this reason an established order of modulation cannot be lacking in this celestial revolution.

If one knew the mass and velocity of a spinning object, it would be possible theoretically to calculate its fundamental pitch. Johannes Kepler, who also believed in a perfect system binding music and astronomy, calculated the following pitches for each of the planets.

In Kepler's notation, the pitches looked like this:



In modern notation, like this:



The Music of the Spheres represents eternal perfection. If we do not hear it, it is because we are imperfect. Shakespeare puts it eloquently in *The Merchant of Venice* (V, i).

Look, how the floor of heaven
Is thick inlaid with patines of bright gold:
There's not the smallest orb which thou behold'st
But in his motion like an angel sings. . . .
Such harmony is in immortal souls;
But whilst this muddy vesture of decay
Doth grossly close it in, we cannot hear it.

But our imperfection is not merely moral; it is physical also. For man, the perfectly pure and mathematically defined sound exists as a theoretical concept only. The French mathematician Fourier knew and stated this when he was developing his theory of harmonic analysis. Distortion results the moment a sound is produced, for the sounding object first has to overcome its own inertia to be set in motion, and in doing this little imperfections creep into the transmitted sound. The same thing is true of

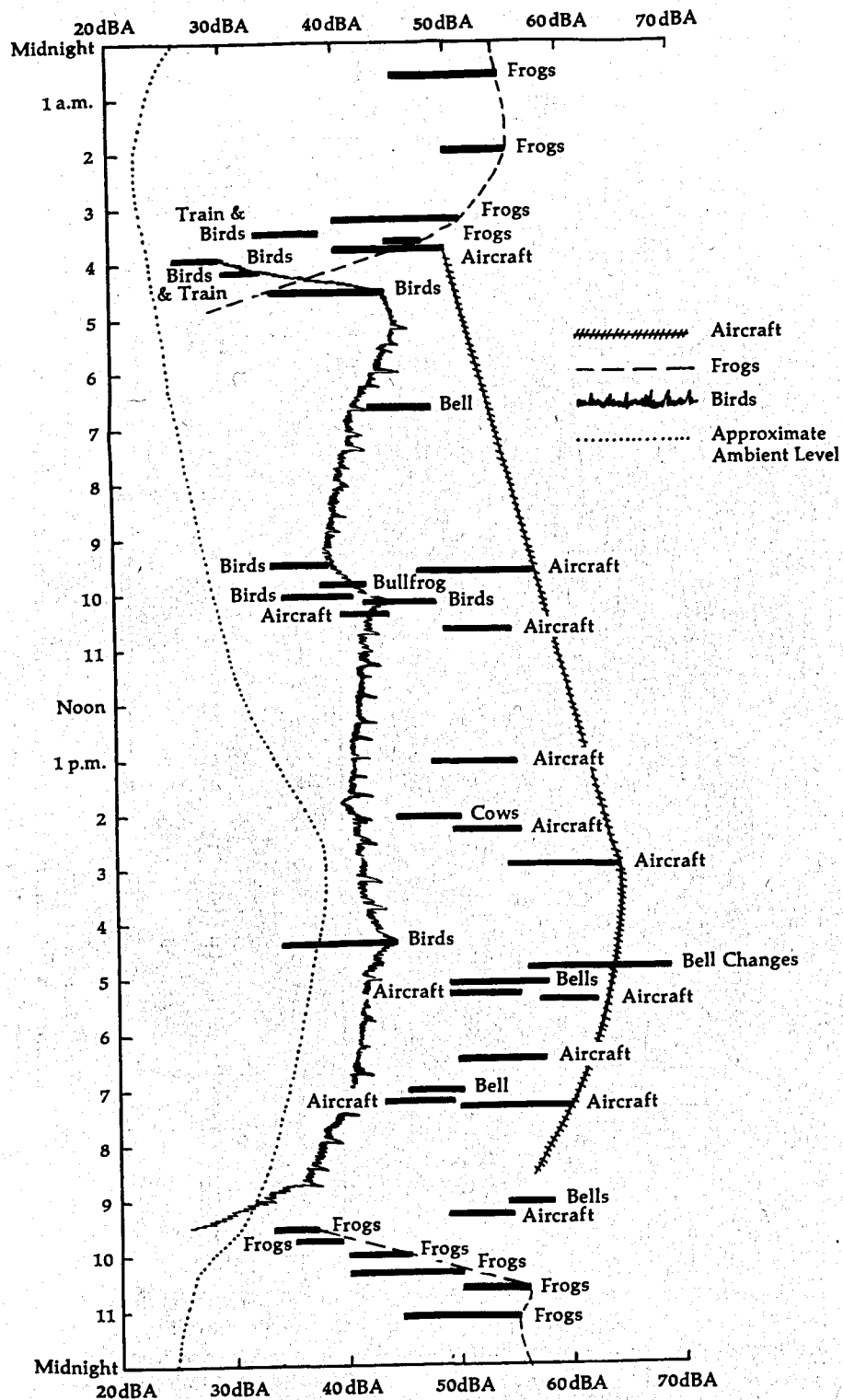
our ears. For the ear to begin vibrating, it too has first to overcome its own inertia, and accordingly it too introduces more distortions.

All the sounds we hear are imperfect. For a sound to be totally free of onset distortion, it would have to have been initiated before our lifetime. If it were also continued after our death so that we knew no interruption in it, then we could comprehend it as being perfect. But a sound initiated before our birth, continued unabated and unchanging throughout our lifetime and extended beyond our death, would be perceived by us as—*silence*.

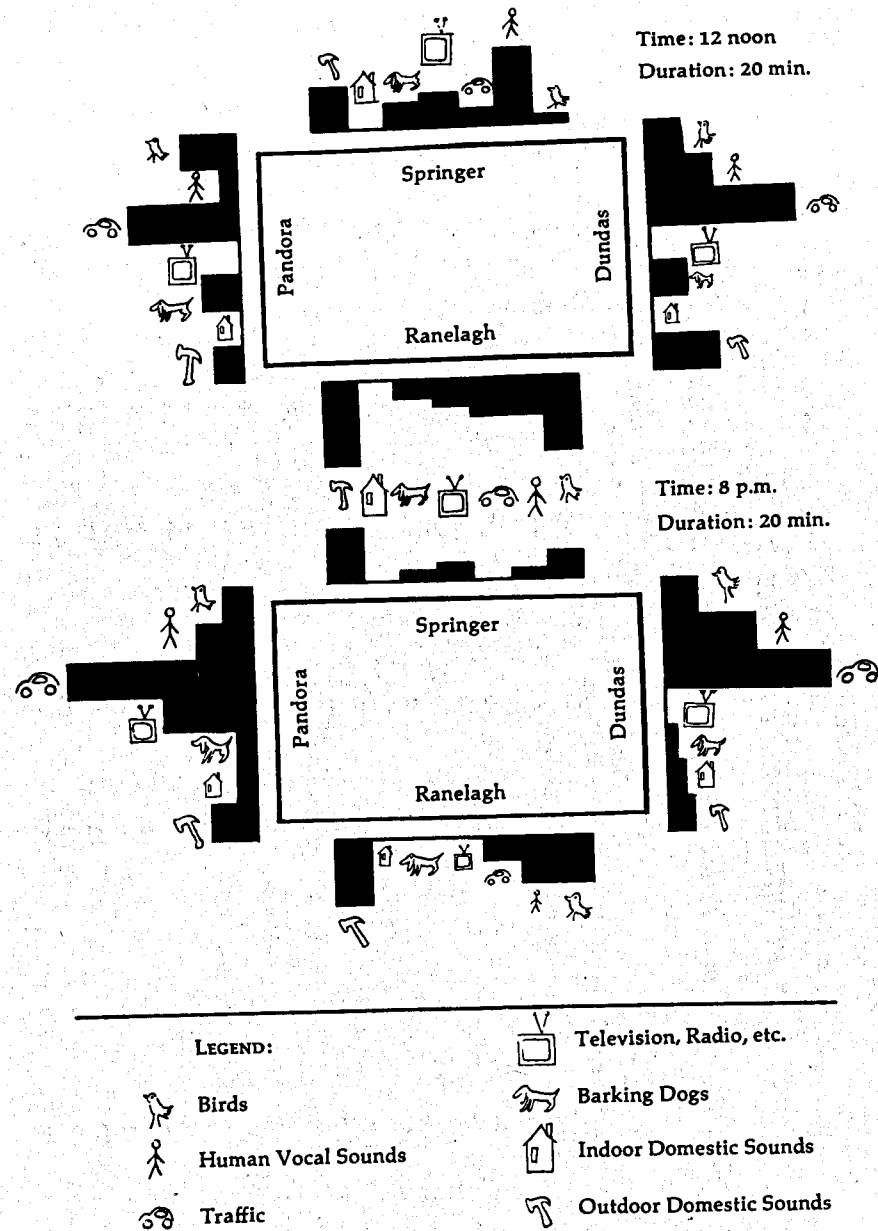
This is why, as I intimated at the beginning of this book, all research into sound must conclude with silence—not the silence of negative vacuum, but the positive silence of perfection and fulfillment. Thus, just as man strives for perfection, all sound aspires to the condition of silence, to the eternal life of the Music of the Spheres.

Can silence be heard? Yes, if we could extend our consciousness outward to the universe and to eternity, we could hear silence. Through the practice of contemplation, little by little, the muscles and the mind relax and the whole body opens out to become an ear. When the Indian yogi attains a state of liberation from the senses, he hears the *anāhata*, the “unstruck” sound. Then perfection is achieved. The secret hieroglyph of the Universe is revealed. Number becomes audible and flows down filling the receiver with tones and light.

Appendixes



This chart shows log notes of sound events taken during a 24-hour period in the countryside in British Columbia.



One possible form of a sound map, made during two different time periods on a "listening walk" around a city block. The different types of sounds are given graphic values according to whether they are soft, medium or loud, and tabulated to show the general activity and intensity. Using this method, it is simple to make comparisons of sound events historically or geographically.

APPENDIX II

International Sound Preference Survey

Percentage of People Tested Liking or Disliking Sounds by Category

	AUCKLAND, NEW ZEALAND 113 People Tested		VANCOUVER, CANADA 99 People Tested		PORT ANTONIO, JAMAICA 72 People Tested		ZURICH, SWITZERLAND 217 People Tested	
	Pleasant	Unpleasant	Pleasant	Unpleasant	Pleasant	Unpleasant	Pleasant	Unpleasant
WATER								
Rain	31	1	23	0	7	3	25	1
Brooks, Rivers, Waterfalls	18	0	37	0	6	0	43	0
Ocean	58	1	42	0	19	8	4	0
Other	7	0	10	0	0	0	21	2
WIND								
Breeze	50	0	47	0	30	0	28	0
Stormy	0	4	0	0	0	8	1	1
Other	0	0	0	0	0	0	0	0
NATURE								
Dawn	2	0	0	0	0	0	0	0
Night	2	2	0	0	0	7	0	0
Thunderstorms	3	2	2	0	1	6	1	13
Fire Crackling	6	0	8	0	0	0	7	0
Trees	1	1	5	0	0	3	29	1
Other Nature Sounds	1	0	0	0	0	6	7	1
Animals	20	7	22	16	33	100	20	15
Birds	49	3	53	0	68	13	75	7
Insects	10	13	2	5	10	18	15	5
HUMAN SOUNDS								
Voices	27	43	35	35	11	60	13	16
Baby Sounds	2	12	2	8	8	11	0	4
Laughter	27	3	20	2	31	6	6	0
Crying	10	16	0	23	0	40	0	7
Body (Breathing, Belching, Snoring, etc.)	8	9	13	21	7	15	2	6
Whistling	1	0	2	0	17	0	0	2
Lovemaking	6	0	8	0	0	0	0	0
Footsteps	3	4	3	0	0	3	3	4
Other	1	3	3	3	1	14	1	11
MUSIC								
Specific Instruments	29	0	35	0	58	0	29	4
Vocal	23	0	12	0	49	0	7	4
Types of Music (Jazz, Classical)	13	4	4	17	15	0	9	1
Other Mentions	28	10	17	3	35	7	40	1
SOUND EQUIPMENT								
Amplifiers	0	0	0	6	0	1	0	1
Malfunctioning Equipment	0	0	0	8	0	0	0	1
Radio and T.V. Commercials	0	9	0	7	0	0	0	0
Other	0	0	0	2	4	0	4	1
DOMESTIC								
Door Slam	0	10	4	0	0	8	0	12
Clocks	2	12	1	6	0	0	4	8
Telephone	2	6	0	5	0	1	1	13
Other	9	4	10	19	1	18	5	14
TRANSPORTATION								
Traffic Noise Specific Vehicles Mentioned	0	43	0	32	0	0	4	6
	8	30	6	58	13	26	4	94

	AUCKLAND, NEW ZEALAND 113 People Tested		VANCOUVER, CANADA 99 People Tested		PORT ANTONIO, JAMAICA 72 People Tested		ZURICH, SWITZERLAND 217 People Tested	
	Pleasant	Unpleasant	Pleasant	Unpleasant	Pleasant	Unpleasant	Pleasant	Unpleasant
TRANSPORTATION (continued)								
Aircraft	1	4	0	5	7	0	2	36
Trains	0	1	3	1	1	0	4	6
Sounds of Accidents	0	6	0	1	0	4	0	1
MACHINERY AND MECHANICAL								
Machinery (General)	0	23	1	19	0	0	2	46
Construction	0	11	0	10	0	0	0	15
Jackhammers	0	15	0	13	0	0	0	14
Dentist Drills	0	12	0	13	0	0	0	5
Power Lawnmowers	0	18	1	0	0	0	0	3
Sirens	0	15	0	25	0	0	0	26
Other	1	12	0	27	0	0	0	18
OTHER SOUNDS								
Bells	2	0	8	0	1	0	54	2
Loud Impact (Gunshot, etc.)	0	8	0	7	1	4	1	13
Hammering	0	4	0	7	0	0	0	1
Chalk Squeaking on Blackboard	0	38	0	32	0	1	0	13
Miscellaneous	4	8	11	1	1	4	2	2
Silence	8	0	15	0	0	0	1	1

Glossary of Soundscape Terms

The following short list of terms includes only neologisms or acoustic terms which I have adapted and given special meanings to for the purpose of this book. The list does not include general acoustic terms employed in the customary manner, definitions of which may be found in standard works of reference.

ACOUSTIC DESIGN: A new interdisciplinary requiring the talents of scientists, social scientists and artists (particularly musicians), acoustic design attempts to discover principles by which the aesthetic quality of the acoustic environment or **SOUNDSCAPE** may be improved. In order to do this it is necessary to conceive of the soundscape as a huge musical composition, ceaselessly evolving about us, and to ask how its orchestration and forms may be improved to bring about a richness and diversity of effects which, nevertheless, should never be destructive of human health or welfare. The principles of acoustic design may thus include the elimination or restriction of certain sounds (noise abatement), the testing of new sounds before they are released indiscriminately into the environment, but also the preservation of sounds (**SOUNDMARKS**), and above all the imaginative placement of sounds to create attractive and stimulating acoustic environments for the future. Acoustic design may also include the composition of model environments, and in this respect it is contiguous with contemporary musical composition. Compare: **ACOUSTIC ECOLOGY**.

ACOUSTIC ECOLOGY: Ecology is the study of the relationship between living organisms and their environment. Acoustic ecology is thus the study of the effects of the acoustic environment or **SOUNDSCAPE** on the physical responses or behavioral characteristics of creatures living within it. Its particular aim is to draw attention to imbalances which may have unhealthy or inimical effects. Compare: **ACOUSTIC DESIGN**.

ACOUSTIC SPACE: The profile of a sound over the landscape. The acoustic space of any sound is that area over which it may be heard before it drops below the ambient sound level.

AURAL SPACE: The space on any graph which results from a plotting of the various dimensions of sound against one another. For convenience in

reading usually only two dimensions are plotted at once. Thus time may be plotted against frequency, frequency against amplitude or amplitude against time. Aural space is thus merely a notational convention and should not be confused with ACOUSTIC SPACE, which is an expression of the profile of a sound over the landscape.

CLAIRAUDIENCE: Literally, clear hearing. The way I use the term there is nothing mystical about it; it simply refers to exceptional hearing ability, particularly with regard to environmental sound. Hearing ability may be trained to the cliraudent state by means of EAR CLEANING exercises.

EAR CLEANING: A systematic program for training the ears to listen more discriminately to sounds, particularly those of the environment. A set of such exercises is given in my book *Ear Cleaning*.

EARWITNESS: One who testifies or can testify to what he or she has heard.

HI-FI: Abbreviation for high fidelity, that is, a favorable signal-to-noise ratio. The most general use of the term is in electroacoustics. Applied to soundscape studies a hi-fi environment is one in which sounds may be heard clearly without crowding or masking. Compare: LO-FI.

KEYNOTE SOUND: In music, keynote identifies the key or tonality of a particular composition. It provides the fundamental tone around which the composition may modulate but from which other tonalities take on a special relationship. In soundscape studies, keynote sounds are those which are heard by a particular society continuously or frequently enough to form a background against which other sounds are perceived. Examples might be the sound of the sea for a maritime community or the sound of the internal combustion engine in the modern city. Often keynote sounds are not consciously perceived, but they act as conditioning agents in the perception of other sound signals. They have accordingly been likened to the ground in the figure-ground grouping of visual perception. Compare: SOUND SIGNAL.

LO-FI: Abbreviation for low fidelity, that is, an unfavorable signal-to-noise ratio. Applied to soundscape studies a lo-fi environment is one in which signals are overcrowded, resulting in masking or lack of clarity. Compare: HI-FI.

MOOZAK (MOOZE, etc.): Term applying to all kinds of schizophrenic musical drivel, especially in public places. Not to be confused with the brand product Muzak.

MORPHOLOGY: The study of forms and structures. Originally employed in biology, it was later (by 1869) employed in philology to refer to patterns of inflection and word formation. Applied to soundscape studies it refers to changes in groups of sounds with similar forms or functions when arbitrarily arranged in temporal or spatial formations. Examples of acoustic morphology might be a study of the historical evolution of foghorns, or a geographical comparison of methods of telegraphy (alphorn, jungle drums, etc.).

NOISE: Etymologically the word can be traced back to Old French (*noyse*) and to eleventh-century Provençal (*noysa, nosa, nausea*), but its origin is uncertain. It has a variety of meanings and shadings of meaning, the most important of which are the following:

1. *Unwanted sound.* The Oxford English Dictionary contains references to noise as unwanted sound dating back as far as 1225.
2. *Unmusical sound.* The nineteenth-century physicist Hermann Helmholtz employed the expression noise to describe sound composed of nonperiodic vibrations (the rustling of leaves), by comparison with musical sounds, which consist of periodic vibrations. Noise is still used in this sense in expressions such as white noise or Gaussian noise.
3. *Any loud sound.* In general usage today, noise often refers to particularly loud sounds. In this sense a noise abatement by-law prohibits certain loud sounds or establishes their permissible limits in decibels.
4. *Disturbance in any signaling system.* In electronics and engineering, noise refers to any disturbances which do not represent part of the signal, such as static on a telephone or snow on a television screen.

The most satisfactory definition of noise for general usage is still "unwanted sound." This makes noise a subjective term. One man's music may be another man's noise. But it holds open the possibility that in a given society there will be more agreement than disagreement as to which sounds constitute unwanted interruptions. It should be noted that each language preserves unique nuances of meaning for words representing noise. Thus in French one speaks of the *bruit* of a jet but also the *bruit* of the birds or the *bruit* of the waves. Compare: SACRED NOISE.

SACRED NOISE: Any prodigious sound (noise) which is exempt from social proscription. Originally Sacred Noise referred to natural phenomena such as thunder, volcanic eruptions, storms, etc., as these were believed to represent divine combats or divine displeasure with man. By analogy the expression may be extended to social noises which, at least during certain periods, have escaped the attention of noise abatement legislators, e.g., church bells, industrial noise, amplified pop music, etc.

SCHIZOPHONIA (Greek: *schizo* = split and *phone* = voice, sound): I first employed this term in *The New Soundscape* to refer to the split between an original sound and its electroacoustic reproduction. Original sounds are tied to the mechanisms that produce them. Electroacoustically reproduced sounds are copies and they may be restated at other times or places. I employ this "nervous" word in order to dramatize the aberrational effect of this twentieth-century development.

SONIFEROUS GARDEN: A garden, and by analogy any place, of acoustic delights. This may be a natural soundscape, or one submitted to the

principles of ACOUSTIC DESIGN. The soniferous garden may also include as one of its principal attractions a Temple of Silence for meditation.

SONOGRAPHY: The art of soundscape notation. It may include customary methods of notation such as the sonogram or sound level recording, but beyond these it will also seek to register the geographic distribution of SOUND EVENTS. Various techniques of aerial sonography are employed, for instance, the isobel contour map.

SONOLOGICAL COMPETENCE: The implicit knowledge which permits the comprehension of sound formations. The term has been borrowed from Otto Laske. Sonological competence unites impression with cognition and makes it possible to formulate and express sonic perceptions. It is possible that just as sonological competence varies from individual to individual, it may also vary from culture to culture, or at least may be developed differently in different cultures. Sonological competence may be assisted by EAR CLEANING exercises. See O. Laske, "Musical Acoustics (Sonology): A Questionable Science Reconsidered," *Numus-West*, Seattle, No. 6, 1974; "Toward a Theory of Musical Cognition," *Interface*, Amsterdam, Vol. 4, No. 2, Winter, 1975, *inter alia*.

SOUND EVENT: Dictionary definition of *event*: "something that occurs in a certain place during a particular interval of time." This suggests that the event is not abstractable from the time-and-space continuum which give it its definition. The sound event, like the SOUND OBJECT, is defined by the human ear as the smallest self-contained particle of a SOUNDSCAPE. It differs from the sound object in that the latter is an abstract acoustical object for study, while the sound event is a symbolic, semantic or structural object for study, and is therefore a nonabstractable point of reference, related to a whole of greater magnitude than itself.

SOUNDMARK: The term is derived from *landmark* to refer to a community sound which is unique or possesses qualities which make it specially regarded or noticed by the people in that community.

SOUND OBJECT: Pierre Schaeffer, the inventor of this term (*l'objet sonore*), describes it as an acoustical "object for human perception and not a mathematical or electro-acoustical object for synthesis." The sound object is then defined by the human ear as the smallest self-contained particle of a SOUNDSCAPE, and is analyzable by the characteristics of its envelope. Though the sound object may be referential (i.e., a bell, a drum, etc.), it is to be considered primarily as a phenomenological sound formation, independently of its referential qualities as a sound event. Compare: SOUND EVENT.

SOUNDSCAPE: The sonic environment. Technically, any portion of the sonic environment regarded as a field for study. The term may refer to actual environments, or to abstract constructions such as musical

compositions and tape montages, particularly when considered as an environment.

SOUND SIGNAL: Any sound to which the attention is particularly directed. In soundscape studies sound signals are contrasted by KEYNOTE SOUNDS, in much the same way as figure and ground are contrasted in visual perception.

WORLD SOUNDSCAPE PROJECT: A project headquartered at the Sonic Research Studio of the Communications Department, Simon Fraser University, British Columbia, Canada, devoted to the comparative study of the world SOUNDSCAPE. The Project came into existence in 1971, and since that time a number of national and international research studies have been conducted, dealing with aural perception, sound symbolism, noise pollution, etc., all of which have attempted to unite the arts and sciences of sound studies in preparation for the development of the interdiscipline of ACOUSTIC DESIGN. Publications of the World Soundscape Project have included: *The Book of Noise*, *The Music of the Environment*, *A Survey of Community Noise By-Laws in Canada* (1972), *The Vancouver Soundscape*, *A Dictionary of Acoustic Ecology*, *Five Village Soundscapes* and *A European Sound Diary*.

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