

Introduction

Now I will do
nothing but
listen...

I hear all sounds
running
together,
combined,
fused or
following,
Sounds of the
city and
sounds out of
the city,
sounds of the
day and
night...

WALT WHITMAN, *Song of Myself*

The soundscape of the world is changing. Modern man is beginning to inhabit a world with an acoustic environment radically different from any he has hitherto known. These new sounds, which differ in quality and intensity from those of the past, have alerted many researchers to the dangers of an indiscriminate and imperialistic spread of more and larger sounds into every corner of man's life. Noise pollution is now a world problem. It would seem that the world soundscape has reached an apex of vulgarity in our time, and many experts have predicted universal deafness as the ultimate consequence unless the problem can be brought quickly under control.

In various parts of the world

important research is being undertaken in many independent areas of sonic studies: acoustics, psychoacoustics, otology, international noise abatement practices and procedures, communications and sound recording engineering (electroacoustics and electronic music), aural pattern perception and the structural analysis of language and music. These researches are related; each deals with aspects of the world soundscape. In one way or another researchers engaged on these various themes are asking the same question: what is the relationship between man and the sounds of his environment and what happens when those sounds change? Soundscape studies attempt to unify these various researches.

Noise pollution results when man does not listen carefully. Noises are the sounds we have learned to ignore. Noise pollution today is being resisted by noise abatement. This is a negative approach. We must seek a way to make environmental acoustics a *positive* study program. Which sounds do we want to preserve, encourage, multiply? When we know this, the boring or destructive sounds will be conspicuous enough and we will know why we must eliminate them. Only a total appreciation of the acoustic environment can give us the resources for improving the orchestration of the world soundscape. For many years I have been fighting for ear cleaning in schools to eliminate audiometry in

factories. Clairaudience not ear muffs. It is an idea over which I do not wish to exercise permanent ownership.³

The home territory of soundscape studies will be the middle ground between science, society and the arts. From acoustics and psychoacoustics we will learn about the physical properties of sound and the way sound is interpreted by the human brain. From society we will learn how man behaves with sounds and how sounds affect and change his behavior. From the arts, particularly music, we will learn how man creates ideal soundscapes for that other life, the life of the imagination and psychic reflection. From these studies we will begin to lay the foundations of a new interdisciplinary—acoustic design.

From Industrial Design to Acoustic Design

The most important revolution is aesthetic education in the twentieth century was that accomplished by the Bauhaus, that celebrated German school of the twenties. Under the leadership of architect Walter Gropius, the Bauhaus collected some of the great painters and architects of the time (Klee, Kandinsky, Moholy-Nagy, Mies van der Rohe), together with craftsmen of distinction. At first it seemed disappointing that the graduates of this school did not rise to rival their mentors as artists. But the purpose of the school was different. From the interdisciplinary synergy of faculty skills a whole new study

field was created, for the school invented the subject of industrial design. The Bauhaus brought aesthetics to machinery and mass production.

It devolves on us now to invent a subject which we might call acoustic design, an interdisciplinary in which musicians, acousticians, psychologists, sociologists and others would study the world soundscape together in order to make intelligent recommendations for its improvement. This study would consist of documenting important features, of noting differences, parallels and trends, of collecting sounds threatened with extinction, of studying the effects of new sounds before they are indiscriminate released into the environment, of studying the rich symbolism sounds have for man and of studying human behavior patterns in different sonic environments in order to use these insights in planning future environments for man. Cross-cultural evidence from around the world must be carefully assembled and interpreted. New methods of educating the public to the importance of environmental sound must be devised. The final question will be: is the soundscape of the world an indeterminate composition over which we have no control, or are we its composers and performers, responsible for giving it form and beauty?

Orchestration Is a Musician's Business

Throughout this book I am going to treat the world as a macrocosmic musical composition. This is an unusual

idea but I am going to nudge it forward relentlessly. The definition of music has undergone radical change in recent years. In one of the more contemporary definitions, John Cage has declared: "Music is sounds, sounds around us whether we're in or out of concert halls: cf. Thoreau." The reference is to Thoreau's *Walden*, where the author experiences in the sounds and sights of nature an inexhaustible entertainment.

To define music merely as *sounds* would have been unthinkable a few years ago, though today it is the more exclusive definitions that are proving unacceptable. Little by little throughout the twentieth century, all the conventional definitions of music have been exploded by the abundant activities of musicians themselves. First with the huge expansion of percussion instruments in our orchestras, many of which produce nonpitched and arrhythmic sounds; then through the introduction of aleatoric procedures in which all attempts to organize the sounds of a composition rationally are surrendered to the "higher" laws of entropy; then through the opening-out of the time-and-space containers we call compositions and concert halls to allow the introduction of a whole new world of sounds outside them (in Cage's *4'33" Silence* we hear only the sounds external to the composition itself, which is merely one protracted caesura); then in the practices of *musique concrete*, which inserts any sound from the

environment into a composition via tape; and finally in electronic music, which has revealed a whole gamut of new musical sounds, many of them related to industrial and electric technology in the world at large.

Today all sounds belong to a continuous field of possibilities lying *within the comprehensive dominion of music*. Behold the new orchestra: the sonic universe!

And the musicians: anyone and anything that sounds!

Dionysian Versus Apollonian Concepts of Music

it is easier to see the responsibilities of the acoustical engineer or the audiologist toward the world soundscape than to understand the precise manner in which the contemporary musician is supposed to attach himself to this vast theme, so I am going to grind my axe on this point for a moment longer.

There are two basic ideas of what music is or ought to be. They may be seen most clearly in two Greek myths dealing with the origin of music. Pindar's twelfth Pythian Ode tells how the art of aulos playing was invented by Athena when, after the beheading of Medusa, she was touched by the heart-rending cries of Medusa's sisters and created a special *nomos* in their honor. In a Homeric hymn to Hermes an alternative origin is mentioned. The lyre is said to have been invented by Hermes when he surmised that the shell of the turtle, if used as a body of resonance, could produce sound.

In the first of these myths music

arises as subjective emotion; in the second it arises with the discovery of sonic properties in the materials of the universe. These are the cornerstones on which all subsequent theories of music are founded. Characteristically the lyre is the instrument of Homer, of the epos, of serene contemplation of the universe; while the aulos (the reed oboe) is the instrument of exaltation and tragedy, the instrument of the dithyramb and of drama. The lyre is the instrument of Apollo, the aulos that of the Dionysian festivals. In the Dionysian myth, music is conceived as internal sound breaking forth from the human breast; in the Apollonian it is external sound, God-sent to remind us of the harmony of the universe. In the Apollonian view music is exact, serene, mathematical, associated with transcendental visions of Utopia and the Harmony of the Spheres. It is also the *anahata* of Indian theorists. It is the basis of Pythagoras's speculations and those of the medieval theoreticians (where music was taught as a subject of the quadrivium, along with arithmetic, geometry and astronomy), as well as of Schoenberg's twelve-note method of composition. Its methods of exposition are number theories. It seeks to harmonize the world through acoustic design. In the Dionysian view music is irrational and subjective. It employs expressive devices: tempo fluctuations, dynamic shadings, tonal colorings. It is the music of the operatic stage, of *bel canto*, and its reedy voice can also be heard in

Bach's Passions. Above all, it is the musical expression of the romantic artist, prevailing throughout the nineteenth century and on into the expressionism of the twentieth century. It also directs the training of the musician today.

Because the production of sounds is so much a subjective matter with modern man, the contemporary soundscape is notable for its dynamic hedonism. The research I am about to describe represents a reaffirmation of music as a search for the harmonizing influence of sounds in the world about us. In Robert Fludd's *Utriusque Cosmi Historia* there is an illustration entitled "The Tuning of the World" in which the earth forms the body of an instrument across which strings are stretched and are tuned by a divine hand. We must try once again to find the secret of that tuning.

Music, the Soundscape and Social Welfare

In Hermann Hesse's *The Glass Bead Game* there is an arresting idea. Hesse claims to be repeating a theory of the relationship between music and the state from an ancient Chinese source: "Therefore the music of a well-ordered age is calm and cheerful, and so is its government. The music of a restive age is excited and fierce, and its government is perverted. The music of a decaying state is sentimental and sad, and its government is imperiled."

Such a theory would suggest that the egalitarian and enlightened reign of Maria Theresa (for

instance, as expressed in her unified criminal code of 1768) and the grace and balance of Mozart's music are not accidental. Or that the sentimental vagaries of Richard Strauss are perfectly consistent with the waning of the same Austro-Hungarian Empire. In Gustav Mahler we find, etched in an acid Jewish hand, marches and German dances of such sarcasm as to give us a presentiment of the political *dance macabre* soon to follow.

The thesis is also borne out well in tribal societies where, under the strict control of the flourishing community, music is tightly structured, while in detribalized areas the individual sings appallingly sentimental songs. Any ethnomusicologist will confirm this. There can be little doubt then that music is an indicator of the age, revealing, for those who know how to read its symptomatic messages, a means of fixing social and even political events.

For some time I have also believed that the general acoustic environment of a society can be read as an indicator of social conditions which produce it and may tell us much about the trending and evolution of that society. Throughout this book I will suggest many such relationships, and though it is probably in my nature to do this emphatically, I hope the reader may continue to regard the method as valid even if some of the equations seem disagreeable. They are all open to further testing.

The Notation of Soundscapes

(Sonography) The soundscape is any acoustic field of study. We may speak of a musical composition as a soundscape, or a radio program as a soundscape or an acoustic environment as a soundscape. We can isolate an acoustic environment as a field of study just as we can study the characteristics of a given landscape. However, it is less easy to formulate an exact impression of a soundscape than of a landscape. There is nothing in sonography corresponding to the instantaneous impression which photography can create. With a camera it is possible to catch the salient features of a visual panorama to create an impression that is immediately evident. The microphone does not operate this way. It samples details. It gives the close-up but nothing corresponding to aerial photography.

Similarly, while everyone has had some experience reading maps, and many can draw at least significant information from other schematics of the visual landscape, such as architects' drawings or geographers' contour maps, few can read the sophisticated charts used by phoneticians, acousticians or musicians. To give a totally convincing image of a soundscape would involve extraordinary skill and patience: thousands of recordings would have to be made; tens of thousands of measurements would have to be taken; and a new means of description would have to be devised.

A soundscape consists of events *heard* not objects *seen*. Beyond

aural perception is the notation and photography of sound, which, being silent, presents certain problems that will be discussed in a special chapter in the Analysis section of the book. Through the misfortune of having to present data on silent pages, we will be forced to use some types of visual projection as well as musical notation, in advance of this discussion, and these will only be useful if they assist in opening ears and stimulating clairaudience.

We are also disadvantaged in the pursuit of a historical perspective. While we may have numerous photographs taken at different times, and before them drawings and maps to show us how a scene changed over the ages, we must make inferences as to the changes of the soundscape. We may know exactly how many new buildings went up in a given area in a decade or how the population has risen, but we do not know by how many decibels the ambient noise level may have risen for a comparable period of time. More than this, sounds may alter or disappear with scarcely a comment even from the most sensitive of historians. Thus, while we may utilize the techniques of modern recording and analysis to study contemporary soundscapes, for the foundation of historical perspectives, we will have to turn to earwitness accounts from literature and mythology, as well as to anthropological and historical records.

Earwitness The first part of the book will be particularly indebted

to such accounts. I have always attempted to go directly to sources. Thus, a writer is trustworthy only when writing about sounds directly experienced and intimately known. Writing about other places and times usually results in counterfeit descriptions. To take an obvious instance, when Jonathan Swift describes Niagara Falls as making "a terrible squash" we know he never visited the place; but when Chateaubriand tells us that in 1791 he heard the roar of Niagara eight to ten miles away, he provides us with useful information about the ambient sound level, against which that of today could be measured. When a writer writes uncounterfeitly about directly apprehended experiences, the ears may sometimes play tricks on the brain, as Erich Maria Remarque discovered in the trenches during the First World War when he heard shells exploding about him followed by the rumble of the distant guns that fired them. This aural illusion is perfectly accountable, for as the shells were traveling at super-sonic speeds they arrived in advance of the sounds of their original detonations; but only someone trained in acoustics could have predicted this. *All Quiet on the Western Front* is convincing because the author was there. And we trust him when he describes other unusual sound events—for instance, the sounds made by dead bodies. "The days are hot and the dead lie unburied. We cannot fetch them all in, if we did we should not know what to do with them. The

shells will bury them. Many have their bellies swollen up like balloons. They hiss, belch, and make movements. The gases in them make noises." William Faulkner also knew the noise of corpses, which he described as "little trickling bursts of secret and murmurous bubbling."

In such ways is the authenticity of the earwitness established. It is a special talent of novelists like Tolstoy, Thomas Hardy and Thomas Mann to have captured the soundscapes of their own places and times, and such descriptions constitute the best guide available in the reconstruction of soundscapes past.

Features of the

Soundscape What the soundscape analyst must do first is to discover the significant features of the soundscape, those sounds which are important either because of their individuality, their numerousness or their domination. Ultimately some system or systems of generic classification will have to be devised, and this will be a subject for the third part of the book. For the first two parts it will be enough to categorize the main themes of a soundscape by distinguishing between what we call *keynote sounds*, *signals* and *soundmarks*. To these we might add *archetypal* sounds, those mysterious ancient sounds, often possessing felicitous symbolism, which we have inherited from remote antiquity or prehistory.

Keynote is a musical term; it is the note that identifies the key or

tonality of a particular composition. It is the anchor or fundamental tone and although the material may modulate around it, often obscuring its importance, it is in reference to this point that everything else takes on its special meaning. Keynote sounds do not have to be listened to consciously; they are overheard but cannot be overlooked, for keynote sounds become listening habits in spite of themselves.

The psychologist of visual perception speaks of "figure" and "ground," the figure being that which is looked at while the ground exists only to give the figure its outline and mass. But the figure cannot exist without its ground; subtract it and the figure becomes shapeless, nonexistent. Even though keynote sounds may not always be heard consciously, the fact that they are ubiquitously there suggests the possibility of a deep and pervasive influence on our behavior and moods. The keynote sounds of a given place are important because they help to outline the character of men living among them.

The keynote sounds of a landscape are those created by its geography and climate: water, wind, forests, plains, birds, insects and animals. Many of these sounds may possess archetypal significance; that is, they may have imprinted themselves so deeply on the people hearing them that life without them would be sensed as a distinct impoverishment. They may even affect the behavior or life style of a society, though for a discussion of

this we will wait until the reader is more acquainted with the matter.

Signals are foreground sounds and they are listened to consciously. In terms of the psychologist, they are figure rather than ground. Any sound can be listened to consciously, and so any sound can become a figure or signal, but for the purposes of our community-oriented study we will confine ourselves to mentioning some of those signals which *must* be listened to because they constitute acoustic warning devices: bells, whistles, horns and sirens. Sound signals may often be organized into quite elaborate codes permitting messages of considerable complexity to be transmitted to those who can interpret them. Such, for instance, is the case with the *cor de chasse*, or train and ship whistles, as we shall discover.

The term *soundmark* is derived from landmark and refers to a community sound which is unique or possesses qualities which make it specially regarded or noticed by the people in that community. Once a soundmark has been identified, it deserves to be protected, for soundmarks make the acoustic life of the community unique. This is a subject to be taken up in Part Four of the book, where the principles of acoustic design will be discussed.

I will try to explain all other soundscape terminology as it is introduced. At the end of the book there is a short glossary of terms which are either neologistic or have been used idiosyncratically, in case doubt exists at any point in

the text. I have tried not to use too many complex acoustical terms, though a knowledge of the fundamentals of acoustics and a familiarity with both musical theory and history is presupposed.

Ears and Clairaudience We will not argue for the priority of the ear. In the West the ear gave way to the eye as the most important gatherer of information about the time of the Renaissance, with the development of the printing press and perspective painting. One of the most evident testaments of this change is the way in which we have come to imagine God. It was not until the Renaissance that God became portraiture. Previously he had been conceived as sound or vibration. In the Zoroastrian religion, the priest Srosh (representing the genius of hearing) stands between man and the pantheon of the gods, listening for the divine messages, which he transmits to humanity. *Samā* is the Sufi word for audition or listening. The followers of Jalal-ud-din Rumi worked themselves into a mystical trance by chanting and whirling in slow gyrations. Their dance is thought by some scholars to have represented the solar system, recalling also the deep-rooted mystical belief in an extraterrestrial music, a Music of the Spheres, which the attuned soul may at times hear. But these exceptional powers of hearing, what I have called clairaudience, were not attained effortlessly. The poet Saadi says in one of his lyric poems:

I will not say,
my brothers,
what *samā* is
Before I know
who the
listener is.

Before the days of writing, in the days of prophets and epics, the sense of hearing was more vital than the sense of sight. The word of God, the history of the tribe and all other important information was heard, not seen. In parts of the world, the aural sense still tends to predominate.

... rural Africans live largely in a world of sound—a world loaded with direct personal significance for the hearer—whereas the western European lives much more in a visual world which is on the whole indifferent to him. ... Sounds lose much of this significance in western Europe, where man often develops, and must develop, a remarkable ability to disregard them. Whereas for Europeans, in general, "seeing is believing," for rural Africans reality seems to reside far more in what is heard and what is said. ... Indeed, one is constrained to believe that the eye is regarded by many Africans less as a receiving organ than as an instrument of the will, the ear being the main receiving organ.

Marshall McLuhan has suggested that since the advent of electric culture we may be moving back to such a state again, and I think he is right. The very emergence of noise

pollution as a topic of public concern testifies to the fact that modern man is at last becoming concerned to clean the sludge out of his ears and regain the talent for clairaudience—clean hearing.

A Special Sense Touch is the most personal of the senses. Hearing and touch meet where the lower frequencies of audible sound pass over to tactile vibrations (at about 20 hertz). Hearing is a way of touching at a distance and the intimacy of the first sense is fused with sociability whenever people gather together to hear something special. Reading that sentence an ethnomusicologist noted: "All the ethnic groups I know well have in common their physical closeness and an incredible sense of rhythm. These two features seem to co-exist."

The sense of hearing cannot be closed off at will. There are no earlids. When we go to sleep, our perception of sound is the last door to close and it is also the first to open when we awaken. These facts have prompted McLuhan to write: "Terror is the normal state of any oral society for in it everything affects everything all the time."

The ear's only protection is an elaborate psychological mechanism for filtering out undesirable sound in order to concentrate on what is desirable. The eye points outward; the ear draws inward. It soaks up information. Wagner said: "To the eye appeals the outer man, the inner to the ear." The ear is also an erotic orifice. Listening to beautiful sounds, for instance the

sounds of music, is like the tongue of a lover in your ear. Of its own nature then, the ear demands that insouciant and distracting sounds would be stopped in order that it may concentrate on those which truly matter.

Ultimately, this book is about sounds that matter. In order to reveal them it may be necessary to rage against those which don't. In Parts One and Two I will take the reader on a long excursion of soundscapes through history, with a heavy concentration on those of the Western world, though I will try to incorporate material from other parts of the world whenever it has been obtainable. In Part Three the soundscape will be subjected to critical analysis in preparation for Part Four, where the principles of acoustic design will be outlined—at least as far as they can be determined at the moment.

All research into sound must conclude with silence—a thought which must await its development in the final chapters. But the reader will clearly sense that this idea also links the first part of the book to the last, thus uniting an undertaking that is above all lyrical in character.

One final warning. Although I will at times be treating aural perception and acoustics as if they were abstractable disciplines, I do not wish to forget that the ear is but one sense receptor among many. The time has come to move out of the laboratory into the field of the living environment. Soundscape studies do this. But even they must be integrated into that wider study

of the total environment in this not yet best of all possible worlds.